



TOLL FREE NUMBER 800-777-3960

multiple devices

dual transistors

Type	Polarity	Breakdown Voltages (volts)			$h_{FE} @ I_C$ $V_{CE} = 5.0V$		$h_{FE-1}/h_{FE-2}$ $V_{CE} = 5.0V$	$V_{BE-1} - V_{BE-2}$		$\Delta(V_{BE-1} - V_{BE-2})$ $\Delta T = -55 \text{ to } +125^\circ C$		$I_{CBO}$ Max. (nA)	Case Style	
		$V_{CB}$	$V_{CE}$	$V_{EB}$	Min.	Max.		$\mu A$	Min.	$I_C$ ( $\mu A$ )	Max. (mV)			$I_C$ ( $\mu A$ )
2N2060	NPN	100	60	7	30	90	—	0.9	—	5.0	—	10	—	TO-77
2N2060A	NPN	100	60	7	30	90	—	0.9	—	3.0	—	10	—	TO-77
2N2060B	NPN	100	60	7	30	90	—	—	—	1.5	—	5	—	TO-77
2N2223	NPN	100	—	—	25	150	—	—	—	15.0	—	25	—	TO-77
2N2223A	NPN	100	—	—	25	150	—	—	—	5.0	—	25	—	TO-77
2N2453	NPN	60	30	7	150	600	1000	0.9	1000	3.0	10	10	10	TO-78
2N2453A	NPN	80	50	7	150	600	1000	0.9	1000	3.0	10	5	10	TO-78
2N2490	NPN	75	40	5	20	—	—	0.8	—	10.0	—	—	—	TO-77
2N2490A	NPN	80	40	5	35	—	—	0.8	—	5.0	—	—	—	TO-77
2N2639	NPN	45	45	5	300	300	10	0.9	10	5.0	10	10	10	TO-78
2N2640	NPN	45	45	5	50	300	10	0.8	10	10.0	10	20	10	TO-78
2N2641	NPN	45	45	5	50	300	10	—	—	—	—	—	—	TO-78
2N2642	NPN	45	45	5	100	300	10	0.9	10	5.0	10	10	10	TO-78
2N2643	NPN	45	45	5	100	300	10	0.8	10	10.0	10	20	10	TO-78
2N2644	NPN	45	45	5	100	300	10	—	—	—	—	—	—	TO-78
2N2907	PNP	25	20	5	40	120	—100	—	—	—	—	—	—10	TO-78
2N2903	NPN	60	30	7	125	625	1000	0.8	1000	10.0	10	20	10	TO-78
2N2903A	NPN	60	30	7	125	625	1000	0.9	1000	5	10	10	10	TO-78
2N2910	NPN	45	25	—	70	—	—	—	—	—	—	—	—	TO-79
2N2913	NPN	45	45	6	60	240	10	—	—	—	—	—	10	TO-78
2N2914	NPN	45	45	6	150	600	10	—	—	—	—	—	10	TO-78
2N2915	NPN	45	45	6	60	240	10	0.9	100	3	100	10	100	TO-78
2N2915A	NPN	45	45	6	100	—	—	—	—	1.5	—	5	—	TO-77
2N2916	NPN	45	45	6	150	600	10	0.9	100	3	100	10	100	TO-78
2N2916A	NPN	45	45	6	225	—	—	—	—	1.5	—	5	—	TO-77
2N2917	NPN	45	45	6	60	240	10	0.8	100	5.0	100	20	100	TO-78
2N2918	NPN	45	45	6	150	600	10	0.8	100	5.0	100	20	100	TO-78
2N2919	NPN	60	60	6	60	240	10	0.9	100	3.0	100	3.0	100	TO-78
2N2919A	NPN	60	60	6	100	—	—	—	—	1.5	—	5	—	TO-77
2N2920	NPN	60	60	6	150	600	10	0.9	100	3.0	100	10	100	TO-78
2N2920A	NPN	60	60	6	100	—	—	—	—	1.5	—	5	—	TO-77
2N2972	NPN	45	45	6	60	240	10	—	—	—	—	—	10	TO-71
2N2973	NPN	45	45	6	150	600	10	—	—	—	—	—	10	TO-71
2N2974	NPN	45	45	6	60	240	10	0.9	100	3.0	100	10	100	TO-71
2N2975	NPN	45	45	6	150	600	10	0.9	100	3.0	100	10	100	TO-71
2N2976	NPN	45	45	6	60	240	10	0.8	100	5.0	100	20	100	TO-71
2N2977	NPN	45	45	6	150	600	10	0.8	100	5.0	100	20	100	TO-71
2N2978	NPN	60	60	6	60	240	10	0.9	100	3.0	100	10	100	TO-71
2N2979	NPN	60	60	6	150	600	10	0.9	100	3.0	100	10	100	TO-71
2N3423	NPN	30	15	3	20	200	—	0.8	—	10.0	—	40	—	TO-79
2N3424	NPN	30	15	3	20	200	—	0.9	—	5.0	—	20	—	TO-79
2N3650	NPN	60	50	6	300	—	—	0.9	—	3.0	—	5	—	TO-79
2N3907	NPN	60	45	6	60	300	—	0.9	—	1.0	—	5	—	TO-79
2N3908	NPN	60	60	6	100	500	—	0.9	—	1.0	—	5	—	TO-79

unijunction transistors

2N489	450	6.8	0.62	8.0	20	12 @ 60	5.0
2N489A	450	6.8	0.62	8.0	15	12 @ 60	4.0
2N489B	450	6.8	0.62	8.0	6.0	0.2 @ 60	4.0
2N490	450	9.1	0.62	8.0	20	12 @ 60	5.0
2N490A	450	9.1	0.62	8.0	15	12 @ 60	4.0
2N490B	450	9.1	0.62	8.0	6.0	0.2 @ 60	4.0
2N490C	450	9.1	0.51	8.0	—	—	—
2N491	450	6.8	0.68	8.0	20	12 @ 60	5.0
2N491B	450	6.8	0.68	8.0	6.0	0.2 @ 60	4.3
2N492	450	9.1	0.68	8.0	20	12 @ 60	5.0
2N492A	450	9.1	0.68	8.0	15	12 @ 60	4.3
2N492B	450	9.1	0.68	8.0	6.0	0.2 @ 60	4.3
2N492C	450	9.1	0.56	8.0	—	—	—
2N493	450	6.8	0.75	8.0	20	12 @ 60	5.0
2N493A	450	6.8	0.75	8.0	15	—	—
2N493B	450	6.8	0.75	8.0	6.0	0.2 @ 60	5.0
2N494	450	9.1	0.75	8.0	20	12 @ 60	5.0
2N494A	450	9.1	0.75	8.0	15	12 @ 60	4.6
2N494B	450	9.1	0.75	8.0	6.0	0.2 @ 60	4.6
2N494C	450	9.1	0.62	8.0	2.0	0.02 @ 60	4.6
2N1671	450	9.1	0.62	8.0	25	12 @ 30	5.0
2N1671A	450	9.1	0.62	8.0	25	12 @ 30	5.0
2N1671B	450	9.1	0.62	8.0	6.0	0.2 @ 30	5.0
2N1671C	450	4.1-9.1	—	—	—	—	—
2N2160	450	4.0-12	0.47-0.80	8.0	25	12 @ 30	—
2N2646.7	300	4.7-9.1	0.56-0.75	4.0	5	12 @ 30	2.0
2N2647	300	4.7-9.1	0.68-0.82	8.0	2.0	0.2 @ 30	3.5
2N4851	300	4.7-9.1	0.56-0.75	2.0	2.0	0.1 @ 30	*2.5
2N4852	300	4.7-9.1	0.70-0.85	4.0	2.0	0.1 @ 30	*2.5
2N4853	300	4.7-9.1	0.70-0.85	6.0	0.4	0.05 @ 30	*2.5
2N6027.8	300	—	—	—	—	—	—

PROGRAMMABLE

\*See full specifications

## case outline drawings

**FIG. "A" AXIAL (NOTE 2)**

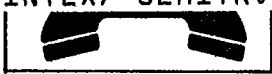
**FIG. "B" PERIPHERAL (NOTE 3)**

**SECTION X-X**

PACKAGE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	NOTES
Y220n/	.140	.045	.020	.012	.840	.340				.180	.040	.530	.040				.050	.340	.127	.100	.580	2	
TO350AA	.180	.075	.045	.045	.885	.420				.210	.045	.570	.115										
Y220D	.140	.045	.020	.012	.840	.340				.180	.040	.530	.040				.050	.340	.127	.100	.580	2	
TO350AB	.180	.075	.045	.045	.885	.420				.210	.045	.570	.115										
TO350B	.180	.075	.045	.045	.885	.420				.210	.045	.570	.115										

**NOTES:**

1. Refer to rules for dimensioning semiconductor product outlines included in Publication No. 76.
2. Figure "A", Axial Terminal Configuration, applicable.
3. Figure "B", Peripheral Terminal Configuration, applicable.
4. Alternate lead configurations allowed within C and D.
5. Tab contour optional within M and P.
6. Chamfer optional.
7. Position of lead to be measured .050 - .055 below seating plane.
8. Position of lead to be measured .250 - .325 from bottom of dimension E.



T-91-20

case outline drawings cont'd

**D01-3**

**D013**

**D027**

**D04**

**D035**

**D041**

**D05**

**A249**

	A	B	C	D	E	F
AA48	1.87	1.87	1.87	1.87	1.87	1.87
AA48B	1.87	1.87	1.87	1.87	1.87	1.87
AA48C	1.87	1.87	1.87	1.87	1.87	1.87
AA48D	1.87	1.87	1.87	1.87	1.87	1.87
AA48E	1.87	1.87	1.87	1.87	1.87	1.87
AA48F	1.87	1.87	1.87	1.87	1.87	1.87
AA48G	1.87	1.87	1.87	1.87	1.87	1.87
AA48H	1.87	1.87	1.87	1.87	1.87	1.87
AA48I	1.87	1.87	1.87	1.87	1.87	1.87
AA48J	1.87	1.87	1.87	1.87	1.87	1.87
AA48K	1.87	1.87	1.87	1.87	1.87	1.87
AA48L	1.87	1.87	1.87	1.87	1.87	1.87
AA48M	1.87	1.87	1.87	1.87	1.87	1.87
AA48N	1.87	1.87	1.87	1.87	1.87	1.87
AA48O	1.87	1.87	1.87	1.87	1.87	1.87
AA48P	1.87	1.87	1.87	1.87	1.87	1.87
AA48Q	1.87	1.87	1.87	1.87	1.87	1.87
AA48R	1.87	1.87	1.87	1.87	1.87	1.87
AA48S	1.87	1.87	1.87	1.87	1.87	1.87
AA48T	1.87	1.87	1.87	1.87	1.87	1.87
AA48U	1.87	1.87	1.87	1.87	1.87	1.87
AA48V	1.87	1.87	1.87	1.87	1.87	1.87
AA48W	1.87	1.87	1.87	1.87	1.87	1.87
AA48X	1.87	1.87	1.87	1.87	1.87	1.87
AA48Y	1.87	1.87	1.87	1.87	1.87	1.87
AA48Z	1.87	1.87	1.87	1.87	1.87	1.87

**D07**

MILLIMETER DIMENSIONS ARE DERIVED FROM ORIGINAL INCH DIMENSIONS

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
#B	.012	.023	0.458	0.558	1
#D	.005	.107	2.16	2.71	1
C	.730	.740	5.85	7.62	1
L	1.000	-	25.40	-	1
L <sub>1</sub>	-	.650	-	1.627	2

**D08**

**C212**

**C223**

SPACED ON 200 (51) CENTERS

LEADS .050 (1) DIA

250 (16.4)

750 (119.1)

DIMENSIONS IN INCHES AND MILLIMETERS

**D09**

**D010**

**F22**

	A	B	C	D	E	F	G	H
F22	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22A	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22B	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22C	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22D	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22E	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22F	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22G	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22H	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22I	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22J	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22K	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22L	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22M	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22N	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22O	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22P	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22Q	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22R	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22S	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22T	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22U	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22V	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22W	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22X	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22Y	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
F22Z	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87