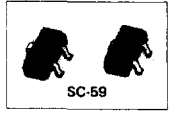


MINI MOLD

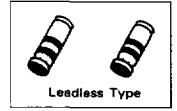


QUICK REFERENCE TABLE (Switching Diodes) □

V_R (V)	30	50	70	100
ANODE COMMON	1S2835	1S2836		
CATHODE COMMON	1S2837	1S2838		
SERIES			1SS123	
SINGLE			1SS220 1SS222	1SS221 1SS223
for VHF	1SS153			

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Leadless Type



QUICK REFERENCE TABLE (Switching Diodes) □

V_R (V)		30	50	70	100
SINGLE	GENERAL PURPOSE	LS953	LS954	LS955	
	HIGH SPEED	LS953	LS954	LS955	

QUICK REFERENCE GUIDE



MINI MOLD DEVICES

□ QUICK REFERENCE TABLE (Transistors and FETs)

V_{CE0} (V) I_C (mA)	15	20	30	40	50	60	80	120	200
10	2SC3663 (8 V, 5 mA)	2SK67A ¹⁾ 2SK238 ¹⁾							
20		2SC2223 2SC2758	2SC2755 2SK160 ¹⁾		2SK94 ¹⁾ 2SK160A ¹⁾ 2SK515 ¹⁾				
30	2SC3585 (10 V, 35 mA)	2SC2756		2SA1226	2SK425 ¹⁾ 2SK426 ¹⁾				
50	2SA1424 (-12 V) 2SA1462 2SC2757 2SC2759 2SC3545 2SC3583 (10 V, 65 mA) 2SK508 ¹⁾		2SC1009A 2SK520 ¹⁾					2SA811A 2SA1247 2SC1622A 2SC1653 (130 V) 2SC1654 (160 V) 2SC3115	
100	2SC2351 (70 mA) 2SC3356 (12 V)				2SA812 2SC1623 FA1[] FN1[]				2SA1330 2SC3360
150		2SA1411 (-25 V)			2SC3624 2SC3624A				
200	2SC3735 NTM2369	2SC1621		2SA1461 2SC3734 NTM3904 NTM3906					
300						2SB736 2SD780	2SB736A 2SD780A		
500				2SA1464 2SC3739					
700		2SB624 (-25 V) 2SD596 (25 V) FB1[] FP1[]					NTM2907A (-600 mA)		
1000		2SA1467 (-25 V) 2SC3742 (25 V)		NTM2222A (800 mA)					

¹⁾ V_{GD0}/I_D

MINI MOLD DEVICES



QUICK REFERENCE TABLE (Resistors built-in type Transistors) □

		R ₂					
		1.0 kΩ	4.7 kΩ	10 kΩ	22 kΩ	47 kΩ	—
R ₁	0.47 kΩ		FB1L2Q FP1L2Q				
	1.0 kΩ	FB1A3M FP1A3M		FA1A3Q FN1A3Q			
	2.2 kΩ			FB1F3P FP1F3P			
	3.3 kΩ			FB1J3P FP1J3P			
	4.7 kΩ		FA1L3M FN1L3M	FA1L3N FN1L3N FB1L3N FP1L3N			FA1L3Z FN1L3Z
	10 kΩ			FA1A4M FN1A4M FB1A4M FP1A4M		FA1A4P FN1A4P	FA1A4Z FN1A4Z
	22 kΩ				FA1F4M FN1F4M	FA1F4N FN1F4N	FA1F4Z FN1F4Z
	47 kΩ				FA1L4L FN1L4L	FA1L4M FN1L4M	FA1L4Z FN1L4Z
	—			FB1A4A FP1A4A			

QUICK REFERENCE GUIDE



POWER MINI MOLD

□ QUICK REFERENCE TABLE (Transistors)

V_{CE0} (V)	20	25	50	60	80	100	120	140	300
I_C (A)									
50 m								2SA1173 2SC2780	
200 m	2SC2954 (18 V, 150 mA) 2SC3357 (12 V, 100 mA)								2SC3554
300 m			2SC3617		2SB800 2SD1001				
0.7		2SC3618	2SB799 2SD1000			2SB805 2SD1006	2SB806 2SD1007		
1.0		2SB798 2SD999 2SK680 ¹⁾ (30 V)	2SA1463 2SB1115 2SC3736 2SD1815 2SD1702	2SB1115A 2SD1815A HD1[] HD2[] HR1[]	2SB804 2SD1005 2SD1699				
2.0	2SB1114 2SD1814 HC1[] HQ1[]	2SD1950							
3.0	2SB1301 2SD1952								

¹⁾ V_{DSS}/I_D

Darlington

□ QUICK REFERENCE TABLE (Resistors built-in type Transistors)

		R_2			
		1.0 k Ω	2.2 k Ω	4.7 k Ω	10 k Ω
R_1	0.22 k Ω		HC1F2Q HQ1F2Q HD1F2Q HD2F2Q HR1F2Q		
	0.47 k Ω	HC1L2N HQ1L2N		HC1L2Q HQ1L2Q HD1L2Q HD2L2Q HR1L2Q	
	1.0 k Ω	HC1A3M HQ1A3M HD1A3M HD2A3M HR1A3M			
	2.2 k Ω		HC1F3M HP1F3M		HC1F3P HQ1F3P HD1F3P HD2F3P HR1F3P
	4.7 k Ω				HD1L3N HD2L3N HR1L3N
	10 k Ω				HD1A4M HD2A4M HR1A4M
	-				HC1A4A HQ1A4A HD1A4A HD2A4A HR1A4A

QUICK REFERENCE GUIDE

MP-3



QUICK REFERENCE TABLE (Transistors)

V _{CEO} (V) I _C (A)	20	30	45	60	100	200	300	400	600
0.2							2SC2802		
0.5								2SA1400-Z 2SC3588-Z	
1.0				2SB963-Z 2SD1286-Z	2SK611-Z ¹⁾ 2SK654-Z				2SA1413-Z 2SC3632-Z
2.0	2SD1583-Z	2SD992-Z 2SJ132-Z 2SK738-Z		2SD1164-Z (1.5 A) 2SJ133-Z 2SK739-Z	2SJ128-Z ¹⁾ 2SK612-Z	2SB768 (150 V) 2SD1033 (150 V) 2SC2946(1)		2SA1412-Z 2SC3631-Z	
3.0		2SB962-Z	2SD1448-Z	2SB1261-Z 2SD1584-Z 2SD1899-Z					
5.0				2SA1385-Z 2SC3518-Z					
10	2SA1615-Z								

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1) V_{DSS}/I_D

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QUICK REFERENCE GUIDE



SUPER MINI MOLD

□ QUICK REFERENCE TABLE (Transistors and FETs)

$V_{CE0}(V)$ $I_C(mA)$	15	20	30	40	50	120	160
10	2SC4187* (8 V, 5 mA)						
20		2SC4178 2SC4183* (25 V)	2SK853 1)*		2SK852 1)		
30	2SC4186* (12 V) 2SC4228* (10 V, 35 mA)						
50	2SA1610 2SC4182* 2SC4184* 2SC4185* (14 V) 2SC4225* (12 V, 70 mA) 2SC4227* (10 V, 65 mA)		2SC4179			2SA1612 2SC4180	2SA1609* 2SC4174*
100	2SC4226* (12 V)				2SA1611 2SC4177 GA1[] GN1[]		
150		2SA1613 (25 V)			2SC4181		
200	2SC4176	2SC4175					
500				2SA1608 2SC4173			

1) V_{GD0}/I_D

* Under Development

□ QUICK REFERENCE TABLE (Resistors built-in type Transistors)

		R_2				
		4.7 k Ω	10 k Ω	22 k Ω	47 k Ω	-
R_1	1.0 k Ω		GA1A3Q GN1A3Q			
	4.7 k Ω	GA1L3M GN1L3M	GA1L3N GN1L3N			GA1L3Z GN1L3Z
	10 k Ω		GA1A4M GN1A4M		GA1A4P GN1A4P	GA1A4Z GN1A4Z
	22 k Ω			GA1F4M GN1F4M	GA1F4N GN1F4N	GA1F4Z GN1F4Z
	47 k Ω			GA1L4L GN1L4L	GA1L4M GN1L4M	GA1L4Z GN1L4Z

MINI MOLD



SC-59

JAPANESE STANDARD PACKAGES (SC-59) □

● Switching Diodes

Type No.	Mark	Structure	Application	Absolute Maximum Ratings (T _a = 25 °C)						Electrical Characteristics (T _a = 25 °C)							Page		
				V _{RM} (V)	V _R (V)	I _{FSM} (A)	I _{FM} (mA)	I _O (mA)	T _J (°C)	V _{F1} (V) I _F = 10 mA MAX.	V _{F2} (V) I _F = 50 mA MAX.	V _{F3} (V) I _F = 100 mA MAX.	I _R (μA) MAX. / V _R (V)	C (pF) MAX. / V _R	t _{rr} (ns) MAX.	Note			
1S2835	A3	Double	High Speed Switching	35	30					1.0	1.1	1.2	0.1/30	4.0/0 V	4.0	t _{rr} : I _F = 10 mA V _R = 6.0 V R _L = 100 Ω t _{rr} = 0.1 t _F	83		
1S2836	A4			75	50	6.0*	450*	150*	0.1/50				83						
1S2837	A5			35	30	4.0	300	100	0.1/30				86						
1S2838	A6			75	50				0.1/50				86						
1S5123	A7	Series	High Speed Switching	70	70			100		0.855	1.1	1.3	1.0/70	4.0/0 V	9.0	t _{rr} : I _F = 10 mA I _F = 10 mA R _L = 100 Ω t _{rr} = 0.1 t _F	89		
1S5153	A9	Single	Band Switch	35	35			100	125			1.1	0.05/30	1.8/15 V		t _F : 0.6 t _{MAX.}	92		
1S5220	A13		70	70								0.1/70	4.0/0 V	3.0	t _{rr} : I _F = 10 mA V _R = 6.0 V R _L = 100 Ω t _{rr} = 0.1 t _F	94			
1S5221	A14		High Speed Switching	100	100			2.0	300	100	150	0.85				1.0	1.2	0.1/100	94
1S5222	A15		70	70								0.1/70				96			
1S5223	A16		100	100								0.1/100				96			

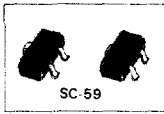
* Total Current

● Transistors

Type No.	Polarity	Application	Absolute Maximum Ratings (T _a = 25 °C)						Electrical Characteristics (T _a = 25 °C)							Page	
			V _{CEO} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (mA)	P _T (mW)	T _J (°C)	Class & Marking	h _{FE} Range	V _{CE} (V)	I _C (mA)	V _{CE(sat)} (mV) TYP.	f _T (MHz) TYP.	C _{ob} (pF) TYP.		Note
2SA811A	PNP	Audio Frequency High Gain Amplifier	-120	-120	-5.0	-50	200	150	C15	135 to 270	-6.0	-1.0	-90	90	2.0		107
									C16	200 to 400							
									C17	300 to 600							
									C18	450 to 900							
2SA812	PNP	Audio Frequency Amplifier	-60	-50	-5.0	-100	150	125	M4	90 to 180	-6.0	-1.0	-180	180	4.5		110
									M5	135 to 270							
									M6	200 to 400							
									M7	300 to 600							
2SA1226	PNP	High Frequency Amplifier	-40	-40	-5.0	-30	200	150	E2	40 to 80	-10	-1.0	-90	400	1.1	NF = 3.5 dB f = 1 MHz	116
									E3	60 to 120							
									E4	90 to 180							
									C25	135 to 270							
2SA1247	PNP	Audio Frequency Low Noise Amplifier	-120	-120	-5.0	-50	200	150	C26	200 to 400	-6.0	-1.0	-90	100	2.0		
									C27	300 to 600							
									C28	450 to 900							
									C5	90 to 180							
2SA1330	PNP	High Voltage Amplifier	-200	-200	-5.0	-100	200	150	O6	135 to 270	-10	-10	-100	130	4.0		119
									O7	200 to 450							
									M15	500 to 1000							
									M16	800 to 1600							
2SA1411	PNP	Audio Frequency High Gain Amplifier	-25	-25	-10	-150	200	150			-5.0	-1.0	-150	200	4.6	t _{stg} = 0.58 μs	128
2SA1424	PNP	Microwave Low Noise Amplifier	-20	-12	-3.0	-50	200	150	R52	20 to 200	-10	-15		4 GHz	1.5	NF = 3.0 dB (1 GHz)	
2SA1461	PNP	High Frequency Amplifier, Switching	-40	-40	-5.0	-200	200	150	Y22	75 to 150	-1.0	-10	-100	510	2.5	t _{stg} = 110 ns	137
									Y23	100 to 200							
									Y24	150 to 300							
2SA1462	PNP	High Speed Switching	-15	-15	-4.5	-50	200	150	Y33	50 to 100	-1.0	-10	-90	1800	2.0	t _{stg} = 16 ns	141
									Y34	75 to 150							
2SA1464	PNP	High Frequency Amplifier, Switching	-60	-40	-5.0	-500	200	150	Y12	75 to 150	-2.0	-150	-450	400	5.0	t _{stg} < 225 ns	148
									Y13	100 to 200							
									Y14	150 to 300							
2SA1467	PNP	Audio Frequency Amplifier	-30	-25	-5.0	1 A	200	150	S11	110 to 180	-1.0	-60	-200	100	10		
									S12	135 to 220							
									S13	170 to 270							
									S14	200 to 320							
									S15	250 to 400							

(to be continued)

QUICK REFERENCE GUIDE



MINI MOLD

□ JAPANESE STANDARD PACKAGES (SC-59)

• Transistors

(Continued)

Type No.	Polarity	Application	Absolute Maximum Ratings (T _a =25°C)						Electrical Characteristics (T _a =25°C)							Page	
			V _{CEO} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (mA)	P _T (mW)	T _J (°C)	Class & Marking	hFE Range	V _{CE} (V)	I _C (mA)	V _{CE(sat)} (mV) TYP.	f _T (MHz) TYP.	C _{ob} (pF) TYP.		Note
2SB624	PNP	Audio Frequency Amplifier	-30	-25	-5.0	-700	200	150	BV1	110 to 180	-1.0	-100	-250	160	17		171
									BV2	135 to 220							
									BV3	170 to 270							
									BV4	200 to 320							
									BV5	250 to 400							
2SB738/ 2SB736A	PNP	Audio Frequency Amplifier	-60/ -80	-60/ -80	-5.0	-300	200	150	BW1/B51	110 to 180	-1.0	-50	-150	100	13		174
									BW2/B52	135 to 220							
									BW3/B53	170 to 270							
									BW4/B54	200 to 320							
									BW5/B55	250 to 400							
2SC1009A	NPN	High Frequency Amplifier, Oscillator, Mixer and Converter	50	30	5.0	30	150	125	FA3	60 to 120	6.0	1.0	80	250	1.9	NF = 2.0 dB f = 1.0 MHz	214
									FA4	90 to 180							
2SC1621	NPN	High Speed Switching	25	20	5.0	200	150	125	B2	40 to 80	0.5	1.0	130	500	3.0	t _{stg} < 20 ns	218
									B3	60 to 120							
									B4	90 to 180							
									D15	135 to 270							
2SC1622A	NPN	Audio Frequency High Gain Amplifier	120	120	5.0	50	200	150	D16	200 to 400	6.0	1.0	70	110	1.6		222
									D17	300 to 600							
									D18	450 to 900							
									L4	90 to 180							
2SC1623	NPN	Audio Frequency, Intermediate Frequency (AM) Amplifier	60	50	5.0	100	150	125	L5	135 to 270	6.0	1.0	150	250	3.0		225
									L6	200 to 400							
									L7	300 to 600							
									N2	90 to 180							
2SC1853	NPN	High Voltage Switching	150	130	5.0	50	150	125	N3	135 to 270	3.0	15	100	120	2.3		228
									N4	200 to 400							
									N5	90 to 180							
									N6	135 to 270							
2SC1854	NPN	High Voltage Switching	180	160	5.0	50	150	125	N7	200 to 400	3.0	15	100	120	2.3		229
									F12	40 to 80							
									F13	60 to 120							
2SC2223	NPN	High Frequency Amplifier	30	20	4.0	20	150	125	F14	90 to 180	6.0	1.0	100	600	1.0	NF = 3.0 dB f = 100 MHz	232
									R2	40 to 120							
									R3	100 to 200							
2SC2351	NPN	Microwave Low Noise Amplifier	25	12	3.0	70	200	150	T12	80 to 120	10	20	-	4500	0.75	NF = 1.5 dB (1 GHz)	235
									T13	90 to 180							
									T14	120 to 240							
2SC2755	NPN	VHF Tuner/RF Amp.	30	30	5.0	20	150	125	T22	60 to 120	10	3.0	-	600	(C _{ob}) 0.3		238
									T23	90 to 180							
									T24	120 to 240							
2SC2756	NPN	VHF Tuner/MIX.	30	20	4.0	30	150	125	T32	80 to 120	10	5.0	-	850	(C _{re}) 0.35		242
									T33	90 to 180							
									T34	120 to 240							
2SC2757	NPN	VHF Tuner/MIX., OSC; UHF Tuner/OSC.	30	15	5.0	50	150	125	T32	80 to 120	10	5.0	-	1100	1.3		246
									T33	90 to 180							
									T34	120 to 240							
2SC2758	NPN	UHF Tuner/RF Amp., MIX.	30	25	4.0	20	150	125	U12	AGC -8 to -10	P _G = -30 dB	-	1000	0.6		249	
									U13	AGC -9 to -11							
									U14	60 to 240							
									U21	40 to 80							
2SC2759	NPN	UHF Tuner/MIX., OSC.	30	14	3.0	50	150	125	U22	60 to 120	10	5	-	2000	1.0		253
									U23	90 to 180							
									D25	135 to 270							
2SC3115	NPN	Audio Frequency Low Noise Amplifier	120	120	5.0	50	200	150	D26	200 to 400	6.0	1.0	70	110	1.6		
									D27	300 to 600							
									D28	450 to 900							

(to be continued)

MINI MOLD



SC-59

JAPANESE STANDARD PACKAGES (SC-59) □

• Transistors

(Continued)

Type No.	Polarity	Application	Absolute Maximum Ratings (T _a =25°C)						Electrical Characteristics (T _a =25°C)								Page	
			V _{CB0} (V)	V _{CEO} (V)	V _{EB0} (V)	I _C (mA)	P _T (mW)	T _J (°C)	Class & Marking	h _{FE} Range	V _{CE} (V)	I _C (mA)	V _{CE(sat)} (mV) TYP.	f _T (MHz) TYP.	C _{ob} (pF) TYP.	Note		
2SC3358	NPN	Microwave Low Noise Amplifier	25	12	3.0	80	150	150	R22	50 to 250	10	20	—	6500	0.7	NF = 1.1 dB (1 GHz)	271	
2SC3360		High Voltage Amplifier	200	200	5.0	100	200	150	N15	90 to 180	10	10	—	180	3.4		279	
2SC3545		UHF Tuner MIX., OSC.		30	15	3.0	50	150	150	T42	40 to 80	10	5.0	500 (MAX.)	1800	0.45 (C _{re})		286
										T43	80 to 120							
										T44	100 to 200							
2SC3583		Microwave Low Noise Amplifier	20	10	1.5	85	200	150	R32	50 to 300	8	20	—	9 GHz	0.35 (C _{re})	NF = 1.2 dB (1 GHz)	293	
2SC3585		Microwave Low Noise Amplifier	20	10	1.5	35	200	150	R42	50 to 250	6	10	—	10 GHz	0.30 (C _{re})	NF = 1.8 dB (2 GHz)	297	
2SC3624/ 2SC3624A		Audio Freq. High Gain Amplifier	-60	-50	-12/-15	150	200	150	L17/L15	1000 to 2000	5.0	1.0	70	250	3.0	t _{stg} = 0.7 μs	311	
L18/L16		1600 to 3200																
2SC3663		High Frequency Low Noise Amplifier	15	8	2	5	50	150	R62	50 to 250	1.0	0.25	—	4000	0.4	NF = 3.0 dB (1 GHz)		
2SC3734		High Frequency Amplifier, Switching	60	40	6.0	200	200	150	B22	75 to 150	1.0	10	120	510	3.0	t _{stg} = 100 ns	322	
2SC3735		High Speed Switching	40	15	5.0	200	200	150	B23	100 to 200								
									B24	150 to 300								
2SC3739		High Frequency Amplifier, Switching	60	40	5.0	500	200	150	B33	40 to 80	1.0	10	150	750	1.8	t _{stg} = 6 ns	326	
									B34	60 to 120								
2SC3742		Audio Frequency Amplifier	30	25	5.0	1 A	200	150	B35	100 to 200	2.0	150	250	400	3.5	t _{stg} < 225 ns	329	
									B12	75 to 150								
									B13	100 to 200								
									B14	150 to 300								
	P11								110 to 180									
	P12								135 to 220									
	P13								170 to 270									
	P14								200 to 320									
	P15								250 to 400									
	T52								60 to 120									
2SC3827	UHF Tuner/OSC.	30	15	4.0	20	200	125	T53	100 to 200	10	5.0	100	1300	0.8		333		
T54	140 to 250																	
T62	40 to 80																	
2SC3841	UHF Tuner/MIX., OSC.	25	12	3.0	30	200	150	T63	60 to 120	10	5.0	90	4000	0.85		337		
T64	100 to 200																	
DV1	110 to 180																	
2SD596	Audio Frequency Amplifier	30	25	5.0	700	200	150	DV2	135 to 220	1.0	100	200	170	12		370		
								DV3	170 to 270									
								DV4	200 to 320									
								DV5	250 to 400									
								DW1/D51	110 to 180									
2SD780/ 2SD780A	Audio Frequency Amplifier	60/ 80	60/ 80	5.0	300	200	150	DW2/D52	135 to 220	1.0	50	150	140	7.0		373		
								DW3/D53	170 to 270									
								DW4/D54	200 to 320									
								DW5/D55	250 to 400									
NTM-2222A	NPN	General Purpose Amplifier, High Speed Switching	75	40	6.0	800	200	150	815	100 to 300	10	150	300 (MAX.) [C=150 mA I _B =15 mA]	300 (MIN.)	8.0 (MAX.)	t _{stg} < 225 ns	602	
NTM-2369		High Speed Switching	40	15	4.5	200	200	150	B32	40 to 120	1.0	10	450 (MAX.) [C=100 mA I _B =10 mA]	500 (MIN.)	4.0 (MAX.)	t _{stg} < 18 ns	607	

** Under development

(to be continued)

2

QUICK REFERENCE GUIDE



MINI MOLD

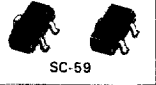
□ JAPANESE STANDARD PACKAGES (SC-59)

• Transistors

(Continued)

Type No.	Polarity	Application	Absolute Maximum Ratings (T _g =25 °C)					Electrical Characteristics (T _g =25 °C)									
			V _{CB0} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (mA)	P _T (mW)	T _j (°C)	Class & Marking	^h f _{FE} Range	V _{CE} (V)	I _C (mA)	V _{CE(sat)} (mV) TYP.	f _T (MHz) TYP.	C _{ob} (pF) TYP.	Notes	Page
NTM-2907A	PNP	General Purpose Amplifier, High Speed Switching	-60	-60	-5.0	-600	200	150	Y15	100 to 300	-10	-150	-400 (MAX.) -150 mA I _B = -15 mA	200 (MIN.)	8.0 (MAX.)	t _{stg} < 80 ns	611
NTM-3904	NPN	General Purpose Switching and Amplifier	60	40	6.0	200	200	B25	100 to 300	1.0	10	200 (MAX.) I _C = 10 mA I _B = 10 mA	300 (MIN.)	4.0 (MAX.)	t _{stg} < 200 ns	616	
NTM-3908	PNP	General Purpose Switching and Amplifier	-40	-40	-5.0	-200	200	Y25	100 to 300	-1.0	-10	-250 (MAX.) I _C = -10 mA I _B = -1.0 mA	250 (MIN.)	4.5 (MAX.)	t _{stg} < 225 ns	621	

MINI MOLD



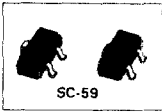
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NEC STANDARD PACKAGES (SC-59) □

● Resistors Built-in Type Transistors

Type No.	Connection Diagram/Application	Absolute Maximum Ratings (T _a = 25 °C)						Electrical Characteristics (T _a = 25 °C)						Page
		V _{CB0} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (mA)	P _T (mW)	T _J (°C)	Class Marking	R ₁ (kΩ)	R ₂ (kΩ)	h _{FE} Range	V _{CE} (V)	I _C (mA)	
FA1L4L		60	50	15	100	200	150	L30	47	22	60 to 195	5.0	5.0	549
FA1L4M		60	50	10	100	200	150	L31	47	47	85 to 340	5.0	5.0	552
FA1F4M		60	50	10	100	200	150	L32	22	22	60 to 195	5.0	5.0	570
FA1A4M		60	50	10	100	200	150	L33	10	10	35 to 100	5.0	5.0	522
FA1A4P		60	50	5.0	100	200	150	L34	10	47	85 to 340	5.0	5.0	525
FA1F4N		60	50	5.0	100	200	150	L35	22	47	85 to 340	5.0	5.0	534
FA1L3Z		60	50	5.0	100	200	150	L36 L37 L38	4.7	∞	135 to 270 200 to 400 300 to 600	5.0	5.0	546
FA1L4Z		60	50	5.0	100	200	150	L61 L62 L63	47	∞	135 to 270 200 to 400 300 to 600	5.0	5.0	555
FA1F4Z		60	50	5.0	100	200	150	L64 L65 L66	22	∞	135 to 270 200 to 400 300 to 600	5.0	5.0	537
FA1A4Z		60	50	5.0	100	200	150	L67 L68 L69	10	∞	135 to 270 200 to 400 300 to 600	5.0	5.0	528
FA1L3M		60	50	10	100	200	150	L81	4.7	4.7	20 to 80	5.0	5.0	540
FA1L3N		60	50	5.0	100	200	150	L82	4.7	10	35 to 100	5.0	5.0	543
FA1A3Q		60	50	5.0	100	200	150	L83	1.0	10	35 to 100	5.0	5.0	579
FN1L4L			-60	-50	-15	-100	200	150	M30	47	22	60 to 195	-5.0	-5.0
FN1L4M	-60		-50	-10	-100	200	150	M31	47	47	85 to 340	-5.0	-5.0	491
FN1F4M	-60		-50	-10	-100	200	150	M32	22	22	60 to 195	-5.0	-5.0	570
FN1A4M	-60		-50	-10	-100	200	150	M33	10	10	35 to 100	-5.0	-5.0	561
FN1A4P	-60		-50	-5.0	-100	200	150	M34	10	47	85 to 340	-5.0	-5.0	564
FN1F4N	-60		-50	-5.0	-100	200	150	M35	22	47	85 to 340	-5.0	-5.0	573
FN1L3Z	-60		-50	-5.0	-100	200	150	M36 M37 M38	4.7	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0	585
FN1L4Z	-60		-50	-5.0	-100	200	150	M61 M62 M63	47	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0	594
FN1F4Z	-60		-50	-5.0	-100	200	150	M64 M65 M66	22	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0	576
FN1A4Z	-60		-50	-5.0	-100	200	150	M67 M68 M69	10	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0	567
FN1L3M	-60		-50	-10	-100	200	150	M81	4.7	4.7	20 to 80	-5.0	-5.0	579
FN1L3N	-60		-50	-5.0	-100	200	150	M82	4.7	10	35 to 100	-5.0	-5.0	582
FN1A3Q	-60		-50	-5.0	-100	200	150	M83	1.0	10	35 to 100	-5.0	-5.0	558

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MINI MOLD

□ NEC STANDARD PACKAGES (SC-59)

Type No.	Connection Diagram/Application	Absolute Maximum Ratings (T _a =25 °C)					Electrical Characteristics (T _a =25 °C)						Page	
		V _{CBO} (V)	V _{CEO} (V)	V _{EBO} (V)	I _C (A)	P _T (mW)	T _J (°C)	Class Marking	R ₁ (kΩ)	R ₂ (kΩ)	hFE Range	V _{CE} (V)		I _C (mA)
FB1A3M*	<p>Switching</p>	30	25	10	0.7	200	150	P32	1.0	1.0	100 to	2.0	500	—
FB1F3P*		30	25	10	0.7	200	150	P33	2.2	10	300 to	2.0	500	—
FB1J3P*		30	25	10	0.7	200	150	P36	3.3	10	300 to	2.0	500	—
FB1L3N*		30	25	10	0.7	200	150	P34	4.7	10	300 to	2.0	500	—
FB1A4M*		30	25	10	0.7	200	150	P35	10	10	300 to	2.0	500	—
FB1A4A*		30	25	10	0.7	200	150	P30	—	10	300 to	2.0	500	—
FB1L2Q*	30	25	10	0.7	200	150	P31	0.47	4.7	300 to	2.0	500	—	
FP1A3M*	<p>Switching</p>	-30	-25	-10	-0.7	200	150	S32	1.0	1.0	100 to	-2.0	-500	—
FP1F3P*		-30	-25	-10	-0.7	200	150	S33	2.2	10	100 to	-2.0	-500	—
FP1J3P*		-30	-25	-10	-0.7	200	150	S36	3.3	10	100 to	-2.0	-500	—
FP1L3N*		-30	-25	-10	-0.7	200	150	S34	4.7	10	100 to	-2.0	-500	—
FP1A4M*		-30	-25	-10	-0.7	200	150	S35	10	10	100 to	-2.0	-500	—
FP1A4A*		-30	-25	-10	-0.7	200	150	S30	—	10	100 to	-2.0	-500	—
FP1L2Q*	-30	-25	-10	-0.7	200	150	S31	0.47	4.7	100 to	-2.0	-500	—	

* Under development

MINI MOLD



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JAPANESE STANDARD PACKAGES (SC-59) □

● FETs

Type No.	Polarity & Structure	Application	Absolute Maximum Ratings (T _a =25°C)					Electrical Characteristics (T _a =25°C)							Page																
			V _{GD0} (V)	V _{GS0} (V)	I _D (mA)	P _r (mW)	T _j (°C)	Class & Marking	I _{DSS} Range (mA)	V _{DS} (V)	V _{GS} (V)	V _{GS(off)} (V) TYP.	V _{TS} (mS) TYP.	C _{iss} (pF) TYP.		Note															
2SK67A		ECM Impedance Converter	-20		10	80	100	J2	20 to 40 μA	5.0	0	-0.8 (MAX.)	1.5	5.5		438															
								J3	35 to 70 μA																						
								J4	60 to 120 μA																						
								J5	100 to 200 μA																						
								J6	150 to 300 μA																						
								J7	270 to 540 μA																						
								2SK94									Audio Frequency Amplifier	-50	-50	20	150	125	X2	1.0 to 3.0	10	0	-0.5	12	13	C _{iss} =2.6 pF	441
X3	2.0 to 6.0																														
X4	4.0 to 12																														
K4/K24	0.5 to 1.5																														
2SK160/ 2SK160A		Audio and High Frequency Amplifier	-30/ -50	-30/ -50	20	150	125	K5/K25	1.0 to 3.0	5.0	0	-1.1	4.1	4.1	C _{iss} =0.9 pF	444															
								K6/K26	2.0 to 6.0																						
								K7/K27	4.0 to 12																						
2SK238		High Frequency Amplifier	-20	20 (V _{DSX}) V _{GS} * -2.5 V	10	150	125	K14	0.5 to 1.5	5.0	0	-2.5 (MAX.)	3.5	4.5	C _{iss} =0.07 pF	448															
								K15	1.0 to 3.0																						
								K16	2.0 to 6.0																						
								K17	4.0 to 8.0																						
								X11	1.0 to 4.0																						
2SK425	Silicon N-channel Junction	Audio Frequency Amplifier	-50	-50	30	150	150	X12	3.0 to 6.0	10	0	-1.2 (MAX.)	9.0	13	C _{iss} =3.2 pF	450															
								X13	5.0 to 8.0																						
								X14	7.0 to 10																						
								X15	9.0 to 12																						
								X16	11 to 14																						
								X17	13 to 16																						
								X18	15 to 18																						
								2SK426									Audio Frequency Amplifier	-50	-50	30	200	150	X21	1.0 to 4.0	10	0	-1.2 (MAX.)	9.0	13	C _{iss} =3.2 pF	
																							X22	3.0 to 6.0							
X23	5.0 to 8.0																														
X24	7.0 to 10																														
X25	9.0 to 12																														
X26	11 to 14																														
X27	13 to 16																														
X28	15 to 18																														
2SK508		High Frequency Amplifier	-15	-15	50	200	150	K51	10 to 20	5.0	0	-1.4	26	4.8	C _{iss} =1.6 pF	453															
								K52	15 to 30																						
								K53	25 to 50																						
2SK515		Audio Frequency Amplifier	-50	-50	20	150	125	X31	1.0 to 2.0	5.0	0	-1.7	4.1	6.0	C _{iss} =1.5 pF	455															
								X32	1.5 to 3.0																						
								X33	2.5 to 5.0																						
								X34	4.0 to 8.0																						
								X35	6.0 to 12																						
2SK520		High Frequency Amplifier	-30	-30	50	200	150	K41	30 to 50	10	0	-4.0	28	6.0	C _{iss} =2.0 pF	458															
								K42	45 to 65																						
								K43	60 to 80																						
								K44	75 to 95																						
								K45	90 to 110																						

QUICK REFERENCE GUIDE



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MINI MOLD

NEC STANDARD PACKAGES (SC-59)

• PUTs

Type No.	Mark	Application	Maximum Ratings ($T_a = 25^\circ\text{C}$)						Electrical Characteristics ($T_a = 25^\circ\text{C}$)					Page	
			V_{GKF} (V)	V_{CKR} (V)	V_{AK} (V)	I_T (mA)	P_T (mW)	T_j ($^\circ\text{C}$)	T_{stg} ($^\circ\text{C}$)	I_p (μA)	V_T (V)		I_V (μA)		V_I (V) ($\phi_I = 50\text{ mA}$)
											MIN.	MAX.			
U71	71	Hybrid IC Thyristor trigger Timing circuits	40	5	+40	100	150	+125	-80 to +125	2	0.2	1.6	50	1.5	—
U71	72										0.15	0.2			

• Zener Diodes

Type No.	Suffix	Mark	Application	Maximum Ratings ($T_a = 25^\circ\text{C}$)			Electrical Characteristics ($T_a = 25^\circ\text{C}$)							Page		
				P (mW)	T_j ($^\circ\text{C}$)	T_{stg} ($^\circ\text{C}$)	V_Z^* (V)		Z_z^{**} (Ω) MAX.	I_Z (mA)	Z_z^{**} (Ω) MAX.	I_Z (mA)	I_R (μA) MAX.		ϕ_{VR} (V)	
							MIN.	MAX.								
RD2.0M	B	Example RD2.4M B1 241	200	+150	-85 to +150	1.90	2.20	5	100	5	120	0.5	640			
RD2.2M	B					2.10	2.40							100	120	0.7
RD2.4M	B					2.30	2.60							100	120	1.0
RD2.7M	B					2.50	2.90							110	120	1.0
RD3.0M	B					2.80	3.20							120	50	1.0
RD3.3M	B					3.10	3.50							130	20	1.0
RD3.6M	B					3.40	3.80							130	10	1.0
RD3.9M	B					3.70	4.10							130	10	1.0
RD4.3M	B					4.01	4.48							130	10	1.0
RD4.7M	B					4.42	4.90							130	10	1.0
RD5.1M	B	4.84	5.37	130	5	1.5										
RD5.6M	B	5.31	5.92	80	5	2.5										
RD6.2M	B	5.86	6.53	50	2	3.0										
RD6.8M	B	6.47	7.14	30	2	3.5										
RD7.5M	B	7.06	7.84	30	2	4.0										
RD8.2M	B	7.76	8.64	30	2	5.0										
RD9.1M	B	8.56	9.55	30	2	6.0										
RD10M	B	9.45	10.55	30	2	7.0										
RD11M	B	10.44	11.56	30	2	8.0										
RD12M	B	11.42	12.60	35	2	9.0										
RD13M	B	12.47	13.96	35	2	10										
RD15M	B	13.84	15.52	40	2	11										
RD16M	B	15.37	17.09	40	2	12										
RD18M	B	16.94	19.03	45	2	13										
RD20M	B	18.86	21.08	50	2	15										
RD22M	B	20.88	23.17	55	2	17										
RD24M	B	22.93	25.57	80	2	19										
RD27M	B	25.10	28.90	70	2	21										
RD30M	B	28.00	32.00	80	2	23										
RD33M	B	31.00	35.00	80	2	25										
RD36M	B	34.00	38.00	2	2	27										
RD39M	B	37.00	41.00	100	2	30										
RD43M	B	40.0	45.0	130	2	33										
RD47M	B	44.0	49.0	150	2	36										

* Tested with pulse (40 ms)

** Z_z is measured at I_Z by given a very small AC current signal.

*** Each suffix B is classified into B1 to B3.

MINI MOLD



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NEC STANDARD PACKAGES (SC-59)

● Silicon Bilateral Switch

Type No.	Mark	Application	Maximum Ratings (T _a = 25 °C)				Electrical Characteristics (T _a = 25 °C)					Page	
			I _T (mA)	P _T (mW)	T _J (°C)	T _{stg} (°C)	V _S (V)		I _S (μA)	JVS (V)	I _H (mA)		V _T (V) (@I _T = 100 mA)
							MIN.	MAX.					
N213	SB	Hybrid IC Thyristor trigger	100	135	+125	-55 to +125	7	9	200	0.5	1.5	1.3	-

2

POWER MINI MOLD



SOT-89

PRO ELECTRON'S STANDARD TYPE NUMBERS (Transistors)

Type No.	Polarity	Application	Absolute Maximum Ratings (T _a = 25 °C)						Electrical Characteristics (T _a = 25 °C)										Complements to	Page																
			V _{CB0} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (A)	P _T * (W)	T _J (°C)	hFE Range		V _{CE(sat)} (mV)			f _T (MHz)																						
									Class & Marking	V _{CE} (V)	I _C (A)	TYP.	I _C (A)	I _B (A)	TYP.	V _{CE} (V)	I _E (mA)																			
BCX51	PNP	Audio Frequency Amplifier	-45	-45	-5.0	-1.0	2.0	150	AB	40 to 100	-2.0	-0.15	-290	-0.5	-50 m	80	-5.0	10	BCX54	507																
BCX52			AC	60 to 160	AD	100 to 250	AF	40 to 100	AG	60 to 160											AJ	40 to 100	AK	60 to 160	BB	40 to 100	BC	60 to 160	BD	100 to 250						
BCX53			AD	100 to 250	AF	40 to 100	AG	60 to 160	AJ	40 to 100											AK	60 to 160	BB	40 to 100	BC	60 to 160	BD	100 to 250	BF	40 to 100	BG	60 to 160	BJ	40 to 100	BK	80 to 160
BCX54	NPN	Audio Frequency Amplifier	45	45	5.0	1.0	2.0	150	BC	60 to 160	2.0	0.15	150	0.5	50 m	160	5.0	-10	BCX51	510																
BCX55			BF	40 to 100	BG	60 to 160	BJ	40 to 100	BK	80 to 160	2.0	0.15	150	0.5	50 m	160	5.0	-10	BCX52	510																
BCX56			AG	60 to 160	AJ	40 to 100	AK	60 to 160	BB	40 to 100	BC	60 to 160	BD	100 to 250	BF	40 to 100	BG	60 to 160	BJ	40 to 100	BK	80 to 160	CB	85 to 170	CC	120 to 240	CD	190 to 375	DB	85 to 170	DC	120 to 240	DD	190 to 375		
BCX58	PNP	Audio Frequency Power Amplifier	25	20	5.0	1.0	2.0	150	CC	120 to 240	1.0	0.5	210	1.0	0.1	130	5.0	-10	BCX69	513																
BCX69			DD	190 to 375	DB	85 to 170	DC	120 to 240	DD	190 to 375	-1.0	-0.5	250	-1.0	-0.1	110	-5.0	10	BCX68	516																

* With 2.5 cm² x 0.7 mm Ceramic Substrate

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POWER MINI MOLD

☐ JAPANESE STANDARD TYPE NUMBERS

• Transistors

Type No.	Polarity	Application	Absolute Maximum Ratings (T _a =25°C)						Electrical Characteristics (T _a =25°C)										Complements to	Page														
			V _{CEO} (V)	V _{CEO} (V)	V _{BE0} (V)	I _C (A)	P _T * (W)	T _j (°C)	Class & Marking	hFE Range	V _{CE(sat)} (mV)			f _T (MHz)																				
											V _{CE} (V)	I _C (A)	TYP.	I _C (A)	I _B (A)	TYP.	V _{CE} (V)	I _E (mA)																
2SA1173	PNP	Audio Frequency Amplifier	-140	-140	-5.0	-50 m	2.0	150	PM 90 to 180	-10	-10 m	-180	-20 m	-20 m	80	-10	10	2SC2780	113															
		PL 135 to 270																																
		PK 200 to 400																																
2SA1463		High Speed Switching	-60	-45	-5.0	-1.0	2.0	150	1L 60 to 120	-10	-50 m	-260	-0.5	-50 m	400	-10	100	2SC3736	144															
		1K 100 to 200																																
		DM 90 to 180																																
2SB798		Audio Frequency Power Amplifier	-30	-25	-5.0	-1.0	2.0	150	DL 135 to 270	-1.0	-0.1	-250	-1.0	-0.1	110	-6.0	10	2SD999	180															
									DK 200 to 400																									
									MM 90 to 180																									
2SB799									ML 135 to 270																									
									MK 200 to 400																									
2SB800		Audio Frequency Amplifier	-80	-80	-5.0	-0.3	2.0	150	FM 90 to 180	-1.0	-50 m	-300	-0.3	-30 m	100	-6.0	10	2SD1001	186															
									FL 135 to 270																									
									FK 200 to 400																									
2SB804									AN 90 to 180																									
	AV 135 to 270																																	
	AU 200 to 400																																	
2SB805	-100								-100											-5.0	-1.0	2.0	150	KM 90 to 180	-1.0	-0.1	-220	-0.5	-50 m	75	-10	-10	2SD1006	192
																								KL 135 to 270										
																								KK 200 to 400										
																								KR 90 to 180										
2SB806	-120								-120											-5.0	-0.7	2.0	150	KQ 135 to 270	-1.0	-0.1	-220	-0.5	-50 m	75	-10	10	2SD1007	182
		KP 200 to 400																																
		ZM 135 to 270																																
		ZL 200 to 400																																
2SB1114	Audio Frequency Amplifier	-20	-20	-6.0	-2.0	2.0	150	ZK 300 to 600	-2.0	-0.1	-300	-1.5	-60 m	180	-10	50	2SD1614	261																
								YM/YQ 135 to 270																										
2SB1115/2SB1115A								YL/YP 200 to 400																										
								YK/- 300 to 600																										
								ZR 135 to 270																										
								ZO 200 to 400																										
								ZP 300 to 600																										
2SB1301	-20	-16	-6.0	-3.0	2.0	150	NM 90 to 180	-2.0	-0.1	-280	-2.0	-0.1	140	-10	50	2SD1962	211																	
							NL 135 to 270																											
							NK 200 to 400																											
2SC2780							140											140	5.0	50 m	2.0	150	NL 135 to 270	10	10 m	70	20 m	2.0 m	120	10	-10	2SA1173	257	
							NK 200 to 400																											
2SC2954							High Frequency Wideband Amplifier											35	18	3.0	0.15	2.0	150	RK 30 to 200	10	0.05	-	-	-	4000	10	-50	-	267
2SC3357							High Frequency Low Noise Amplifier											20	12	3.0	0.1	2.0	150	QK 50 to 300	10	0.02	-	-	-	6500	10	-20	-	275
2SC3554							High Voltage Amplifier											300	300	5.0	0.2	2.0	150	SM 60 to 120	10	10 m	150	50 m	50 m	50	30	-10	-	280
							SL 100 to 200																											
							SK 160 to 250																											
2SC3617	Audio Frequency High Gain Amplifier	50	50	15	0.3	2.0	150	TM 800 to 1600	5.0	0.1	120	0.1	10 m	220	5	-50	-	305																
	TL 1200 to 2400																																	
	TK 2000 to 3200																																	

* With 2.5 cm² × 0.7 mm Ceramic Substrate

(to be continued)

POWER MINI MOLD



JAPANESE STANDARD TYPE NUMBERS □

• Transistors

(Continued)

Type No.	Polarity	Application	Absolute Maximum Ratings (T _a =25 °C)					Electrical Characteristics (T _a =25 °C)										Complements to	Page	
			V _{CEO} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (A)	P _T (W)	T _j (°C)	Class & Marking	h _{FE} Range	V _{CE} (V)	I _C (A)	V _{CE(sat)} (mV)			f _T (MHz)				
			I _C (A)	I _B (A)	I _C (A)	I _B (A)	TYP.	V _{CE} (V)					I _E (mA)							
25C3618	NPN	Audio Frequency High Gain Amplifier*	25	25	15	0.7	2.0	150	UM 800 to 1600	2.0	0.3	160	0.3	30 m	250	5	-0.3A	-	306	
							UL 1200 to 2400													
							UK 2000 to 3200													
25C3736		High Speed Switching	80	45	5.0	1.0	2.0	150	OL 60 to 120	10	50 m	170	0.5	50 m	380	10	-100	25A1463		
							OK 100 to 200													
25D999		Audio Frequency Power Amplifier	30	25	5.0	1.0	2.0	150	CM 90 to 180	1.0	0.1	210	1.0	0.1	130	6.0	-10	25B798	376	
								CL 135 to 270												
							CK 200 to 400													
25D1000			80	50	5.0	0.7	2.0	150	LM 90 to 180	1.0	0.1	120	0.5	50 m	110	6.0	-10	25B799	379	
							LL 135 to 270													
							LK 200 to 400													
25D1001		Audio Frequency Amplifier	80	80	5.0	0.3	2.0	150	EM 90 to 180	1.0	50	150	0.3	30 m	140	6.0	-10	25B800	382	
								EL 135 to 270												
								EK 200 to 400												
25D1005				100	80	5.0	1.0	2.0	150	BW 90 to 180	2.0	0.1	200	0.5	50 m	100	5.0	-10	25B804	385
								BV 135 to 270												
								BU 200 to 400												
25D1006				100	100	5.0	0.7	2.0	150	HM 90 to 180	1.0	0.1	140	0.5	50 m	90	10	-10	25B805	386
								HL 135 to 270												
								HK 200 to 400												
25D1007			120	120	5.0	0.7	2.0	150	HR 90 to 180	1.0	0.1	140	0.5	50 m	90	10	-10	25B806	388	
						HQ 135 to 270														
						HP 200 to 400														
25D1814	Audio Frequency Amplifier	40	20	6.0	2.0	2.0	150	XM 135 to 270	2.0	0.1	300	2.0	50 m	200	10	-50	25B1114	407		
							XL 200 to 400													
							XK 300 to 600													
25D1815/ 25D1815A			60/ 120	50/ 60	6.0	1.0	2.0	150	GM/GO 135 to 270	2.0	0.1	150	1.0	50 m	180	2	0.1A	25B1115/ 25B1115A	410	
							GL/GP 200 to 400													
						GK/- 300 to 600														
25D1699		100	80	8.0	±1.2	2.0	150	TR 4K to 12K	2.0	0.3	900	0.5	1 m	-	-	-	-	413		
						TQ 8K to 50K														
25D1702		60 ±10	60 ±10	8.0	±1.2	2.0	150	TE 4K to 12K	2.0	0.5	900	0.5	1 m	-	-	-	-	-		
						TF 8K to 50K														
25D1950		30	25	15	2.0	2.0	150	VM 800 to 1600	5.0	1.0	180	1.0	10 m	350	10	-0.5A	-	420		
						VL 1200 to 2400														
						VK 2000 to 3200														
25D1952		20	16	6.0	3.0	2.0	150	XR 135 to 270	2.0	0.1	250	2.0	0.1	140	10	-50	25B1301	423		
						XQ 200 to 400														
						XP 300 to 600														

* With 2.5 cm² x 0.7 mm Ceramic Substrate

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QUICK REFERENCE GUIDE



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POWER MINI MOLD

□ JAPANESE STANDARD TYPE NUMBERS

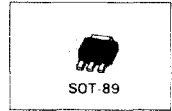
● Resistors Built-in Type Transistors

Type No.	Connection Diagram/Application	Absolute Maximum Ratings (T _a =25 °C)						Electrical Characteristics (T _a =25 °C)						Note	Page
		V _{CEO} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (A)	P _T ** (W)	T _J (°C)	Class Marking	R ₁ (kΩ)	R ₂ (kΩ)	hFE Range	V _{CE} (V)	I _C (A)		
HC1L2N*	<p>Switching</p>	20	20	10	2.0	2.0	150	CP	0.47	1.0	300 to	2.0	1.0	-	
HC1A3M*		20	20	10	2.0	2.0	150	CQ	1.0	1.0	300 to	2.0	1.0		
HC1F3M*		20	20	10	2.0	2.0	150	CR	2.2	2.2	300 to	2.0	1.0		
HC1F3P*		20	20	10	2.0	2.0	150	CS	2.2	10	300 to	2.0	1.0		
HC1A4A*		20	20	10	2.0	2.0	150	CX	-	10	300 to	2.0	1.0		
HC1L2Q*		20	20	10	2.0	2.0	150	CT	0.47	4.7	300 to	2.0	1.0		
HC1F2Q*	20	20	10	2.0	2.0	150	CU	0.22	2.2	300 to	2.0	1.0			
HQ1C2N*	<p>Switching</p>	-20	-20	-10	-2.0	2.0	150	DP	0.47	1.0	150 to	-2.0	-1.0	-	
HQ1A3M*		-20	-20	-10	-2.0	2.0	150	DQ	1.0	1.0	150 to	-2.0	-1.0		
HQ1F3M*		-20	-20	-10	-2.0	2.0	150	DR	2.2	2.2	150 to	-2.0	-1.0		
HQ1F3P*		-20	-20	-10	-2.0	2.0	150	DS	2.2	10	150 to	-2.0	-1.0		
HQ1A4A*		-20	-20	-10	-2.0	2.0	150	DX	-	10	150 to	-2.0	-1.0		
HQ1L2Q*		-20	-20	-10	-2.0	2.0	150	DT	0.47	4.7	150 to	-2.0	-1.0		
HQ1F2Q*	-20	-20	-10	-2.0	2.0	150	DU	0.22	2.2	150 to	-2.0	-1.0			
HD1A3M*	<p>Switching</p>	80	80	10	1.0	2.0	150	LP	1.0	1.0	200 to	2.0	0.5	-	
HD1F3P*		80	80	10	1.0	2.0	150	LQ	2.2	10	300 to	2.0	0.5		
HD1L3N*		80	80	10	1.0	2.0	150	LR	4.7	10	300 to	2.0	0.5		
HD1A4M*		80	80	10	1.0	2.0	150	LS	10	10	300 to	2.0	0.5		
HD1A4A*		80	80	10	1.0	2.0	150	LX	-	10	300 to	2.0	0.5		
HD1L2Q*		80	80	10	1.0	2.0	150	LU	0.47	4.7	300 to	2.0	0.5		
HD1F2Q*	80	80	10	1.0	2.0	150	LT	0.22	2.2	300 to	2.0	0.5			
HD2A3M*	<p>Switching</p>	60±10	60±10	10	1.0	2.0	150	LA	1.0	1.0	200 to	2.0	0.5	-	
HD2F3P*		60±10	60±10	10	1.0	2.0	150	LB	2.2	10	300 to	2.0	0.5		
HD2L3N*		60±10	60±10	10	1.0	2.0	150	LC	4.7	10	300 to	2.0	0.5		
HD2A4M*		60±10	60±10	10	1.0	2.0	150	LD	10	10	300 to	2.0	0.5		
HD2A4A*		60±10	60±10	10	1.0	2.0	150	LY	-	10	300 to	2.0	0.5		
HD2L2Q*		60±10	60±10	10	1.0	2.0	150	LE	0.47	4.7	300 to	2.0	0.5		
HD2F2Q*	60±10	60±10	10	1.0	2.0	150	LF	0.22	2.2	300 to	2.0	0.5			
HR1A3M*	<p>Switching</p>	-60	-60	-10	-1.0	2.0	150	MP	1.0	1.0	100 to	-2.0	-0.5	-	
HR1F3P*		-60	-60	-10	-1.0	2.0	150	MQ	2.2	10	100 to	-2.0	-0.5		
HR1L3N*		-60	-60	-10	-1.0	2.0	150	MR	4.7	10	100 to	2.0	-0.5		
HR1A4M*		-60	-60	-10	-1.0	2.0	150	MS	10	10	100 to	2.0	-0.5		
HR1A4A*		-60	-60	-10	-1.0	2.0	150	MX	-	10	100 to	-2.0	-0.5		
HR1L2Q*		-60	-60	-10	-1.0	2.0	150	MT	0.47	4.7	100 to	-2.0	-0.5		
HR1F2Q*	-60	-60	-10	-1.0	2.0	150	MU	0.22	2.2	100 to	-2.0	-0.5			

* Under development

** With 2.5 cm² × 0.7 mm Ceramic Substrate

POWER MINI MOLD



JAPANESE STANDARD TYPE NUMBERS □

● Power MOS FET

Type No.	Structure	Application	Absolute Maximum Ratings (T _g = 25 °C)					Electrical Characteristics (T _g = 25 °C)								Complements to	Page
			V _{GS} (V)	V _{DS} (V)	I _D (A)	P _T (W)	T _{ch} (°C)	Mark	R _{DS(ON) MAX.} (Ω)	V _{GS} (V)	I _D (A)	C _{iss} TYP (PF)	C _{oss} TYP (PF)	t _r TYP (ns)	t _f TYP (ns)		
2SK680	Silicon N-channel Enhancement	Switching	30	±20	±1.0	1.0	150	YA	1.5	4.0	0.5	40	20	230	550	-	471

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POWER MINI MOLD

NEC STANDARD TYPE NUMBERS

- Zener Diodes

Type No.	Suffix	Mark	Application	Maximum Ratings (T _a = 25 °C)			Electrical Characteristics (T _a = 25 °C)						Page	
				P (W)	T _j (°C)	T _{sig} (°C)	V _Z (V)*		Z _Z (Ω)**		R _Z (μA)			
							MIN.	MAX.	I _Z (mA)	I _Z (mA)	MAX.	V _H (V)		
RD2 0P	B	2.0	Hybrid ICs Constant Voltage	1.0	150	-55 to +150	1.9	2.2	5	5	200	0.5	645	
RD2 2P	B	2.2					2.1	2.4			140	200		0.7
RD2 4P	B	2.4					2.3	2.6			140	200		1.0
RD2 7P	B	2.7					2.5	2.9			140	150		1.0
RD3 0P	B	3.0					2.8	3.2			140	100		1.0
RD3 3P	B	3.3					3.1	3.5			140	80		1.0
RD3 6P	B	3.6					3.4	3.8			140	60		1.0
RD3 9P	B	3.9					3.7	4.1			120	40		1.0
RD4 3P	B	4.3					4.0	4.5			120	20		1.0
RD4 7P	B	4.7					4.4	4.9			100	20		1.0
RD5 1P	B	5.1					4.8	5.4			100	20		1.0
RD5 6P	B	5.6					5.3	6.0			70	20		1.5
RD6 2P	B	6.2					5.8	6.6			40	20		3.0
RD6 8P	B	6.8					6.4	7.2			25	20		3.5
RD7 5P	B	7.5					7.0	7.9			25	20		4.0
RD8 2P	B	8.2					7.7	8.7			25	20		5.0
RD9 1P	B	9.1					8.5	9.6			25	20		5.0
RD10P	B	10					9.4	10.6			20	10		7.0
RD11P	B	11					10.4	11.6			20	10		8.0
RD12P	B	12					11.4	12.6			25	10		9.0
RD13P	B	13					12.4	14.1			30	10		10
RD15P	B	15					13.8	15.6			30	10		11
RD16P	B	16					15.3	17.1			40	10		12
RD18P	B	18					16.8	19.1			45	10		13
RD20P	B	20					18.8	21.2			55	10		15
RD22P	B	22					20.8	23.3			55	10		17
RD24P	B	24					22.8	25.6			70	10		19
RD27P	B	27					25.1	28.9			80	10		21
RD30P	B	30					28.0	32.0			80	10		23
RD33P	B	33					31.0	35.0			80	10		25
RD36P	B	36					34.0	38.0			90	10		27
RD39P	B	39					37.0	41.0			130	10		30
RD43P	B	43					40	45			150	5		33
RD47P	B	47					44	49			170	5		36
RD51P	B	51					48	54			220	5		39
RD56P	B	56					53	60			220	5		43
RD62P	B	62					58	66			220	5		47
RD68P	B	68					64	72			240	5		52
RD75P	B	75					70	79			255	5		57
RD82P	B	82					77	87			275	5		63
RD91P	B	91	85	96	350	5	69							
RD100P	B	1A	94	106	450	5	76							
RD110P	B	1B	104	116	550	5	84							
RD120P	B	1C	114	126	650	5	91							

* Tested with pulse (40 ms)

** Z_Z is measured at I_Z by given a very small A.C. Current signal.

POWER MINI MOLD



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NEC STANDARD TYPE NUMBERS □

• SCRs

Type No.	Mark	Application	Maximum Ratings (T _a = 25 °C)						Electrical Characteristics (T _a = 25 °C)					Page
			V _{DRM} (V)	I _{T(RMS)} (mA)	P _{GM} (mW)	I _{FGM} (mA)	T _J (°C)	T _{stg} (°C)	dV _{DT} /dt (V/μs) TYP.	V _T (V) MAX.	I _{GT} (mA) MAX.	V _{GT} (V) MAX.	I _H (mA) MAX.	
03P2J	JB	Hybrid IC	200	470	100	100	+125	-55 to +125	40	1.6	0.2	0.8	5	650
03P4J	JD		400											
03P5J	JE		500											

MP-3



MP-3

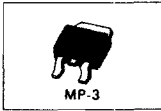
2

• Transistors

Type No.	Polarity & Structure	Application	Absolute Maximum Ratings (T _a = 25 °C)						Electrical Characteristics (T _a = 25 °C)										Page
			V _{CEO} (V)	V _{CE0} (V)	V _{EBO} (V)	I _C (A)	P _T * (W)	T _J (°C)	Class & Marking	hFE Range	V _{CE} (V)	I _C (A)	V _{CE(sat)} (V) TYP.	f _T (MHz) TYP.	C _{ob} (pF) TYP.	Note			
2SA1385-Z	PNP, Si Epitaxial	Audio Frequency Power Amplifier	-60	-60	-5.0	-5.0	2.0	150	M	100 to 200	-1.0	-2.0	-0.3 MAX.	100			122		
									L	160 to 320									
									K	200 to 400									
2SA1400-Z	PNP, Si Triple Diffused	High Speed High Voltage Switching	-400	-400	-7.0	-0.5	2.0	150	N	30 to 60	-5.0	-0.1	-1.0 MAX.			t _r 1.0 μs MAX.	125		
									M	40 to 80									
									K	100 to 200									
2SA1412-Z	PNP, Si Triple Diffused	High Voltage Switching	-400	-400	-7.0	-2.0	2.0	150	L	40 to 80	-5.0	-0.1	-0.25	40	30	t _r 0.1 μs	131		
									K	60 to 120									
									M	30 to 60									
2SA1413-Z	PNP, Si Triple Diffused	High Voltage Switching	-600	-600	-7.0	-1.0	2.0	150	L	40 to 80	-5.0	-0.1	-1.0 MAX.			t _r = 0.1 μs	134		
									K	60 to 120									
									M	30 to 60									
2SA1615-Z	PNP, Si Epitaxial	Audio Frequency Power Amplifier	-30	-20	-10	-10	2.0	150	L	200 to 400	-2.0	-0.5	-0.25 MAX.	180					
									K	300 to 600									
									M	40 to 80									
2SB768	PNP, Si Triple Diffused	Audio Frequency Power Amplifier	-200	-150	-5.0	-2.0	2.0	150	L	60 to 120	-10	-0.4	-1.0 MAX.	10	-	-	177		
									K	100 to 200									
									R	60 to 120									
2SB962-Z	PNP, Si Epitaxial	Audio Frequency Power Amplifier, Low Speed Switching	-40	-30	-5.0	-3.0	2.0	150	Q	100 to 200	-2.0	-1.0	-1.0	80	55		195		
									P	160 to 320									
									E	200 to 400									
									M	2000 to 5000									
									L	4000 to 10000									
2SB963-Z	PNP, Si Epitaxial Darlington	Audio Frequency Power Amplifier and Switching	-60	-60	-8.0	-1.0	2.0	150	K	8000 to 30000	-2.0	-0.5	0.8	-	-		198		
									M	100 to 200									
									L	160 to 320									
2SB1261-Z	PNP, Si Epitaxial	Audio Frequency Power Amplifier and Switching	-60	-60	-7.0	-3.0	2.0	150	K	200 to 400	-2.0	-0.6	-0.3 MAX.	50	40				
									N	40 to 80									
									M	80 to 120									
2SC2802	NPN, Si Triple Diffused	Color TV Chroma and Video Output	300	300	5.0	0.2	2.0	150	L	100 to 200	10	10 m	0.15	80	2.5		260		
									K	160 to 250									
									N	20 to 50									
2SC2868-1	NPN, Si Epitaxial	High Speed High Voltage Switching	330	200	7.0	2.0	2.0	150	M	30 to 70	5.0	0.1	1.0 MAX.	-	-	t _{on} , t _r < 10 μs	263		
									L	50 to 100									
									K	80 to 160									
									M	100 to 200									
2SC3518-Z	NPN, Si Epitaxial	Audio Frequency Power Amplifier	60	60	5.0	5.0	2.0	150	L	160 to 320	1.0	2.0	0.3 MAX.	120			282		
									K	200 to 400									
									M	20 to 40									
2SC3588-Z	NPN, Si Triple Diffused	High Speed High Voltage Switching	500	400	7.0	0.5	2.0	150	L	30 to 60	5.0	0.05	1.0 MAX.			t _r 1.0 μs MAX.	301		
									K	40 to 80									
									M	20 to 40									

* With 2.5 cm² x 0.7 mm Ceramic Substrate

QUICK REFERENCE GUIDE



MP-3

• Transistors

(Continued)

Type No.	Polarity & Structure	Application	Absolute Maximum Ratings ($T_a=25^\circ\text{C}$)						Electrical Characteristics ($T_a=25^\circ\text{C}$)							Page	
			V_{CE0} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (A)	P_{T^*} (W)	T_j ($^\circ\text{C}$)	Class & Marking	h_{FE} Range	$V_{CE(sat)}$ (V)	I_C (A)	$V_{CE(sat)}$ (V) TYP.	f_T (MHz) TYP.	C_{ob} (pF) TYP.		Note
29C3631-Z	NPN, Si Triple Diffused	High Speed High Voltage Switching	500	400	7.0	2.0	2.0	150	L	40 to 80	5.0	0.1	0.35	50	20	$t_f = 0.1 \mu\text{s}$	314
29C3632-Z	NPN, Si Triple Diffused	High Speed High Voltage Switching	600	600	7.0	1.0	2.0	150	M	30 to 80							318
								L	40 to 80	5.0	0.1	1.0 MAX.				$t_f = 0.1 \mu\text{s}$	
								K	60 to 120								
2SD1033	NPN, Si Triple Diffused	Audio Frequency Power Amplifier	200	150	5.0	2.0	2.0	150	M	40 to 80	10	0.4	1.0 MAX.	10	-		391
								L	60 to 120								
								K	100 to 200								
2SD1184-Z	NPN, Si Epitaxial Derivation	Audio Frequency Power Amplifier Low Speed Switching	150	60	8.0	± 1.5	2.0	150	M	2000 to 5000	2.0	1.0	1.5 MAX.	-	-	$t_{sig. f} < 1.0 \mu\text{s}$	393
								L	4000 to 10000								
								K	8000 to 30000								
2SD1286-Z	NPN, Si Epitaxial Derivation	Audio Frequency Power Amplifier Low Speed Switching	60	60	8.0	1.0	2.0	150	M	2000 to 5000	2.0	0.5	0.8	-	-		397
								L	4000 to 10000								
								K	1600 to 3200								
2SD1583-Z	NPN, Si Epitaxial	Power Amplifier and Switching	30	20	5.0	2.0	2.0	150	M	800 to 1600	5.0	0.5	0.18	270	20		401
								L	1000 to 2000								
								K	1600 to 3200								
2SD1584-Z	NPN, Si Epitaxial	Audio Frequency Power Amplifier and Switching	60	60	7.0	3.0	2.0	150	M	800 to 1600	5.0	0.5	0.25	120	20		404
								L	1000 to 2000								
								K	1600 to 3200								
2SD1899-Z	NPN, Si Epitaxial	Audio Frequency Power Amplifier	60	60	7.0	3.0	2.0	150	M	100 to 200	2.0	0.6	0.25 MAX	120			416
								L	160 to 320								
								K	200 to 400								

* With $2.5 \text{ cm}^2 \times 0.7 \text{ mm}$ Ceramic Substrate

** Under development

• Power MOS FET

Type No.	Structure	Application	Absolute Maximum Ratings ($T_a=25^\circ\text{C}$)						Electrical Characteristics ($T_a=25^\circ\text{C}$)					Page
			V_{DSS} (V)	V_{GSS} (V)	$I_{D(DC)}$ (A)	$I_{D(pulse)}$ (A)	P_{T^*} (W)	T_{ch} ($^\circ\text{C}$)	$V_{GS(off)}$ (V) MAX.	$ V_{fs} $ (S) MIN.	$R_{DS(on)}$ (Ω) MAX.	C_{iss} (pF) TYP.	t_f (ns) TYP.	
2SJ128-Z	P-Channel MOS FET		-100	-20	± 2	± 8	20	150	-3.0	1.0	1.0	1000	40	426
2SJ132-Z			-30	± 20	± 2	± 8	20	150	-3.0	1.0	0.4	730	40	430
2SJ133-Z			-60	± 20	± 2	± 8	20	150	-3.0	1.0	0.8	660	40	434
2SK611-Z	N-Channel MOS FET	Fast Switching	100	± 20	± 1	± 3	10	150	3.0	0.2	5.0	45	5	460
2SK612-Z			100	± 20	± 2	± 8	20	150	3.0	1.0	0.45	500	20	464
2SK654-Z			100	± 15	± 1	± 3	10	150	3.0	0.5	3.0	120	5	468
2SK738-Z			30	± 20	± 2	± 8	20	150	2.5	1.0	0.17	550	20	475
2SK739-Z			60	± 20	± 2	± 8	20	150	2.5	1.0	0.25	550	20	479
2SK801-Z			30	± 20	± 2	± 8	12	150	2.5	1.0	0.35	250	250	483
2SK1059-Z			60	± 20	± 5	± 20	20	150	2.5	4.0	0.135	900	30	
2SK1060-Z			100	± 20	± 5	± 20	20	150	2.5	4.0	0.27	900	30	

Leadless Type



● Switching Diodes

Type No.	Mark	Application	Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$)						Electrical Characteristics ($T_A = 25^\circ\text{C}$)								Page
			V_{RM} (V)	V_R (V)	I_{FSM} (A)	I_{FM} (mA)	I_0 (mA)	T_J ($^\circ\text{C}$)	V_{F1} (V) $I_F = 1.0\text{ mA}$ MAX	V_{F2} (V) $I_F = 30\text{ mA}$ MAX	V_C (V) MAX./1s	I_R (μA) MAX./ V_R (V)	C (pF) $V_R = 0\text{ V}$ MAX	t_{rr} (ns) MAX.	Note		
LS53	White & Black	General Purpose	35	30								0.1/30	6.0	100	$I_F = 10\text{ mA}$ $V_R = 6.0\text{ V}$ $R_L = 100\ \Omega$ $t_{rr} = 0.5\ \mu\text{s}$	997	
LS54	Blue & Black		75	50	2	300	100	175	0.8	1.0		0.1/50	5.0				
LS55	Red & Black		100	75								0.1/75	4.0				
LS953	Green & Black	High Speed Switching	35	30	2	300	100				1.0/30	4.0	3.0	$I_F = 10\text{ mA}$ $V_R = 6.0\text{ V}$ $R_L = 100\ \Omega$ $t_{rr} = 0.1\ \mu\text{s}$	599		
LS954	Green & Yellow		75	50			175	-	-		1.0/100	0.1/50				3.5	
LS955	Green & Green		100	75	4	600	200				1.0/150	0.1/75				3.0	

● Zener Diodes

Type No.	Suffix	Mark	Application	Maximum Ratings ($T_A = 25^\circ\text{C}$)			Electrical Characteristics ($T_A = 25^\circ\text{C}$)								Page				
				$P +$ (mW)	T_J ($^\circ\text{C}$)	T_{stg} ($^\circ\text{C}$)	V_Z^{**} (V)		Z_Z^{***} (Ω) MAX.	Z_{Zk}^{***} (Ω) MAX.		I_R (μA) MAX.	I_Z (mA)	V_R (V) @ V_R					
							MIN.	MAX.		I_Z (mA)	I_Z (mA)								
RD4.7K	B	Colored 3 Band	Hybrid ICs Constant Voltage	400	+175	-65 to +175	4.42	4.90	5	100	5	800	0.5	2	1.0	626			
RD5.1K	B						4.84	5.37		80							500	2	1.5
RD5.6K	B						5.31	5.92		60							200	1	2.5
RD6.2K	B						5.86	6.53		60							100	1	3.0
RD6.8K	B						6.47	7.14		40							60	0.5	3.5
RD7.5K	B						7.06	7.84		30							60	0.5	4.0
RD8.2K	B						7.76	8.64		30							60	0.5	5.0
RD9.1K	B						8.56	9.55		30							60	0.5	6.0
RD10K	B						9.45	10.55		30							60	0.1	7.0
RD11K	B						10.44	11.56		30							60	0.1	8.0
RD12K	B						11.42	12.60		30							80	0.1	9.0
RD13K	B						12.47	13.96		37							80	0.1	10
RD15K	B						13.84	15.52		42							80	0.1	11
RD16K	B						15.37	17.09		50							80	0.1	12
RD18K	B						16.94	19.03		65							80	0.1	13
RD20K	B						18.86	21.08		85							100	0.1	15
RD22K	B						20.88	23.17		100							100	0.1	17
RD24K	B						22.93	25.57		120							120	0.1	19
RD27K	B						25.10	28.90		150							150	0.1	21
RD30K	B						28.00	32.00		200							200	0.1	23
RD33K	B	31.00	35.00	250	250	0.1	25												
RD36K	B	34.00	38.00	300	300	0.1	27												
RD39K	B	37.00	41.00	360	360	0.1	30												

* With $0.9\text{ cm}^2 \times 0.7\text{ mm}$ Ceramic Substrate
 ** Tested with pulse (40 ms)
 *** Z_Z and Z_{Zk} are measured at I_Z by given a very small A.C. current signal.
 **** Each Suffix B is classified into B1 to B3

QUICK REFERENCE GUIDE

• Zener Diodes

Type No.	Suffix	Mark	Application	Maximum Ratings (T _a = 25 °C)			Electrical Characteristics (T _a = 25 °C)								Page
				P * (mW)	T _j (°C)	T _{stg} (°C)	V _Z ** (V)		Z _Z *** (Ω)		Z _{Zk} *** (Ω)		I _R (μA)		
							MIN.	MAX.	I _Z (mA)	MAX.	I _Z (mA)	MAX.	I _Z (mA)	MAX.	
RD2.0L	B						1.88	2.20		100	1000	1000	120	0.5	
RD2.2L	B						2.12	2.41		100		1000		120	0.7
RD2.4L	B						2.33	2.64		100		1000		120	1.0
RD2.7L	B						2.54	2.91		110		1000		100	1.0
RD3.0L	B						2.85	3.22		120		1000		50	1.0
RD3.3L	B						3.16	3.53		120		1000		20	1.0
RD3.6L	B						3.47	3.83		120		1100		10	1.0
RD3.9L	B						3.77	4.14		120		1200		5	1.0
RD4.3L	B						4.05	4.53		120		1200		5	1.0
RD4.7L	B						4.47	4.91		100		1200		5	1.0
RD5.1L	B						4.85	5.35		70		1200		5	1.5
RD5.6L	B						5.29	5.88		40		900		5	2.5
RD6.2L	B						5.81	6.40		30		500		5	3.0
RD6.8L	B						6.32	6.97		25		150		2	3.5
RD7.5L	B						6.88	7.64		25		120		0.5	4.0
RD8.2L	B	Colored 3 Band	Hybrid ICs Constant Voltage	500	+175	-65 to +175	7.56	8.41	5	20	5	120	0.5	0.5	5.0
RD9.1L	B						8.33	9.29		20		120		0.5	6.0
RD10L	B						9.19	10.30		20		120		0.2	7.0
RD11L	B						10.18	11.26		20		120		0.2	8.0
RD12L	B						11.13	12.30		25		110		0.2	9.0
RD13L	B						12.18	13.62		25		110		0.2	10
RD15L	B						13.48	15.02		25		110		0.2	11
RD16L	B						14.87	16.50		25		150		0.2	12
RD18L	B						16.34	18.30		30		150		0.2	13
RD20L	B						18.14	20.45		30		200		0.2	15
RD22L	B						20.23	22.61		30		200		0.2	17
RD24L	B						22.62	24.81		35		200		0.2	19
RD27L	B						24.26	27.64		45		250		0.2	21
RD30L	B						26.99	30.51		55		250		0.2	23
RD33L	B						29.68	33.11		65		250		0.2	25
RD36L	B						32.14	35.77		75		250		0.2	27
RD39L	B						34.68	38.52		85		250		0.2	30

* With 0.9 cm² x 0.7 mm Ceramic Substrate

** Tested with pulse (40 ms)

*** Z_Z and Z_{Zk} are measured

**** Each Suffix B is classified into B1 to B4.

SUPER MINI MOLD



SC-70

• Transistors

Type No	Structure	Application	Absolute Maximum Ratings (T _a =25°C)					Electrical Characteristics (T _a =25°C)								
			V _{CEO} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (mA)	P _T (mW)	T _J (°C)	Class Marking	h _{FE} Range	V _{CE} (V)	I _C (mA)	V _{CE(sat)} (mV) TYP.	f _T (MHz) TYP.	C _{ob} (pF) TYP.	Note
2SA1608	PNP Silicon Epitaxial	High Speed Switching	-60	-40	-5.0	-500	150	150	Y12	75 to 150	-2.0	-150	-450	400	5.0	t _{on} < 35 ns t _{off} < 265 ns
									Y13	100 to 200						
									Y14	150 to 300						
2SA1609**	PNP Silicon Epitaxial	High Voltage Switching	-160	-160	-5.0	-50	150	150	O15	90 to 180	-3.0	-15	-100	120	2.3	
									O16	135 to 270						
									O17	200 to 400						
2SA1610	PNP Silicon Epitaxial	High Speed Switching	-15	15	-4.5	-50	150	150	Y33	50 to 100	-1.0	-10	-90	1800	2.0	t _{on} < 20 ns t _{off} < 40 ns
									Y34	75 to 150						
									M4	90 to 180						
2SA1611	PNP Silicon Epitaxial	Audio Frequency Amplifier	-60	50	-5.0	-100	150	150	M5	135 to 270	-6.0	-1.0	-180	180	4.5	
									M6	200 to 400						
									M7	300 to 600						
									C15	135 to 270						
2SA1612	PNP Silicon Epitaxial	Audio Frequency High Gain Amplifier	-120	-120	-5.0	-50	150	150	C16	200 to 400	-6.0	-1.0	-90	90	2.0	
									C17	300 to 600						
									C18	450 to 900						
									M15	500 to 1000						
2SA1613	PNP Silicon Epitaxial	Audio Frequency Amplifier and Switching	-25	-25	-10	-150	150	150	M16	800 to 1600	-5.0	-1.0	-150	200	4.6	t _{on} ≈ 0.12 μs t _{off} ≈ 0.75 μs
									B12	75 to 150						
2SC4173	NPN Silicon Epitaxial	High Speed Switching	60	40	5.0	500	150	150	B13	100 to 200	1.0	150	250	400	3.5	t _{on} < 35 ns t _{off} < 275 ns
									B14	150 to 300						
									N5	90 to 180						
2SC4174**	NPN Silicon Epitaxial	High Voltage Switching	180	160	5.0	50	150	150	N6	135 to 270	3.0	15	100	120	2.3	
									N7	200 to 400						
									B2	40 to 80						
2SC4175	NPN Silicon Epitaxial	High speed switching	25	20	5.0	200	150	150	B3	60 to 120	0.5	1.0	130	500	3.0	t _{off} < 20 ns
									B4	90 to 180						
									B33	40 to 80						
2SC4176	NPN Silicon Epitaxial	High Speed Switching	40	15	5.0	200	150	150	B34	60 to 120	1.0	10	150	750	1.8	t _{on} < 12 ns t _{off} < 18 ns
									B35	100 to 200						
									L4	90 to 180						
2SC4177	NPN Silicon Epitaxial	Audio Frequency Intermediate Frequency Amplifier	60	50	5.0	100	150	150	L5	135 to 270	6.0	1.0	150	250	3.0	
									L6	200 to 400						
									L7	300 to 600						
									F12	40 to 80						
2SC4178	NPN Silicon Epitaxial	High Frequency Amplifier	30	20	4.0	20	150	150	F13	60 to 120	6.0	1.0	100	600	1.0	NF=3.0 dB f=100 MHz
									F14	90 to 180						
									F33	60 to 120						
2SC4179	NPN Silicon Epitaxial	Radio Frequency Amplifier, Oscillator, Mixer and Converter	50	30	5.0	50	150	150	F44	90 to 180	6.0	1.0	80	250	1.9	NF=2.0 dB f=1.0 MHz
									F45	135 to 270						
2SC4180	NPN Silicon Epitaxial	Audio Frequency High Gain Amplifier	120	120	5.0	50	150	150	D16	200 to 400	6.0	1.0	70	110	1.6	
									D17	300 to 600						
									D18	450 to 900						
									L17	1000 to 2000						
2SC4181	NPN Silicon Epitaxial	Audio Frequency Amplifier and Switching	60	50	12	150	150	150	L18	1600 to 3200	5.0	1.0	70	250	3.0	t _{on} ≈ 0.13 μs t _{off} ≈ 1.22 μs
									T32	60 to 120						
2SC4182**	NPN Silicon Epitaxial	VHF TUNER MIX, OSC UHF TUNER OSC	30	15	5.0	50	150	150	T33	90 to 180	10	5.0	-	1100	1.3	
									T34	120 to 240						
2SC4183**	NPN Silicon Epitaxial	UHF TUNER RE/MIX	30	25	4.0	20	150	150	U14	60 to 240	10	3.0	-	1000	0.6	
									T42	40 to 80						
2SC4184**	NPN Silicon Epitaxial	VHF TUNER OSC	30	15	3.0	50	150	150	T43	60 to 120	10	5.0	-	1800	0.45	
									T44	100 to 200						
									U21	40 to 80						
2SC4185**	NPN Silicon Epitaxial	UHF TUNER MIX/OSC	30	14	3.0	50	150	150	J22	60 to 120	10	5	-	2000	1.0	
									J23	90 to 180						
									T62	40 to 80						
2SC4186**	NPN Silicon Epitaxial	UHF TUNER MIX/OSC	25	12	3	30	150	150	T63	60 to 120	10	5	90	4000	0.85	
									T64	120 to 200						

** Under development

QUICK REFERENCE GUIDE



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SUPER MINI MOLD

Type No.	Structure	Application	Absolute Maximum Ratings (T _a =25 °C)						Electrical Characteristics (T _a =25 °C)							Page	
			V _{CEO} (V)	V _{BE0} (V)	I _C (mA)	P _T (mW)	T _J (°C)	Class Marking	h _{FE} Range	V _{CE} (V)	I _C (mA)	V _{CE(sat)} (mV) TYP.	f _T (MHz) TYP.	C _{ob} (pF) TYP.	Note		
																	V _{CB0} (V)
2SC4187**	NPN Silicon Epitaxial	Microwave Low Noise Amplifier	15	8	2	5	50	150	(R82)	50 to 250	1	0.25	-	4000	0.4	NF ₁ 3.0 dB (1 GHz)	-
2SC4225**	NPN Silicon Epitaxial	Microwave Low Noise Amplifier	25	12	3.0	70	150	150	R2	40 to 120	10	20	-	5000	0.75	NF ₁ 1.5 dB (1 GHz)	-
									R3	100 to 200							
2SC4226**	NPN Silicon Epitaxial	Microwave Low Noise Amplifier	20	12	3.0	100	150	150	R22	50 to 300	10	20	-	7000	0.85	NF ₁ 1.1 dB (1 GHz)	-
2SC4227**	NPN Silicon Epitaxial	Microwave Low Noise Amplifier	20	10	1.5	65	150	150	R32	50 to 300	8	20	-	9000	0.35	NF ₁ 1.2 dB (1 GHz)	-
2SC4228**	NPN Silicon Epitaxial	Microwave Low Noise Amplifier	20	10	1.5	35	150	150	R42	50 to 250	6	10	-	10000	0.3	NF ₁ 1.8 dB (2 GHz)	-

** Under development

FETs

Type No.	Structure	Application	Absolute Maximum Ratings (T _a =25 °C)					Electrical Characteristics (T _a =25 °C)							Page	
			V _{GSD} (V)	V _{GS0} (V)	I _D (mA)	P _T (mW)	T _J (°C)	Class Marking	IDSS Range (mA)	V _{DS} (V)	V _{GS} (V)	V _{GS(off)} (V) TYP.	Y _{fs} (mS) TYP.	C _{iss} (pF) TYP.		Note
2SK852	Silicon N-channel Junction	Audio Frequency Amplifier	-50	-50	20	150	150	X1	0.5 to 1.5	10	0	-0.5	12	13	C _{rss} 2.6 pF	-
								X2	1.0 to 3.0							
								X3	2.0 to 8.0							
								X4	4.0 to 12							
2SK853	Silicon N-channel Junction	Audio and Radio Frequency Amplifier	-30	-30	20	150	150	K4	0.5 to 1.5	5.0	0	-1.1	4.1	4.1	C _{rss} 0.9 pF	-
								K5	1.0 to 3.0							
								K6	2.0 to 6.0							
								K7	4.0 to 12							

Diodes

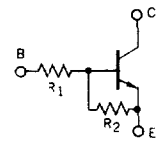
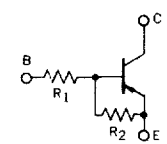
Type No.	Mark	Structure	Application	Absolute Maximum Ratings (T _a =25 °C)						Electrical Characteristics (T _a =25 °C)						Page		
				V _{RM} (V)	V _R (V)	I _{FSM} (A)	I _{FM} (mA)	I _O (mA)	T _J (°C)	V _{F1} (V) MAX. / I _F =10 mA	V _{F2} (V) MAX. / I _F =50 mA	V _{F3} (V) MAX. / I _F =100 mA	I _p (μA) MAX. / V _R (V)	C (pF) MAX. / I _F	t _{rr} (ns) MAX.		Note	
1SS303	A4	EpSi Double	High Speed Switching	75	50	6.0* 4.0	450* 300	150* 100	150	1.0	1.1	1.2	0.1/50	4.0/0 V	4.0	t _{rr}	I _F =10 mA V _R =6.0 V R _L =100 Ω t _{rr} =0.1 t _r	-
1SS304	A6	EpSi Double	High Speed Switching	75	50	6.0* 4.0	450* 300	150* 100	150	1.0	1.1	1.2	0.1/50	4.0/0 V	3.0			-
1SS305	A13	EpSi	High Speed Switching	70	70	2.0	300	100	150	0.85	1.0	1.2	0.1/70	4.0/0 V	3.0		I _F =10 mA V _R =6.0 V R _L =100 Ω t _{rr} =0.1 t _r	-

* Total Current

SUPER MINI MOLD

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● Resistors Built-in Type Transistors

Type No.	Connection Diagram/Application	Absolute Maximum Ratings (T _g =25°C)						Electrical Characteristics (T _g =25°C)						Note	Page
		V _{CB0} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (mA)	P _T (mW)	T _j (°C)	Class Marking	R ₁ (kΩ)	R ₂ (kΩ)	hFE Range	V _{CE} (V)	I _C (mA)		
GA1L4L	 <p>Switching</p>	60	50	15	100	150	150	L30	47	22	60 to 195	5.0	5.0		—
GA1L4M		60	50	10	100	150	150	L31	47	47	85 to 340	5.0	5.0		—
GA1F4M		60	50	10	100	150	150	L32	22	22	60 to 195	5.0	5.0		—
GA1A4M		60	50	10	100	150	150	L33	10	10	35 to 100	5.0	5.0		—
GA1A4P		60	50	5.0	100	150	150	L34	10	47	85 to 340	5.0	5.0		—
GA1F4N		60	50	5.0	100	150	150	L35	22	47	85 to 340	5.0	5.0		—
GA1L3Z		60	50	5.0	100	150	150	L36 L37 L38	4.7	∞	135 to 270 200 to 400 300 to 600	5.0	5.0		—
GA1L4Z		60	50	5.0	100	150	150	L61 L62 L63	47	∞	135 to 270 200 to 400 300 to 600	5.0	5.0		—
GA1F4Z		60	50	5.0	100	150	150	L64 L65 L66	22	∞	135 to 270 200 to 400 300 to 600	5.0	5.0		—
GA1A4Z		60	50	5.0	100	150	150	L67 L68 L69	10	∞	135 to 270 200 to 400 300 to 600	5.0	5.0		—
GA1L3M		60	50	10	100	150	150	L81	4.7	4.7	20 to 80	5.0	5.0		—
GA1L3N		60	50	5.0	100	150	150	L82	4.7	10	35 to 100	5.0	5.0		—
GA1A3Q		60	50	5.0	100	150	150	L83	1.0	10	35 to 100	5.0	5.0		—
GN1L4L		 <p>Switching</p>	-60	-50	-15	-100	150	150	M30	47	22	60 to 195	-5.0	-5.0	
GN1L4M	-60		-50	-10	-100	150	150	M31	47	47	85 to 340	-5.0	-5.0		—
GN1F4M	-60		-50	-10	-100	150	150	M32	22	22	60 to 195	-5.0	-5.0		—
GN1A4M	-60		-50	-10	-100	150	150	M33	10	10	35 to 100	-5.0	-5.0		—
GN1A4P	-60		-50	-5.0	-100	150	150	M34	10	47	85 to 340	-5.0	-5.0		—
GN1F4N	-60		-50	-5.0	-100	150	150	M35	22	47	85 to 340	-5.0	-5.0		—
GN1L3Z	-60		-50	-5.0	-100	150	150	M36 M37 M38	4.7	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0		—
GN1L4Z	-60		-50	-5.0	-100	150	150	M61 M62 M63	47	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0		—
GN1F4Z	-60		-50	-5.0	-100	150	150	M64 M65 M66	22	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0		—
GN1A4Z	-60		-50	-5.0	-100	150	150	M67 M68 M69	10	∞	135 to 270 200 to 400 300 to 600	-5.0	-5.0		—
GN1L3M	-60		-50	-10	-100	150	150	M81	4.7	4.7	20 to 80	-5.0	-5.0		—
GN1L3N	-60		-50	-5.0	-100	150	150	M82	4.7	10	35 to 100	-5.0	-5.0		—
GN1A3Q	-60		-50	-5.0	-100	150	150	M83	1.0	10	35 to 100	-5.0	-5.0		—

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QUICK REFERENCE GUIDE

1. TABLE OF THE SAME CHARACTERISTICS IN DIFFERENT PACKAGES

APPLICATION	TO-92 (Fig. 1)	SP-8 (Fig. 2)	SST (Fig. 3)	DISK MOLD (Fig. 5) **(Fig. 4)	SUPER MINI MOLD (Fig. 11)	MINI MOLD (Fig. 6) *** (Fig. 7)	POWER MINI (Fig. 8)
RF AMP						2SA1424	
	2SC2026			2SC2368	2SC4185*	2SC2759	
	2SC2037			2SC2353			
	2SC2408 (A)						2SC2954
	2SC2570A			2SC2369	2SC4225*	2SC2351	
	2SC3355			2SC3358	2SC4226*	2SC3356	2SC3357
	2SC3582			2SC3584	2SC4227*	2SC3583	
				2SC3586	2SC4228*	2SC3585	
UHF RF				2SC3029	2SC4187*	2SC3663	
				2SC1070 (1)		2SC2758	
				3SK87A		3SK132A***	
				3SK88A		3SK133A***	
				3SK161		3SK134A***	
				3SK123A		3SK135A***	
				3SK124			
	MIX			2SC1070 (2)	2SC4182*	2SC2758	
	MIX/OSC			2SC2353	2SC4185*	2SC2759	
	OSC			2SC288A (5B)**			
		2SC3544			2SC4183*	2SC3545	
	VHF RF	2SC1393					2SC2755
				2SC606 (B)**			
				2SC606 (B)**			
				3SK74			
				3SK122		3SK131***	
MIX		2SC2352				2SC2756	
MIX/OSC		2SC1730			2SC4184*	2SC2757	
OSC		2SC1395				2SC2755	
		2SC1396					
				2SC287A (B)**			
FM RF	2SA1005					2SA1226	
	2SK196		2SK193			2SK238	
	RF/MIX/CON	2SC1674	2SC2786			2SC2223	
FM/AM MIX/OSC/IF	2SC1675	2SC2787		2SC4179	2SC1009A		
AM RF	2SC2000						
	2SK518		2SK519			2SK520	
AF AMP	2SA733		2SA1175		2SA1611	2SA812	
	2SA987					(2SA812)	
	2SA988				2SA1612	2SA811A	
	2SA1409		2SA1410		2SA1613	2SA1411	
	2SC945		2SC2785		2SC4177	2SC1623	

* Under development

APPLICATION	TO-92 (Fig. 1)	SP-8 (Fig. 2)	SST (Fig. 3)	DISK MOLD (Fig. 5)	SUPER MINI MOLD (Fig. 11)	MINI MOLD (Fig. 6)	POWER MINI (Fig. 8)
AF AMP	2SC945(L)					(2SC1623)	
	2SC1840					(2SC1623)	
	2SC1841				2SC4180	2SC1622A	
	2SC3622/A		2SC3623/A		2SC4181	2SC3624/A	
	2SK68A				2SK852	2SK94	
	2SK104				2SK853*	2SK160	
	2SK105				2SK853A*	2SK160A	
	(2SK163)					2SK425	
Video Camera	2SK505		2SK507			2SK515	
	2SK508					2SK508	
LNF AMP	2SA990						
	2SA991						
	2SA992		2SA1174			2SA1247	
	2SC1842						
	2SC1843						
	2SC1844						
	2SC1845		2SC2784			2SC3115	
	2SK163					2SK426*	
		2SA1138					
		2SC2676					
Driver, Output	2SA952		2SB810			2SB624	
	2SA953					2SB736	
	2SA954					2SB736A	2SB800
	2SA1376					2SA1330	
	2SA1465		2SA1466			2SA1467	
							2SA1173
		2SB564	2SB811				2SB798
		2SB605					2SB799
		2SB733					
		2SB734					
	2SB1068						2SB1114
	2SB1116						2SB1115
	2SB1116A						2SB1115A
							2SB804
							2SB805
							2SB806
	2SB1300						2SB1301
	2SC2001		2SD1020			2SD596	
2SC2002					2SD780		
2SC2003					2SD780A	2SD1001	
2SC3478					2SC3360		

() STAND FOR SIMILARITY

* Under development

QUICK REFERENCE GUIDE

APPLICATION	TO-92 (Fig. 1)	SP-8 (Fig. 2)	SST (Fig. 3)	DISK MOLD (Fig. 4)	SUPER MINI MOLD (Fig. 11)	MINI MOLD	POWER MINI
Driver, Output	2SC3740		2SC3741			2SC3742	
		2SC1940				2SC1653	2SC2780
		2SC1941				2SC1654	
		2SC3209					2SC3554
	2SC3615						2SC3617
	2SC3616						2SC3618
		2SD471					2SD999
		2SD571					2SD1000
		2SD773					
		2SD774					
	2SD1513						2SD1614
	2SD1616						2SD1615
	2SD1616A						2SD1615A
							2SD1005
							2SD1006
							2SD1007
2SD1698	2SD1697					2SD1699	
2SD1701	2SD1700					2SD1702	
	2SD1581					2SD1950	
2SD1951						2SD1952	
ECM			2SK540			2SK67A	
AF AMP, SW	2SA1209		2SA1459		2SA1610	2SA1462	
	2SA1153				2SA1608	2SA1464	
		2SA1460					2SA1463
			2SA1458			2SA1461	
	2SC2720				2SC4173	2SC3739	
	2SC2901		2SC3732		2SC4176	2SC3735	
		2SC3733					2SC3736
			2SC3731			2SC3734	
SCR	03P2M						03P2J
	03P4M						03P4J
	03P5MG						03P5J

QUICK REFERENCE GUIDE

APPLICATION	TO-220AB (Fig. 15)	TO-126 (Fig. 14)	MP-3 (Fig. 12)	MP-3 (Fig. 13)
PO. AMP. SW		2SB1151	2SA1385	2SA1385-Z
		2SB772	2SB962	2SB962-Z
		2SB1217	2SB1261	2SB1261-Z
		2SD1691	2SC3518	2SC3518-Z
	2SD794		2SD1448	2SD1448-Z
		2SD1694	2SD1584	2SD1584-Z
High Voltage		2SD1818	2SD1899	2SD1899-Z
		2SA1156	2SA1400	2SA1400-Z
	(2SA1009A)		2SA1412	2SA1412-Z
		2SA1486	2SA1413	2SA1413-Z
	(2SB546A)			2SB768
		2SC2688		2SC2802
			2SC2885	
			2SC2946	2SC2946 (1)
		2SC2752	2SC3588	2SC3588-Z
	(2SC2333)		2SC3631	2SC3631-Z
Derlington		2SC3940	2SC3632	2SC3632-Z
	(2SD401A)		2SD1557	2SD1033
		2SD985	2SD1164	2SD1164-Z
		2SK802	2SK801	2SK801-Z
Power MOS FET		2SK702	2SK1060*	2SK1060*
		2SK704	2SK1059*	2SK1059*

2

() STAND FOR SIMILARITY

* Under development

• Diodes

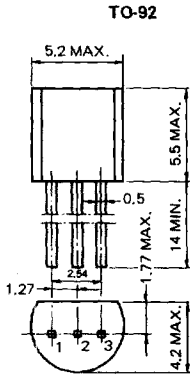
APPLICATION	DO-35 (Fig. 9)	DO-34 (Fig. 9)	SUPER MINI MOLD	MINI MOLD (Fig. 6)	LEADLESS (Fig. 10)	
BAND SW DI				1SS153		
High Speed Switching (Single)				1SS220		
			1SS305	1SS221		
				1SS222		
				1SS223		
	1S953	1SS202			LS953	
	1S954				LS954	
	1S955				LS955	
	(Double)				1S2835	
				1SS303	1S2836	
					1S2837	
			1SS304	1S2838		
Switching	1SS53	1SS205		1SS123	LS53	
	1SS54	1SS206			LS54	
	1SS55	1SS207			LS55	

• Zener Diodes

APPLICATION	DO-41	DO-35	DO-34	MINI MOLD	POWER MINI	LEADLESS
General		RD2.0E to RD120E	RD2.0ES to RD39ES	RD2.0M to RD47M		RD2.0L to RD39L
	RD2.0F RD82F				RD2.0P to RD120P	
Low Noise Sharp Break Down			RD4.7JS to RD39JS			RD4.7K to RD39K
Bidirectional			RD8.2EW RD9.1EW			

QUICK REFERENCE GUIDE

2. PACKAGE DIMENSIONS ^{NOTE 1} (Unit: mm)



EIAJ : SC-43B
 JEDEC : TO-92
 IEC : PA33

Fig. 1

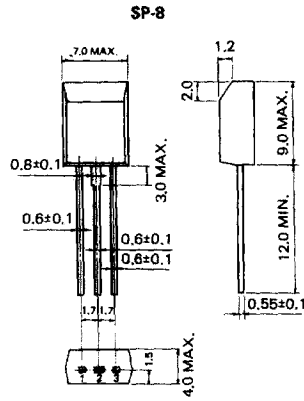


Fig. 2

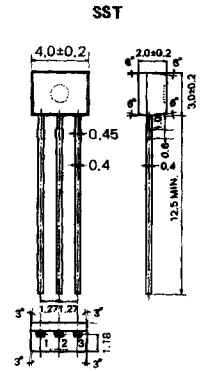


Fig. 3

3 PIN DISK MOLD

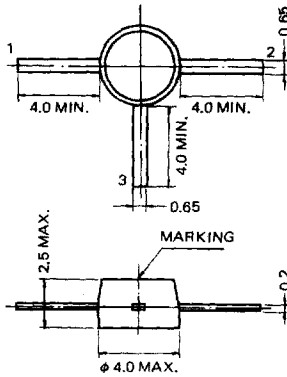


Fig. 4

4 PIN DISK MOLD

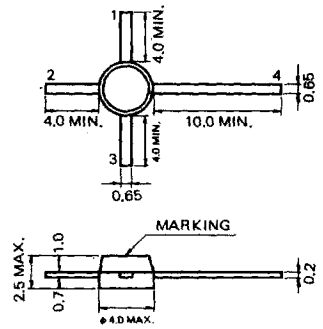
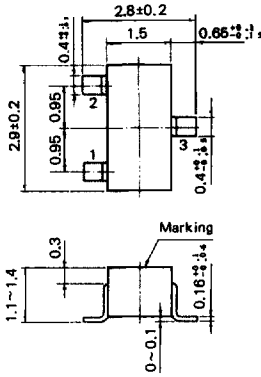


Fig. 5

NOTE 1: This list gives general information on the packages
 See each catalogue for details.

3 PIN MINI MOLD



EIAJ : SC-59

Fig. 6

4 PIN MINI MOLD

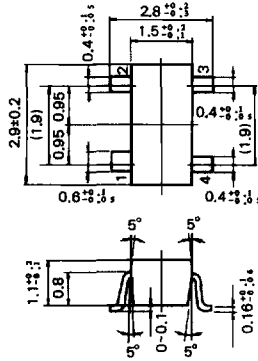
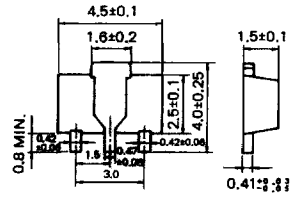


Fig. 7

POWER MINI MOLD



EIAJ : SC-62

Fig. 8

DO-35

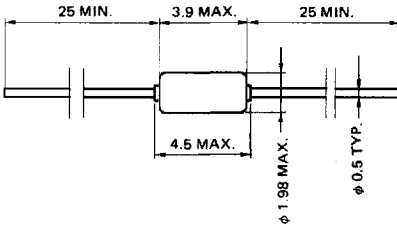


Fig. 9

Leadless Type

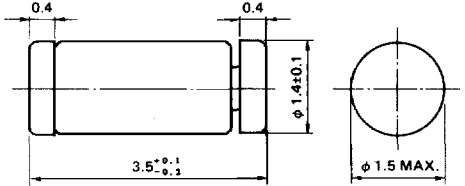


Fig. 10

SUPER MINI MOLD

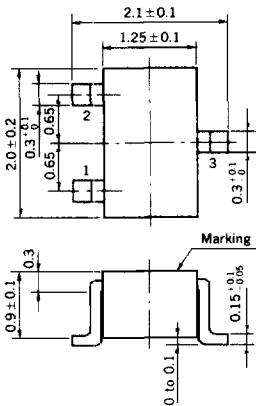


Fig. 11

QUICK REFERENCE GUIDE

MP-3

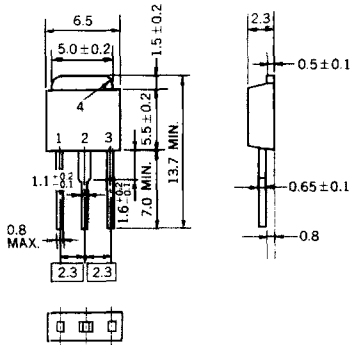


Fig. 12

MP-3 (EIAJ : SC-63)

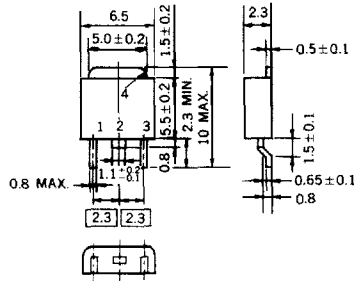


Fig. 13

TO-126

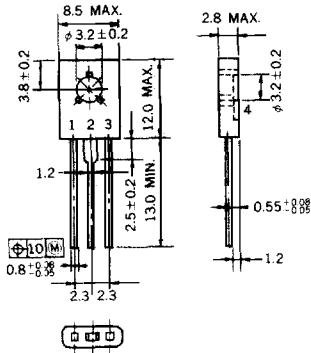


Fig. 14

TO-220AB

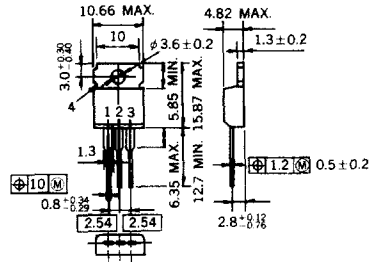


Fig. 15