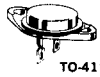
TYPE	MATERIAL	POLARITY	REPLACEMENT	PAGE NUMBER	USE	MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS							
						P_D @ 25°C	Ref Point	T_J °C	V_{CB} (volts)	V_{CE-} (volts)	Subscript	h_{FE} @ I_C (min)	(max)	Units	$V_{CE(SAT)}$ @ I_C (volts)	Units	h_{f-}	Subscript	f_- Units	Subscript
2N1471	G	P			MSS	200M	A	85	12	15	R						100	E	3.0M	B
2N1472	S	N			HSS	150M	A	150	25	25	O	20		10M	0.25	10M			75M	T
2N1473	G	N			MSS	167M	A	75	40	20	O	25	50	400M					4.0M	B
2N1474	S	P			AFA	0.25W	A	175	60	60	U						12	E	1.0M	B
2N1474A	S	P			AFA	0.25W	A	175	60	60	U						18	E	2.0M	B
2N1475	S	P			AFA	0.25W	A	175	60	60	U						36	E	1.0M	B
2N1476	S	P			AFA	0.25W	A	175	100	100	U						12	E	1.0M	B
2N1477	S	P			AFA	0.25W	A	175	100	100	U						30	E	1.0M	B
2N1478	G	P	2N3427	6-41	MSS	250M	A	100	30	20	S	40		100M	0.2	10M			3.0M	B
2N1479	S	N			PMS	5.0W	C	200	60	60	V	20	60	200M	1.4	200M				
2N1480	S	N			PMS	5.0W	C	200	100	100	V	20	60	200M	1.4	200M				
2N1481	S	N			PMS	5.0W	C	200	60	60	V	35	100	200M	1.4	200M				
2N1482	S	N			PMS	5.0W	C	200	100	100	V	35	100	200M	1.4	200M				
2N1483	S	N	2N3766	7-142	PMS	25W	C	200	60	60	V	20	60	750M	2.0	750M				
2N1484	S	N	2N3766	7-142	PMS	25W	C	200	100	100	V	20	60	750M	2.0	750M				
2N1485	S	N	2N3766	7-142	PMS	25W	C	200	60	60	V	35	100	750M	0.75	750M				
2N1486	S	N	2N3766	7-142	PMS	25W	C	200	100	100	V	35	100	750M	0.75	750M				
2N1487	S	N	2N3713	7-125	PMS	75W	C	200	60	60	V	15	45	200M	3.0	1.5A				
2N1488	S	N	2N3714	7-125	PMS	75W	C	200	100	100	V	15	45	200M	3.0	1.5A				
2N1489	S	N	2N3713	7-125	PMS	75W	C	200	60	60	V	25	75	1.5A	1.0	1.5A				
2N1490	S	N	2N3714	7-125	PMS	75W	C	200	100	100	V	25	75	1.5A	1.0	1.5A				
2N1491	S	N			RFA	3.0W	C	175	30								15	E		
2N1492	S	N			RFA	3.0W	C	175	60								15	E		
2N1493	S	N			RFA	3.0W	C	175	100			4.0					15	E		
2N1494	G	P		8-92	HSS	400M	A	100	20	15	O	15		400M	0.5	200M			220M	T
2N1494A	G	P		8-92	HSS	400M	A	100	20	15	O	25		200M	0.4	200M			220M	T
2N1495	G	P		8-92	HSS	300M	A	100	40	25	O	25		200M	0.3	200M			150M	T
2N1495A	G	P		8-92	HSS	0.25W	A	100	40	25	O	25		0.2A	0.3	0.2A			150M	T
2N1496	G	P		8-92	HSS	500M	A	100	40	25	O	25		200M	0.3	200M			150M	T
2N1499	G	P	2N960	8-74	HSS	25M	A	85	20	15	S	20		10M	0.2	10M				
2N1499A	G	P	2N960	8-74	HSS	60M	A	100	20	20	S	30		10M	0.2	10M			100M	T
2N1499B	G	P			HSS	75M	A	100	30	20	O	40		10M	0.2	10M			150M	T
2N1500	G	P	2N962	8-74	HSS	60M	A	100	15	12	S	20		10M	0.2	10M			120M	T
2N1501	G	P	2N2144	7-78	PMS	34W	J	95	60	40		25	100	2.0A	0.6	2.0A			200K	T
2N1502	G	P	2N2143	7-78	PMS	34W	J	95	40	40		25	100	2.0A	0.6	2.0A			200K	T
2N1504	G	P			LPA	25W	C	95	80	60	O	21		0.5A	0.75	1.0A			4.0K	E
2N1505	S	N			HPA	0.8W	A	175	50	20	O	7.0	100	0.1A	2.0	0.15A			70M	T
2N1506	S	N			HPA	0.8W	A	175	60	20	O	10	100	0.1A	1.5	0.15A			140M	T
2N1506A	S	N			HPA	0.8W	A	200	80	50	O	10	100	0.1A	0.6	0.15A			140M	T
2N1507	S	N	2N2219	8-108	MSA	600M	A	175	60	30	R	100	300	150M	1.5	150M			50M	T
2N1508	S	N			MSA	1.0W	A	175	100	55	O	20	60	600M	3.6	600M			50M	T
2N1509	S	N			MSA	1.0W	A	175	60	35	O	20	60	600M	3.6	600M			50M	T
2N1510	G	N			SPP	75M	A	85	75	70	R	8.0	90	1.0M	0.8	4.0M				
2N1511	S	N	2N3713	7-125	PMS	75W	C	200	60	60	V	4.0		6.0A	7.2	6.0A			0.3M	T
2N1512	S	N			PMS	75W	C	200	100	100	V	7.0		6.0A	6.0	6.0A			0.3M	T
2N1513	S	N			PMS	75W	C	200	60	60	V	7.0		6.0A	6.0	6.0A			0.3M	T
2N1514	S	N			PMS	75W	C	200	100	100	V								0.3M	T
2N1516	G	P			RFC	83M	A	75	25			20		1.0M						
2N1518	G	P	2N2153	7-82	PMS	50W	C	95	50	40		15	60	15A	0.7	25A				
2N1519	G	P	2N2154	7-82	PMS	50W	C	95	80	60		15	60	15A	0.7	25A				
2N1520	G	P	2N2153	7-82	PMS	50W	C	95	50	40		17	68	15A	0.6	35A				
2N1521	G	P	2N2154	7-82	PMS	50W	C	95	80	60		17	68	15A	0.6	35A				
2N1522	G	P	2N2153	7-82	PMS	50W	C	95	50	40	B	25	100	15A	0.5	50A				
2N1523	G	P	2N2154	7-82	PMS	50W	C	95	80	60	B	25	100	15A	0.5	50A				
2N1524	G	P	2N3325	9-71	RFC	80M	A	85	24								17	E		
2N1525	G	P	2N3325	9-71	RFC	80M	A	85	24								17	E		
2N1526	G	P	2N3325	9-71	RFC	80M	A	85	24								27	E		
2N1527	G	P	2N3325	9-71	RFC	80M	A	85	24								27	E		
2N1528	S	N	2N2218	8-108	VID	150M	A	175	25	25	S						10	E		
2N1529	G	P		7-60	LPA	90W	C	100	40	30	S	20	40	3.0A	1.5	3.0A				
2N1529A	G	P		7-60	LPA	90W	C	100	40	20	O	20	40	3.0A	1.5	3.0A			5.0K	E
2N1530	G	P		7-60	LPA	90W	C	100	60	45	S	20	40	3.0A	1.5	3.0A				
2N1530A	G	P		7-60	LPA	90W	C	100	60	30	O	20	40	3.0A	1.5	3.0A			5.0K	E
2N1531	G	P		7-60	LPA	90W	C	100	80	60	S	20	40	3.0A	1.5	3.0A				
2N1531A	G	P		7-60	LPA	90W	C	100	80	40	O	20	40	3.0A	1.5	3.0A			5.0K	E
2N1532	G	P		7-60	LPA	90W	C	100	100	75	S	20	40	3.0A	1.5	3.0A				
2N1532A	G	P		7-60	LPA	90W	C	100	100	50	O	20	40	3.0A	1.5	3.0A			5.0K	E
2N1533	G	P		7-60	LPA	90W	C	100	120	90	S	20	40	3.0A	1.5	3.0A				
2N1534	G	P		7-60	LPA	90W	C	100	40	30	S	35	70	3.0A	1.2	3.0A				
2N1534A	G	P		7-60	LPA	90W	C	100	40	20	O	35	70	3.0A	1.2	3.0A			5.0K	E
2N1535	G	P		7-60	LPA	90W	C	100	60	45	S	35	70	3.0A	1.2	3.0A				
2N1535A	G	P		7-60	LPA	90W	C	100	60	30	O	35	70	3.0A	1.2	3.0A			5.0K	E
2N1536	G	P		7-60	LPA	90W	C	100	80	60	S	35	70	3.0A	1.2	3.0A				
2N1536A	G	P		7-60	LPA	90W	C	100	80	40	O	35	70	3.0A	1.2	3.0A			5.0K	E
2N1537	G	P		7-60	LPA	90W	C	100	100	75	S	35	70	3.0A	1.2	3.0A				
2N1537A	G	P		7-60	LPA	90W	C	100	100	50	O	35	70	3.0A	1.2	3.0A			5.0K	E
2N1538	G	P		7-60	LPA	90W	C	100	120	90	S	35	70	3.0A	1.2	3.0A				
2N1539	G	P		7-64	LPA	90W	C	100	40	30	S	50	100	3.0A	0.3	3.0A				
2N1539A	G	P		7-64	LPA	90W	C	100	40	20	O	50	100	3.0A	0.3	3.0A			3.0K	E
2N1540	G	P		7-64	LPA	90W	C	100	60	45	S	50	100	3.0A	0.3	3.0A				
2N1540A	G	P		7-64	LPA	90W	C	100	60	30	O	50	100	3.0A	0.3	3.0A			3.0K	E
2N1541	G	P		7-64	LPA	90W	C	100	80	60	S	50	100	3.0A	0.3	3.0A				
2N1541A	G	P		7-64	LPA	90W	C	100	80	40	O	50	100	3.0A	0.3	3.0A			3.0K	E
2N1542	G	P		7-64	LPA	90W	C	100	100	75	S	50	100	3.0A	0.3	3.0A				
2N1542A	G	P		7-64	LPA	90W	C	100	100	50	O	50	100	3.0A	0.3	3.0A			3.0K	E
2N1543	G	P		7-64	LPA	90W	C	100	120	90	S	50	100	3.0A	0.3	3.0A				
2N1544	G	P		7-64	LPA	90W	C	100	40	30	S	75	150	3.0A	0.2	3.0A			1.0K	E
2N1544A	G	P		7-64	LPA	90W	C	100	40	30	S	75		3.0A	0.2	3.0A			3.0K	E

GERMANIUM PNP POWER TRANSISTOR SELECTOR GUIDE

3-AMP — HIGH-FREQUENCY DRIVER

LOW I_{CBO}
$P_D = 62.5$ W
f_T — 0.6 MHz


TO-3


TO-41†①

h_{FE} $I_C = 0.5$ A, $V_{CE} = 2$ V	V_{CES} / V_{CB}	30 V / 30 V	45 V / 45 V	60 V / 60 V	75 V / 75 V	90 V / 90 V
30-60		2N2137	2N2138	2N2139	2N2140	2N2141
50-100		2N2142	2N2143	2N2144	2N2145	2N2146

3-AMP — GENERAL-PURPOSE SWITCH AND AMPLIFIER

$P_D = 106$ W
f_T — 0.35 MHz

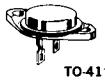

TO-3

h_{FE} $I_C = 1$ A, $V_{CE} = 4$ V	V_{CES} / V_{CB}	40 V / 50 V	60 V / 80 V	75 V / 100 V	100 V / 120 V	
35-90		2N1359	2N375	2N1362	2N1364	
60-140		2N1360	2N618	2N1363	2N1365	

5-AMP — GENERAL-PURPOSE SWITCH AND AMPLIFIER

$P_D = 106$ W


TO-3


TO-41†①

h_{FE} $I_C = 3$ A, $V_{CE} = 2$ V	V_{CES} / V_{CB}	30 V / 40 V	45 V / 60 V	60 V / 80 V	75 V / 100 V	90 V / 120 V
20-40 f_T — 0.35 MHz		2N1529	2N1530	2N1531	2N1532	2N1533
35-70 f_T — 0.35 MHz		2N1534	2N1535	2N1536	2N1537	2N1538
50-100 f_T — 0.4 MHz		2N1539	2N1540	2N1541	2N1542	2N1543
75-150 f_T — 0.4 MHz		2N1544	2N1545	2N1546	2N1547	2N1548

5-AMP — HIGH DC GAIN LOW-SATURATION SWITCH

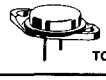
$P_D = 170$ W
f_T — 0.3 MHz


TO-36

h_{FE} $I_C = 3$ A, $V_{CE} = 2$ V	V_{CES} / V_{CB}	30 V / 30 V		45 V / 45 V		60 V / 60 V
60-120		2N3311		2N3312		2N3313
100-200		2N3314		2N3315		2N3316

7-AMP — HIGH-GAIN AUDIO AMPLIFIER

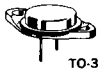
$P_D = 106$ W
f_T — 0.32 MHz

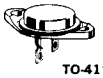

TO-3

h_{FE} $I_C = 1$ A, $V_{CE} = 2$ V	V_{CES}			50 V		
74-250				MP110		

7-AMP — ECONOMY LINE AMPLIFIER

$P_D = 77$ W
f_T — 0.6 MHz


TO-3


TO-41†①

h_{FE} $I_C = 3$ A, $V_{CE} = 2$ V	V_{CES} / V_{CB}	30 V / 40 V	45 V / 60 V	60 V / 80 V	75 V / 100 V	
30-60				2N3615	2N3616	
35-70		2N3611	2N3612			
45-90				2N3617	2N3618	
60-120		2N3613	2N3614			

7-AMP — ECONOMY LINE AMPLIFIER

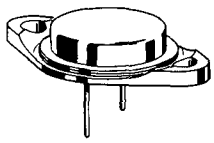
$P_D = 77$ W
f_T — 0.6 MHz


TO-3

h_{FE} $I_C = 3$ A, $V_{CE} = 2$ V	V_{CES} / V_{CB}	30 V / 40 V	45 V / 60 V	60 V / 75 V	75 V / 90 V	
30-200		MP2060	MP2061	MP2062	MP2063	

2N1529 thru 2N1538 (GERMANIUM)
2N1529A thru 2N1532A,

V_{CB} = 40-120 V
I_C = 5 A
P_D = 106W



CASE 11,16
(TO-3,41)

PNP germanium power transistors for switching and amplifier applications in high-reliability equipment.

For units with solder lugs attached, specify devices MP1529A etc. (TO-41 package)

MAXIMUM RATINGS

Rating	Symbol	2N1529 2N1534	2N1530 2N1535	2N1531 2N1536	2N1532 2N1537	2N1533 2N1538	Units
Collector-Emitter Voltage	V_{CEX}	40	60	80	100	120	Vdc
Collector-Emitter Voltage	V_{CES}	30	45	60	75	90	Vdc
Collector-Emitter Voltage	V_{CEO}	20	30	40	50	60	Vdc
Collector-Base Voltage	V_{CB}	40	60	80	100	120	Vdc
Emitter-Base Voltage	V_{EB}	20	30	40	50	60	Vdc
Collector Current (Continuous)	I_C	5	5	5	5	5	Amp
Collector Current (Peak)	I_C	10	10	10	10	10	Amp
Junction Temperature Range	T_J	-65 to +110					°C
Total Device Dissipation (25°C Case Temperature)	P_D	106	106	106	106	106	Watts
Thermal Resistance	θ_{JC}	0.8					°C/W

2N1529 thru 2N1538 (continued)

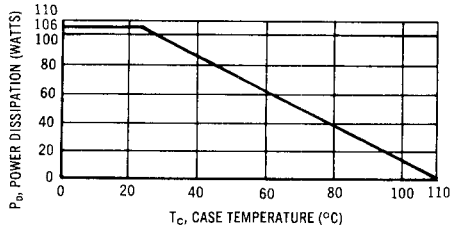
ELECTRICAL CHARACTERISTICS ($T_C = 25°C$ unless otherwise specified.)

Characteristics apply to corresponding "A" type numbers also.

Characteristic		Symbol	Min	Max	Unit
Collector-Base Cutoff Current		I_{CBO1}			mA
(V_{CB} = 25V)	2N1529, 2N1534		—	2.0	
(V_{CB} = 40V)	2N1530, 2N1535		—	2.0	
(V_{CB} = 55V)	2N1531, 2N1536		—	2.0	
(V_{CB} = 65V)	2N1532, 2N1537		—	2.0	
(V_{CB} = 80V)	2N1533, 2N1538		—	2.0	
Collector-Base Cutoff Current		I_{CBO}			mA
(V_{CB} = 2V)			—	0.2	
(V_{CB} = 1 2 BV_{CES} rating; T_C = +90°C)			—	20	
Emitter-Base Cutoff Current		I_{EBO}			mA
(V_{EB} = 12V)			—	0.5	
Collector-Emitter Breakdown Voltage		BV_{CES}			volts
(I_C = 500 mA, V_{EB} = 0)	2N1529, 2N1534		30	—	
	2N1530, 2N1535		45	—	
	2N1531, 2N1536		60	—	
	2N1532, 2N1537		75	—	
	2N1533, 2N1538		90	—	
Collector-Emitter Leakage Current		I_{CEX}			mA
(V_{BE} = 1V, V_{CE} @ rated BV_{CBO})			—	20	
Collector-Emitter Breakdown Voltage		BV_{CEO}			volts
(I_C = 500 mA, I_B = 0)	2N1529, 2N1534		20	—	
	2N1530, 2N1535		30	—	
	2N1531, 2N1536		40	—	
	2N1532, 2N1537		50	—	
	2N1533, 2N1538		60	—	
Collector-Base Breakdown Voltage		BV_{CBO}			volts
(I_C = 20 mA)	2N1529, 2N1534		40	—	
	2N1530, 2N1535		60	—	
	2N1531, 2N1536		80	—	
	2N1532, 2N1537		100	—	
	2N1533, 2N1538		120	—	
Current Gain		h_{FE1}			—
(V_{CE} = 2V, I_C = 3A)	2N1529 - 2N1532		20	40	
	2N1534 - 2N1537		35	70	
	2N1529 - 2N1533		20	40	
	2N1534 - 2N1538		35	70	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			volts
(I_C = 3A, I_B = 300 mA)	2N1529 - 2N1532		—	1.7	
	2N1534 - 2N1537		—	1.5	
	2N1529 - 2N1533		—	1.7	
	2N1534 - 2N1538		—	1.5	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			volts
(I_C = 3A, I_B = 300 mA)	2N1529 - 2N1532		—	1.5	
	2N1534 - 2N1537		—	1.2	
	2N1529 - 2N1533		—	1.5	
	2N1534 - 2N1538		—	1.2	
Transconductance		g_{FE}			mhos
(V_{CE} = 2V, I_C = 3A)	2N1529 - 2N1532		1.2	—	
	2N1534 - 2N1537		1.5	—	
	2N1529 - 2N1533		1.2	—	
	2N1534 - 2N1538		1.5	—	

2N1529 thru 2N1538 (continued)

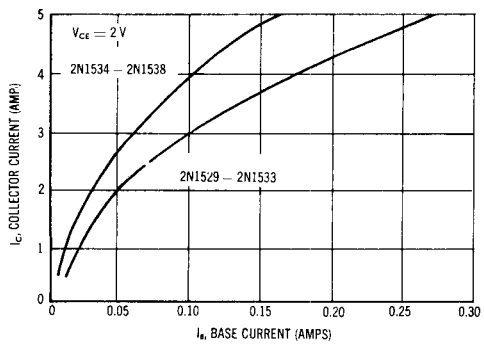
POWER-TEMPERATURE DERATING CURVE



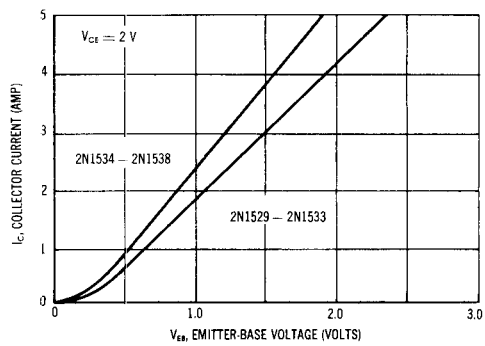
The maximum continuous power is related to maximum junction temperature, by the thermal resistance factor. For dc or frequencies below 25 Hz the transistor must be operated within the constant $P_D = V_C \times I_C$ hyperbolic curve. This curve has a value of 106 Watts at case temperatures of 25°C and is 0 Watts at 110°C with a linear relation between the two temperatures such that

$$P_D \text{ allowable} = \frac{110^{\circ} - Tc}{0.8}$$

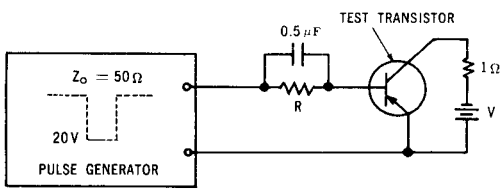
COLLECTOR CURRENT versus BASE CURRENT



COLLECTOR CURRENT versus EMITTER BASE VOLTAGE



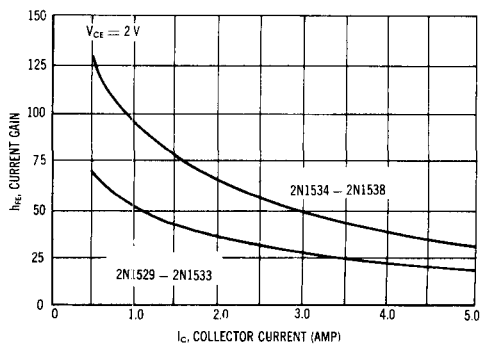
SWITCHING TIME MEASURING CIRCUIT



TYPICAL SWITCHING CHARACTERISTICS

	I_C (Amp)	V (Volt)	R (ohms)	$t_d + t_r$ (μs)	t_s (μs)	t_f (μs)
2N1529-33	3	3	65	10	2	5
2N1534-38	3	3	100	8	3	5

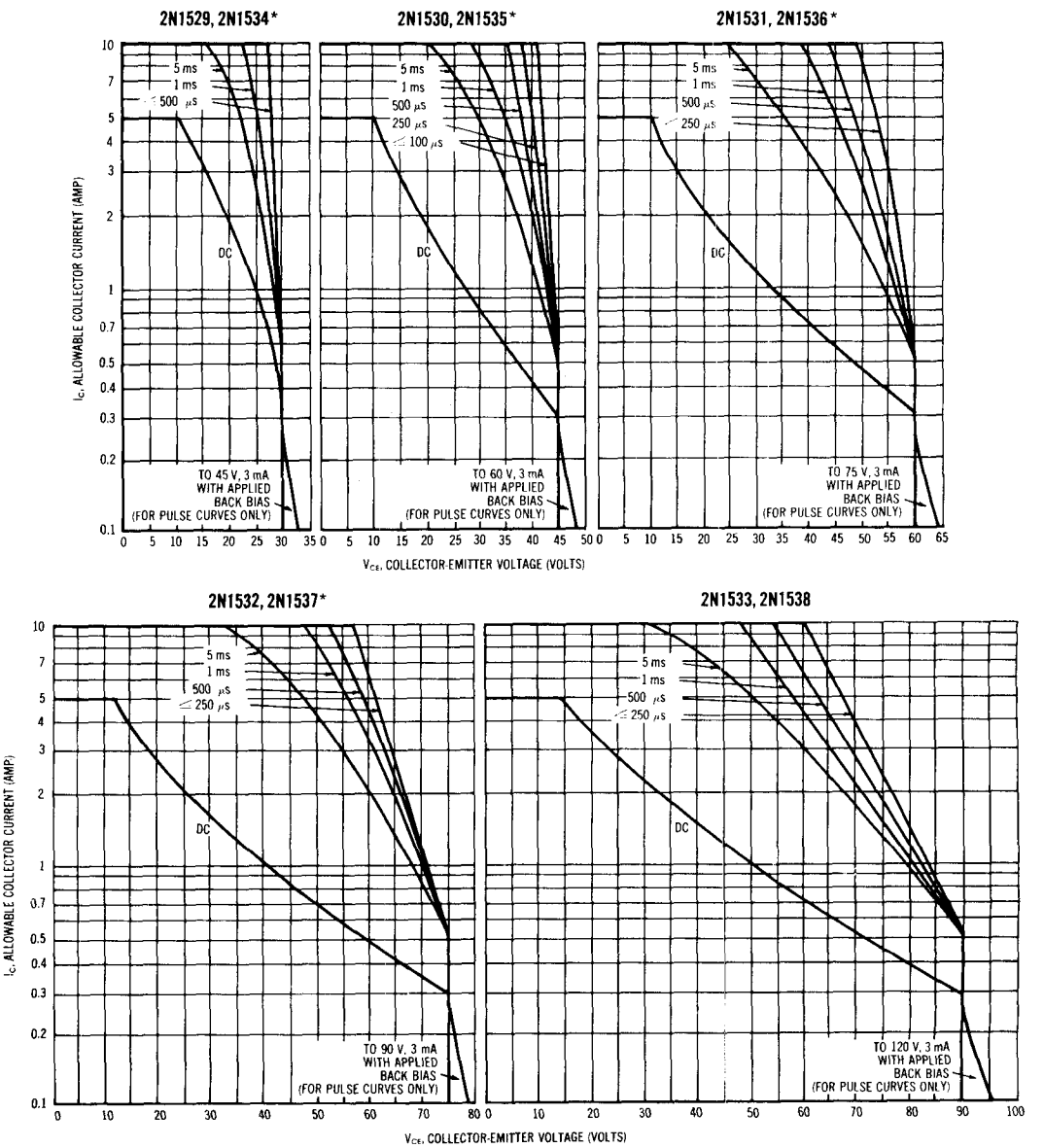
DC CURRENT GAIN versus COLLECTOR CURRENT



2N1529 thru 2N1538 (continued)

SAFE OPERATING AREAS — PULSE CONDITIONS

The Safe Operating Area Curves indicate I_C — V_{CE} limits below which the device will not go into secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a collector-emitter short. (Duty cycle of the excursions make no significant change in these safe areas.) To insure operation below the maximum T_J, the power-temperature derating curve must be observed for both steady state and pulse power conditions.



*Characteristics apply to corresponding "A" type numbers also.