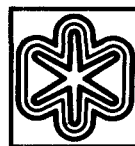


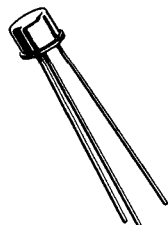
2N2156-2N2229

TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS									
						P_D	T_J	V_{CB}	V_{CE-}	Subscript	h_{FE} @ I_C		$V_{CE(SAT)}$ @ I_C		h_{r-}	Subscript	f_{-}	Subscript			
						@ 25°C	Ref Point	(volts)	(volts)		(min)	(max)	Units	Units					Units	Units	
2N2156	G	P		7-82	LPA	170W	C	110	45	4.5	S	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2156A	G	P		7-82	LPA	170W	C	110	45	30	O	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2157	G	P		7-82	LPA	170W	C	110	60	60	S	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2157A	G	P		7-82	LPA	170W	C	110	60	4.5	O	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2158	G	P		7-82	LPA	170W	C	110	75	75	S	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2158A	G	P		7-82	LPA	170W	C	110	75	60	O	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2159	G	P		7-82	LPA	170W	C	110	90	90	S	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2159A	G	P		7-82	LPA	170W	C	110	90	65	O	80	160	5.0A	0.1	5.0A			2.0K	E	
2N2160	Unijunction Transistor, see Table on Page 1-174																				
2N2161	S	N			HSS	200M	A	150	55	35	O	60	160	10M	1.5	10M	75	E			
2N2162	S	N			CHP	150M	A	140	30	30	O								14M	T	
2N2163	S	N			CHP	150M	A	140	15	15	O								14M	T	
2N2164	S	P			CHP	150M	A	140	12	8.0	O								24M	T	
2N2165	S	P			CHP	150M	A	140	30	30	O								10M	T	
2N2166	S	P			CHP	150M	A	140	15	15	O								10M	T	
2N2167	S	P			CHP	150M	A	140	12	8.0	O								16M	T	
2N2168	S	P			HSS	60M	A	100	20	15	O	50		10M	0.125	10M					
2N2169	G	P			HSS	60M	A	100	15	15	O	40		10M	0.15	10M					
2N2170	G	P			HSS	60M	A	100	15	10	O	20		10M	0.18	10M					
2N2171	G	P		6-10	AFA	0.2W	A	100	50	25	R	110	250	20M							
2N2172	G	P			MSS	200M	A	85	20	15	O	30	150	10M	0.2	10M	0.97	E	5.0M	B	
2N2173	G	P			HSS	240M	A	100	25	15	O	30		200M	0.4	200M					
2N2175	G	P			AFA	0.1W	A	175	6.0	6.0	O	30		20*					10M	T	
2N2176	S	P			AFA	0.1W	A	175	6.0	6.0	O	30		20*					10M	T	
2N2177	S	P			AFA	0.1W	A	160	6.0	6.0	O	15		5.0*					50	E	
2N2178	S	P			AFA	0.1W	A	160	6.0	6.0	O	15		5.0*					50	E	
2N2180	S	P			HSS	50M	A	100	15	6.0	O	100		10M	0.08	10M	120	E	6.0M	T	
2N2181	S	P			CHP	150M	A	140	25	25	O	10		5.0M					6.0M	T	
2N2182	S	P			CHP	150M	A	140	25	25	O	10		5.0M					6.0M	T	
2N2183	S	P			CHP	150M	A	140	15	10	O	10		5.0M					6.0M	T	
2N2184	S	P			CHP	150M	A	140	15	10	O	10		5.0M					6.0M	T	
2N2185	S	P			CHP	150M	A	140	30	30	O								6.5M	T	
2N2186	S	P			CHP	150M	A	140	30	30	O								6.5M	T	
2N2187	S	P			CHP	150M	A	140	30	30	O								6.5M	T	
2N2188	G	P	2N3323	9-71	RFA	125M	A	85	40	25	O	40	160	1.5M				40	E	60M	T
2N2189	G	P	2N3323	9-71	RFA	125M	A	85	40	25	O	60	180	1.5M				40	E	102M	T
2N2190	G	P	2N3323	9-71	RFA	125M	A	85	60	25	O	40	160	1.5M				60	E	60M	T
2N2191	G	P	2N3323	9-71	RFA	125M	A	85	60	25	O	60	180	1.5M				60	E	102M	T
2N2192	S	N		8-106	HSA	800M	A	200	60	40	O	100	300	150M	0.35	150M					
2N2192A	S	N		8-106	HSA	800M	A	200	60	40	O	100	300	150M	0.25	150M					
2N2192B	S	N		8-106	HSA	800M	A	200	60	40	O	100	300	150M	0.18	150M					
2N2193	S	N		8-106	HSA	800M	A	200	80	50	O	40	120	150M	0.35	150M					
2N2193A	S	N		8-106	HSA	800M	A	200	80	50	O	40	120	150M	0.25	150M					
2N2193B	S	N		8-106	HSA	800M	A	200	80	50	O	40	120	150M	0.18	150M					
2N2194	S	N		8-106	HSA	800M	A	200	60	40	O	20	60	150M	0.35	150M					
2N2194A	S	N		8-106	HSA	800M	A	200	60	40	O	20	60	150M	0.25	150M					
2N2194B	S	N		8-106	HSA	800M	A	200	60	40	O	20	60	150M	0.18	150M					
2N2195	S	N		8-106	HSA	800M	A	200	45	25	O	20		150M	0.35	150M					
2N2195A	S	N		8-106	HSA	800M	A	200	45	25	O	20		150M	0.25	150M					
2N2195B	S	N		8-106	HSA	800M	A	200	45	25	O	20		150M	0.18	150M					
2N2196	S	N			LPA	2.0W	A	175	80	60	R	30	90	0.2A	2.0	0.2A	30	E			
2N2197	S	N			LPA	2.0W	A	175	80	60	R	75	200	0.2A	2.0	0.2A	30	E			
2N2198	S	N			RFA	5.5M	A	200	80	80	O	35	55	0.1A	6.0	0.2A			4.0M	T	
2N2199	S	N			RFA	75M	A	100	15	10	O	9.0		3.0M			20	E	120M	T	
2N2200	G	P			RFA	75M	A	100	15	10	O	9.0		3.0M					120M	T	
2N2201	S	N	2N3738	7-133	AFA	1.0W	C	175	120	100	O	25	90	200M	1.7	200M	30	E			
2N2202	S	N	2N3738	7-133	AFA	1.0W	C	175	120	100	O	25	90	200M	1.7	200M	30	E			
2N2203	S	N	2N3738	7-133	AFA	1.0W	C	175	120	100	O	25	90	200M	1.7	200M	30	E			
2N2204	S	N	2N3738	7-133	AFA	1.0W	C	175	120	100	O	25	90	200M	1.7	200M	30	E			
2N2205	S	N	2N835	8-54	HSS	1.0W	C	175	25	12	O	20		10M	0.22	10M	2.0	E			
2N2206	G	P	2N835	8-54	HSS	1.0W	C	175	25	12	O	40	120	10M	0.22	10M	2.0	E			
2N2207	S	N			VID	0.26W	A	75	70	50	R	36	370	10M					140M	B	
2N2208	G	P			RFC	120M	A	85	40	10	O	15		1.5M			30	E			
2N2209	G	P			MSS	150M	A	85	30	12	O	50		24M	0.15	12M			6.0M	B	
2N2210	G	P	2N2075	7-75	LPA	75W	C	100	100	65	S	25	50	5.0A	0.6	12A			5.0K	E	
2N2211	G	P	2N2075	7-75	LPA	90W	C	100	80	60	S	60	140	1.0A	0.8	2.0A			5.0K	E	
2N2212	G	P	2N2075	7-75	HFA	100W	C	110	120	120	R	50	120	5.0A	1.0	5.0A			0.45M	T	
2N2214	S	N			HSS	0.25W	C	150	25	15	O	25		10M	0.2	10M			200M	T	
2N2216	S	N	2N3498	8-232	HSA	3.0W	C	200	150	100	O	25	120	50M	5.0	50M			50M	T	
2N2217	S	N	2N2218	8-108	HSA	0.8W	A	175	60	30	O	20	60	150M	0.4	150M			250M	T	
2N2218	S	N	2N2218	8-108	HSA	0.8W	A	175	60	30	O	40	120	150M	0.4	150M			250M	T	
2N2218A	S	N	2N2222	8-114	HSS	0.8W	A	175	75	40	O	40	120	0.15A	0.3	0.15A	30	E	250M	T	
2N2219	S	N	2N2222	8-114	HSA	0.8W															

2N2192, A, B thru 2N2195, A, B (SILICON)



$V_{CEO} = 25-50 \text{ V}$
 $I_C = 1 \text{ A}$
 $f_T = 250 \text{ MHz}$



NPN silicon annular transistors for high-current switching and amplifier applications.

CASE 31
(TO-5)

Collector connected to case

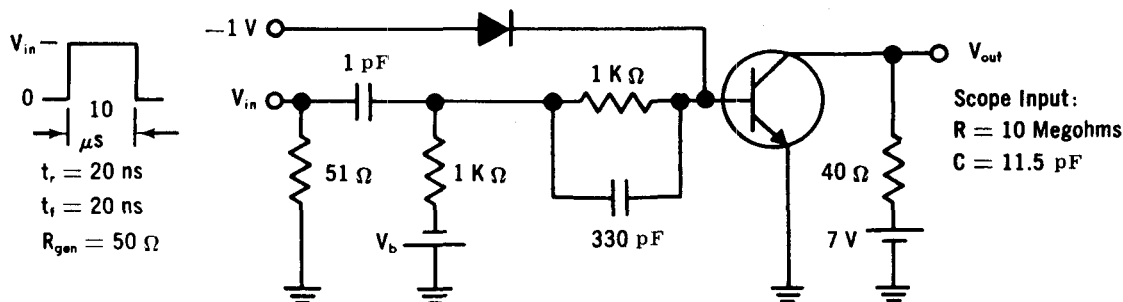
MAXIMUM RATINGS

Rating	Symbol	2N2192 2N2192A 2N2192B 2N2194 2N2194A 2N2194B	2N2193 2N2193A 2N2193B	2N2195 2N2195A 2N2195B	Unit
Collector-Base Voltage	V_{CB}	60	80	45	Vdc
Collector-Emitter Voltage	V_{CEO}	40	50	25	Vdc
Emitter-Base Voltage	V_{EB}	5	8	5	Vdc
Collector Current	I_C	1.0	1.0	1.0	Adc
Total Device Dissipation @ 25°C Ambient Temperature Derating Factor Above 25°C	P_D	0.8 4.56	0.8 4.56	0.6 3.43	Watt mW/°C
Total Device Dissipation @ 25°C Case Temperature Derating Factor Above 25°C	P_D	$\longleftrightarrow 2.8 \longleftrightarrow$ $\longleftrightarrow 16 \longleftrightarrow$			Watts mW/°C
Junction Temperature, Operating	T_J	-65 to +200			°C
Storage Temperature Range	T_{stg}	-65 to +200			°C

FIGURE 1

2N2193, A, B } $V_{in} = 15 \text{ V}, V_b = 15 \text{ V}$
 2N2194, A, B }

2N2192, A, B — $V_{in} = 7.5 \text{ V}, V_b = 7.5 \text{ V}$



2N2192,A,B thru 2N2195,A,B (continued)

ELECTRICAL CHARACTERISTICS (at 25°C unless otherwise specified)

Characteristic		Symbol	Min	Max	Unit
Collector-Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}$, $I_E = 0$)	2N2192, A, B, 2N2194, A, B 2N2193, A, B 2N2195, A, B	BV_{CBO}	60 80 45	- - -	Vdc
Collector Emitter-Open Base Sustain Voltage* ($I_C = 25 \text{ mA pulsed}$, $I_B = 0$)	2N2192, A, B, 2N2194, A, B 2N2193, A, B 2N2195, A, B	$V_{CEO(sus)}$ *	40 50 25	- - -	Vdc
Emitter-Base Breakdown Voltage ($I_E = 100 \mu\text{Adc}$, $I_C = 0$)	2N2192, A, B, 2N2194, A, B, 2N2195, A, B 2N2193, A, B	BV_{EBO}	5 5 8	- - -	Vdc
Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$)	2N2192, A, B, 2N2194, A, B 2N2195, A, B	I_{CBO}	-	.010 .100	μAdc
($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$, $T_A = 150^\circ\text{C}$)	2N2192, A, B 2N2194, A, B 2N2195, A, B		-	15 25 50	
($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$)	2N2193, A, B		-	.010	
($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$, $T_A = 150^\circ\text{C}$)	2N2193, A, B		-	25	
Emitter Cutoff Current ($V_{EB} = 3 \text{ Vdc}$, $I_C = 0$)	2N2192, A, B, 2N2194, A, B 2N2195, A, B	I_{EBO}	-	.050 .100	μAdc
($V_{EB} = 5 \text{ Vdc}$, $I_C = 0$)	2N2193, A, B		-	.050	
Collector-Emitter Saturation Voltage ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$)	2N2192 thru 2N2195 2N2192A thru 2N2195A 2N2192B thru 2N2195B	$V_{CE(sat)}$	-	0.35 0.25 0.18	Vdc
Base-Emitter Saturation Voltage ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$)	All Types	$V_{BE(sat)}$	-	1.3	Vdc
DC Current Gain* ($I_C = 0.1 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)	2N2192, A, B, 2N2193, A, B	h_{FE}^*	15	-	-
($I_C = 10 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)	2N2192, A, B 2N2193, A, B 2N2194, A, B		75 30 15	- - -	
($I_C = 10 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $T_A = -55^\circ\text{C}$)	2N2192, A, B 2N2193, A, B		35 20	- -	
($I_C = 150 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)	2N2192, A, B 2N2193, A, B 2N2194, A, B 2N2195, A, B		100 40 20 20	300 120 60 -	
($I_C = 150 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$)	2N2192, A, B 2N2193, A, B 2N2194, A, B 2N2195, A, B		70 30 15 10	- - - -	
($I_C = 500 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)	2N2192, A, B 2N2193, A, B 2N2194, A, B		35 20 12	- - -	
($I_C = 1.0 \text{ Adc}$, $V_{CE} = 10 \text{ Vdc}$)	2N2192, A, B, 2N2193, A, B		15	-	
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	All Types	C_{ob}	-	20	pF
Small Signal Current Gain ($I_C = 50 \text{ mA}$, $V_{CE} = 10 \text{ V}$, $f = 20 \text{ MHz}$)	All Types	h_{fe}	2.5	-	-
Rise Time	2N2192-94, 2N2192A-94A, 2N2192B-94B	t_r	-	70	ns
Storage Time		t_s	-	150	ns
Fall Time		t_f	-	50	ns

*Pulse Test: PW \leq 300 μs Duty Cycle \leq 2%