

Surface Mount Devices



Surface Mount Transistors

General Purpose Amplifiers and Switches—NPN

Type No.	Case Style	V _{CB0} (V) Min	V _{CE0} (V) Min	V _{EB0} (V) Min	I _{CB0} (mA) @ V _{CB} Max	h _{FE} Min	h _{FE} Max	I _C & V _{CE}		V _{BE(SAT)} (V) Max	V _{BE(SAT)} (V) Min	I _C (mA) @ V _{BE(SAT)} Min	I _C (mA) @ V _{BE(SAT)} Max	C _{ob} (pF) Max	f _T (MHz) Min	f _T (MHz) Max	t _{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
								I _C (mA) Min	V _{CE} (V) Min											
MMBT 100	TO-236 (49)	75	45	6	50	80	0.1	1	0.2	0.85	10	20	4.5	250	20			4	(Note 1)	10
							100	1	0.4	1.0	200									
MMBT 100A	TO-236 (49)	75	45	6	50	300	600	1	0.2	0.85	10	20	4.5	250	20			4	(Note 1)	10
						100	1	0.4	1.0	200										
MMBT 101	TO-236 (49)	75	45	6	50	60	375	1	0.2	0.85	10	20	4.5	250	20			4	(Note 1)	10
						50	1	0.4	1.0	200										
MMBT 2218	TO-236 (49)	60	30	6	10	20	500	10	0.4	1.3	150	20	8	250	20					10
						40	120	10	0.4	1.3	150	20	8	250	20					
MMBT 2218A	TO-236 (49)	75	40	6	10	25	500	10	0.3	0.6	1.2	150	8	250	20		285		(Note 7)	10
						20	150	1	0.3	0.6	1.2	150	8	250	20					
MMBT 2219	TO-236 (49)	60	30	5	10	30	500	10	0.4	1.3	150	20	8	300	20					10
						50	150	1	0.4	1.3	150	20	8	300	20					
						75	10	10	1.0	2.6	500									
						50	1	10	1.0	2.6	500									

Surface Mount Transistors

General Purpose Amplifiers and Switches—NPN (Continued)

Type No.	Case Style	V _{CB0} (V)	V _{CEO} (V)	V _{EB0} (V)		I _{CB0} (mA) @ (V)		h _{FE} @ I _C & V _{CE} (V)		V _{CE(SAT)} (V)		V _{BE(SAT)} (V) @ I _C (mA)		C _{ob} (pF) Max	f _T (MHz)		t _{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.					
				Min	Max	Min	Max	Min	Max	Min	Max	Min	Max		Min	Max									
MMBT 2219A	TO-236 (49)	75	40	6	10	60	500	10	10	0.6	1.2	150	8	300	20	285			(Note 2)	10					
																					40	150	1		
																					100	300	150	10	
MMBT 2221	TO-236 (49)	60	30	5	10	50	500	10	10	0.4	1.3	150	8	250	20					10					
																					20	150	1		
																					40	120	150	10	
MMBT 2221A	TO-236 (49)	75	40	6	10	60	500	10	10	0.3	1.2	150	8	300	20	285			(Note 2)	10					
																					25	10	10		
																					25	1	10		
MMBT 2222	TO-236 (49)	60	30	5	10	50	500	10	10	0.4	1.2	150	8	250	20					10					
																					35	10	10		
																					75	10	10		
MMBT 2222A	TO-236 (49)	75	40	6	10	60	500	10	10	1.6	2.6	500	8	300	20				4	(Note 3)	10				
																						100	300	150	10
																						40	500	10	10

Surface Mount Transistors

General Purpose Amplifiers and Switches—NPN (Continued)

Type No.	Case Style	V _{CB0} (V) Min	V _{CE0} (V) Min	V _{EB0} (V) Min	ICES* ICBO (nA) Max	V _{CB} (V)	I _{FE} @ I _C & V _{CE} (mA) Min Max	V _{CE(SAT)} (V) Max	V _{BE(SAT)} (V) Min Max	I _C (mA) @ I _C Min Max	C _{ob} (pF) Max	f _T (MHz) Min Max	t _{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
MMBT 2484	TO-236 (49)	60	60	5	10	45	250 800	0.35	1	1	6			3	(Note 13)	10
MMBT 2924	TO-236 (49)	25	25	5	100	25	150 300			2 10	10					10
MMBT 3392	TO-236 (49)	25	25	5	100	18	150 300			2 4.5	10					10
MMBT 3393	TO-226 (49)	25	25	5	100	18	90 180			2 4.5	10					10
MMBT 3414	TO-226 (49)	25	25	5	100	25	75 225	0.3	0.6 1.3	2 4.5						10
MMBT 3415	TO-226 (49)	25	25	5	100	25	160 540	0.3	0.6 1.3	2 4.5						10
MMBT 3416	TO-226 (49)	50	50	5	100	25	75 225	0.3	0.6 1.3	2 4.5						10
MMBT 3417	TO-226 (49)	50	50	5	100	25	180 540	0.3	0.6 1.3	2 4.5						10
MMBT 3566	TO-226 (49)	40	30	5	50	20	150 600	1.0		10 10	25	40 30				10
MMBT 3641	TO-226 (49)	60	30	5	50*	50	15 40	0.22		500 150	8	250 50				10
MMBT 3642	TO-226 (49)	60	45	5	50*	50	15 40	0.22		500 150	8	250 50				10
MMBT 3643	TO-226 (49)	60	30	5	50*	50	20 100	0.22		500 150	8	250 50				10

T-35-01

T-35-01

Surface Mount Transistors

General Purpose Amplifiers and Switches—NPN (Continued)

Type No.	Case Style	V _{CE0} (V) Min	V _{BE0} (V) Min	I _{CBO} (nA) @ Max	V _{CB} (V)	h _{FE} @ Min	I _C & V _{CE} (mA) (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} (V) Min	I _C (mA) @ Max	C _{ob} (pF) Max	f _T (MHz) @		t _{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
												Min	Max				
MMBT 5128	TO-236 (49)	15	3	50	10	35	50 10	0.25	1.1	150	10	150	800				10
MMBT 5135	TO-236 (49)	30	4	300	15	50	600 10	1.0	1.0	150	35	40	300				10
MMBT 5136	TO-236 (49)	30	3	100	20	20	400 150 1	0.25	1.0	150	35	40	400				10
MMBT 5137	TO-236 (49)	30	3	100	20	20	400 150 1	0.25	1.1	150	35	40	400				10
MMBT 5172	TO-236 (49)	25	5	100	25	100	500 10 10	0.25		10	10						10
MMBT 5223	TO-236 (49)	25	3	100	10	50	800 2 10	0.7	1.2	10	4	150	10				10
MMBT 6515	TO-236 (49)	40	4	50	30	250	500 2 10	0.5		5.0	3.5						10
MMBT 6520	TO-236 (49)	40	4	50	30	200	400 2 10	0.5		50	3.5						10
MMBT 6521	TO-236 (49)	40	4	50	30	300	600 2 10	0.5			3.5						10
MMBT A20	TO-236 (49)		4	100	30	40	400 5 10	0.25		10	4	125	5				10

Surface Mount Devices

Surface Mount Devices

Surface Mount Transistors

General Purpose Amplifiers and Switches—NPN (Continued)

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							Min	Max						
MMBT 4400	TO-236 (49)	40	6		20 40 1 10	0.4 0.75	0.75 0.95 1.2 500	150 500	6.5					13
MMBT 4401	TO-236 (49)	40	6		20 40 80 100 100 300 40 500	0.4	0.75 0.95 1.2 500	150 500	6.5	250				13
MMBT L01	TO-236 (49)	120	5	100 75	50 300	0.2 0.3	1.2 1.4 1.4 50	10 50	8	60				16
MMBT 5551	TO-236 (49)	160	6	50 120	80 250 30 50	0.15 0.20	1.0 50	10 50	6	100 300				16
MMBT 5830	TO-236 (49)	100	5	50 100	60 80 80 500 80 50	0.15 0.2 0.25	0.8 1.0 1.0 50	1 10 50	4	100 500				16
MMBT 5831	TO-236 (49)	140	5	50 100	60 80 80 250 80 50	0.15 0.2 0.25	0.8 1.0 1.0 50	1 10 50	4	100 500				16
MMBT 5833	TO-236 (49)	180	6	10 160	50 250 50 50	0.15 0.2 0.25	0.8 1.0 1.0 50	1 10 50	4	100 500				16
MMBT 5965	TO-236 (49)	180	5	50 160	50 250 50 50	0.15 0.2 0.25	0.8 1.0 1.0 50	1 10 50	4	100 500				16

T-35-01

Surface Mount Transistors

General Purpose Amplifiers and Switches—NPN (Continued)

Type No.	Case Style	V _{CE0} (V)		V _{BE0} (V)		I _{CBO} (nA) @ (V)		h _{FE} @ I _C & V _{CE} (mA) (V)		V _{CE(SAT)} (V) @ I _C (mA)		V _{BE(SAT)} (V) @ I _C (mA)		C _{ob} (pF)		f _T (MHz) @ I _C (mA)		t _{off} (ns)		NF (dB) Max	Test Conditions	Process No.
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max			
MMBT 3693	TO-236 (49)	45	45	4	4	50	30	40	160	10	10			6	200	500	10					23
MMBT 3694	TO-236 (49)	45	45	4	4	50	30	100	400	10	10			6	200	500	10					23
MMBT 3903	TO-236 (49)	60	40	6	6			20	0.1	1	0.2	0.65	0.85	10	4	250	10				(Note 8)	23
MMBT 3904	TO-236 (49)	60	40	6	6			35	1	1	0.2	0.65	0.85	10	4	300	10				(Note 8)	23
MMBT 3946	TO-236 (49)	60	40	6	6			50	150	10	0.2	0.65	0.9	10	4	250	10				(Notes 6, 7)	23
MMBT 4123	TO-236 (49)	40	30	5	5	50	20	25	50	1	0.3	0.95	50	4	250	10					(Note 7)	23
MMBT 4124	TO-236 (49)	30	25	5	5	50	20	60	50	1	0.3	0.95	50	4	300	10					(Note 7)	23
MMBT 6514	TO-236 (49)	40	25	4	4	50	30	90	100	10	0.5		50	3.5								23

TEST CONDITIONS:

- Note 1: I_C = 300 mA, V_{CC} = 10V, I_B¹ = I_B² = 30 mA
- Note 2: I_C = 150 mA, V_{CC} = 6V, I_B¹ = I_B² = 15 mA
- Note 3: I_C = 300 mA, V_{CC} = 15V, I_B¹ = I_B² = 30 mA
- Note 4: I_C = 300 mA, V_{CC} = 30V, I_B¹ = I_B² = 30 mA
- Note 5: I_C = 10 mA, V_{CC} = 3V, I_B¹ = I_B² = 1 mA
- Note 6: I_C = 100 μA, V_{CE} = 5V, f = 100 Hz
- Note 7: I_C = 30 μA, V_{CE} = 5V, f = 1 kHz
- Note 8: I_C = 100 μA, V_{CE} = 5V, f = 1 kHz

- Note 9: I_C = 250 μA, V_{CE} = 5V, f = 1 kHz
- Note 10: I_C = 10 μA, V_{CE} = 5V, f = 1 kHz
- Note 11: I_C = 50 mA, V_{CC} = 30V, I_B¹ = I_B² = 5 mA
- Note 12: I_C = 150 mA, V_{CC} = 30V, I_B¹ = I_B² = 15 mA
- Note 13: I_C = 50 mA, V_{CC} = 10V, I_B¹ = I_B² = 5 mA
- Note 14: I_C = 500 mA, V_{CC} = 30V, I_B¹ = I_B² = 50 mA
- Note 15: I_C = 100 μA, V_{CE} = 10V, f = 1 kHz
- Note 16: I_C = 200 μA, V_{CE} = 5V, f = 1 kHz

- Note 17: I_C/I_B = 40
- Note 18: I_C/I_B = 20
- Note 19: I_C = 250 μA, V_{CE} = 5V, f = 10 Hz - 10 kHz
- Note 20: I_C = 250 μA, V_{CE} = 5V, f = 100 Hz
- Note 21: I_C = 30 μA, V_{CE} = 5V, f = 1 kHz
- Note 22: I_C = 250 μA, V_{CE} = 5V, f = 10 kHz
- Note 23: I_C = 1 mA, V_{CE} = 10V, f = 1 MHz

T-35-01

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