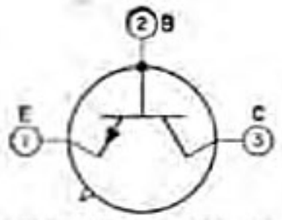


TRANSISTOR

Germanium n-p-n types used in medium-speed switching applications in data-processing equipment. JEDEC No. TO-5 package; outline 6, Outlines Section.

2N388
2N388A

MAXIMUM RATINGS

	2N388	2N388A	
Collector-to-Base Voltage (with emitter open)	25 max	40 max	volts
Collector-to-Emitter Voltage:			
With external base-to-emitter resistance = 10000 ohms	20 max	20 max	volts
With base-to-emitter volts = −0.5	—	40 max	volts
Emitter-to-Base Voltage (with collector open)	15 max	15 max	volts
Collector Current	200 max	200 max	ma
Transistor Dissipation:			
At ambient temperatures up to 25°C	150 max	150 max	mw
At ambient temperatures above 25°C	See curve page 80		
Ambient-Temperature Range:			
(Operating and storage)	−65 to 100	−65 to 100	°C
Lead Temperature (for 10 seconds maximum)	235 max	235 max	°C

CHARACTERISTICS

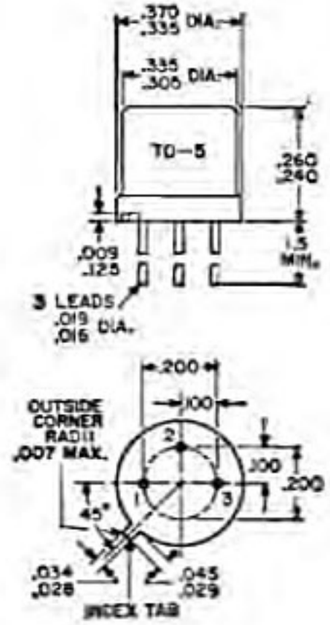
	2N388	2N388A	
Base-to-Emitter Voltage:			
With collector ma = 200 and base ma = 10	1.5 max	1.5 max	volts
With collector ma = 100 and base ma = 4	0.8 max	0.8 max	volt
Collector-Cutoff Current:			
With collector-to-base volts = 40 and emitter current = 0	—	40 max	μa
With collector-to-base volts = 25 and emitter current = 0	10 max	10 max	μa
With collector-to-base volts = 1 and emitter current = 0	5 max	5 max	μa

In Common-Emitter Circuit

Forward Current-Transfer Ratio:			
With collector-to-emitter volts = 0.75 and collector ma = 200	30 min	30 min	
With collector-to-emitter volts = 0.5 and collector ma = 30	60 to 180	60 to 180	

In Common-Base Circuit

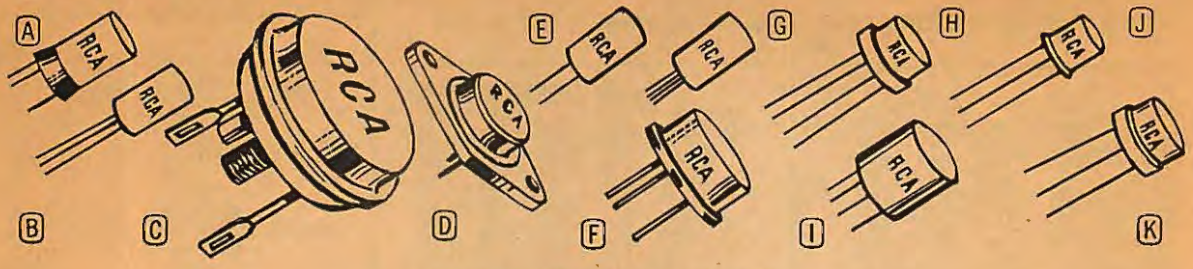
Forward-Current-Transfer-Ratio Cutoff Frequency (with collector-to-base volts = 6 and collector ma = 1)	5 min	5 min	Mc
Collector-to-Base Capacitance (with collector-to-base volts = 6 and collector ma = 1)	20 max	20 max	pf



Germanium Transistors

	Type No.	Case	Construction (see note 1)	Maximum Ratings at 25°C amb.					Characteristics								SPECIAL FEATURES
									h_{FE}			f_T		$V_{CE(SAT)}$			
				V_{CB} V	V_{CE} V	V_{EB} V	I_C A	P_{tot} W	I_C mA	Min.	Max.	I_C mA	Min. Mc/s	I_C mA	I_B mA	Max. V	
NPN General Purpose and Switching	2N388	TO5	A	25	20	15	0·2	0·15	200	30	—	1	5·0φ	—	—	—	
	2N388A	TO5	A	40	40	15	0·2	0·15	200	30	—	1	5·0φ	—	—	—	
	2N1302	TO5	A	25		25	0·3	0·15	10	20	—	1	3·0φ	10	0·5	0·2	
	2N1304	TO5	A	25		25	0·3	0·15	10	40	200	1	5·0φ	10	0·25	0·2	
	2N1306	TO5	A	25		25	0·3	0·15	10	60	300	1	10·0φ	10	0·17	0·2	
	2N1308	TO5	A	25		25	0·3	0·15	10	80	—	1	15·0φ	10	0·13	0·2	

RCA Semiconductor Products



GERMANIUM PNP TRANSISTORS

SMALL SIGNAL (CLASS A)

RCA Type	Fig.	Maximum PT mW	Maximum VCB V	Maximum IC A	Typ. hfe at IC hfe	Typ. hfe at IC A	Max. ICBO μA	Typ. fhfb Mc
2N104	A	150	30	50	44	1	10	0.7
2N175	A	20	10	2	65	0.5	12	0.85
2N215	B	150	30	50	44	1	10	0.7
2N220*	B	20	10	2	65	0.5	12	0.85
2N405	A	150	20	35	35	1	14	0.65
2N406	B	150	20	35	35	1	14	0.65
2N591	B	50	32	20	70	2.0	7	0.7
2N1010*	B	20	10	2	35	0.3	10	2.0
2N2613	B	100	30	50	200	0.5	5	10
2N2614	B	100	40	50	160	1	5	10
40263	B	120	20	50	160	1	.....	10

*NPN. *MIL type also available.

LARGE SIGNAL (CLASS A AND B)

RCA Type	Fig.	Maximum Ratings PT mW	Maximum Ratings VCB V	Maximum Ratings IC A	Typ. hFE at IC hFE	Typ. hFE at IC A	Max. ICBO μA	Typ. fT Mc
2N109	A	0.165	35	0.15	75	0.05	14	1.0†
2N173	C	150	60	15	25	12	100*	.....
2N174*	C	150	80	15	20	12	100*	.....
2N176	D	10	40	3	63	0.5	3 mA	.....
2N217	B	0.165	35	0.15	75	0.05	14	1.0†
2N270	#	0.25	25	0.075	70	0.15	16	1
2N277	C	150	40	15	25	12	100*	.....
2N278	C	150	50	15	25	12	100*	.....
2N351	D	10	40	3	65	0.7	3 mA	.....
2N376	D	10	40	3	78	0.7	3 mA	.....
2N407	A	0.15	20	0.07	65	0.05	14	.....
2N408	B	0.15	20	0.07	65	0.05	14	.....
2N441	C	150	40	15	20	12	100*	.....
2N442	C	150	50	15	20	12	100*	.....
2N443	C	150	60	15	20	12	100*	.....
2N647‡	B	0.1	25	0.05	70	0.050	.....	.....
2N649‡	B	0.1	20	0.05	65	0.050	.....	.....
2N1099	C	150	80	15	25	12	100*	.....
2N1100	C	150	100	15	20	12	100*	.....
2N1183*	F	7.5	45	3	40	0.4	30	0.5§
2N1183A*	F	7.5	60	3	40	0.4	30	0.5§
2N1183B*	F	7.5	80	3	40	0.4	30	0.5§
2N1184*	F	7.5	45	3	80	0.4	30	0.5§
2N1184A*	F	7.5	60	3	80	0.4	30	0.5§
2N1184B*	F	7.5	80	3	80	0.4	30	0.5§
2N1358	C	150	80	15	55	1.2	200	.....
2N1412*	C	150	100	15	20	12	100*	.....
2N1905	D	50	60	10	90	1	500	7.5
2N1906	D	50	100	10	125	5	500	7.5
2N2147	D	12.5	75	5	150	1	1 mA	4.0
2N2148	D	12.5	60	5	80	1	100	3.0
2N2869/ 2N301	D	30	60	10	90	1	500	0.45
2N2870/ 2N301A	D	30	80	10	90	.....	500	0.45
2N2953	B	0.30	30	0.15	350	0.01	5	1
40022	D	12.5	32	5	50	1	500	0.3
40050	D	12.5	40	5	90	1	500	0.5
40051	D	12.5	50	5	90	1	1 mA	0.5
40253	B	0.65	25	0.50	75	0.4	14	1
40254	D	12.5	32	5	70	1	3 mA	0.3
40329	B	0.25	.....	0.10	90	0.025	14	1.5

*Typical. †Typical fhfb. ‡NPN. §Minimum fhfb. #Similar to Fig. E. *MIL type also available.

UHF-VHF SMALL SIGNAL

RCA Type	Fig.	Typ. GP at Operating Frequency Mc	Typ. GP at Operating Frequency db	Typical fhfb Mc	Typical hfe at IC hfe	Typical hfe at IC mA	Max. VCB V
2N384*	G	50	21	100	60	1.5	40
2N1023	G	50	24	120	60	1.5	40
2N1066	H	50	24	30	60	1.5	40
2N1177	I	100	14	140	100	1	30
2N1178	I	120	†	140	48	1	30
2N1179	I	100	17	140	80	1	30
2N1225*	H	50	21	100	60	1.5	40
2N1396	H	50	21	100	90	1.5	40
2N1397	H	50	24	120	90	1.5	40
2N2273*	J	100	12	450‡	20§	1	25
2N2482*	J	100	12	300‡§	25	2	20
40005	G	50	21	100	90	1.5	40
40006	G	50	24	120	90	1.5	40
40268	J	100	12	.....	20§	1	25

*NPN. †Local oscillator service. ‡fT. §Min. *MIL type available.

IF, RF AND VIDEO AMPLIFIER

RCA Type	Fig.	Typ. GP at Operating Frequency Mc	Typ. GP at Operating Frequency db	Typical fhfb Mc	Typical hfe at IC hfe	Typical hfe at IC mA	Max. VCB V
2N139	A	0.455	37	4.7	48	1	16
2N218	B	0.455	37	4.7	48	1	16
2N274*	G	12.5	27	30	60	1.5	40
2N370	E	20	17	30	100	1	24
2N409	A	0.455	37.8	6.7	48	1	13
2N410	B	0.455	37.8	6.7	48	1	13
2N1180	I	10.7	36	100	80	1.5	30
2N1224*	H	12.5	27	30	60	1.5	40
2N1226	H	12.5	22	30	60	1.5	60
2N1395	H	12.5	27	30	90	1.5	40
2N1524	B	0.455	54.4	33	60	1	24
2N1525	A	0.455	54.4	33	60	1	24
2N1631	A	1.5	47.7	45	80	1	34
2N1632	B	1.5	47.7	45	80	1	34
2N1637	B	1.5	47.7	45	80	1	34
2N1638	B	0.262	61.5	40	75	1	34
40004	G	12.5	27	30	90	1.5	40
40262	B	0.455	56	30	150	1	50

*MIL type also available.

CONVERTER, OSCILLATOR AND MIXER

RCA Type	Fig.	Typ. GP at Operating Frequency Mc	Typ. GP at Operating Frequency db	Typical fhfb Mc	Typical hfe at IC hfe	Typical hfe at IC mA	Max. VCB V
2N140	A	1	32	10	75	0.6	16
2N219	B	1	32	10	75	0.6	16
2N371	E	23	*	30	80	1	24
2N372	E	10	26.2	30	80	1	24
2N411	A	1	32	10	75	0.6	13
2N412	B	1	32	10	75	0.6	13
2N1178	I	120	*	140	40	1	30
2N1179	I	100	17	140	80	1	30
2N1526	B	1.5	48.9	33	130	1	24
2N1527	A	1.5	48.9	33	130	1	24
2N1639	B	1.5	37	45	75	1	34
40261	B	1.5	53	40	80	1	50

*Local oscillator service.

HIGH-VOLTAGE COMPUTER SWITCHING

RCA Type	Fig.	Minimum fhfb Mc	Minimum hFE at IC hFE	Minimum hFE at IC mA	Maximum Cob pF	Maximum PT mW	Maximum VCB V
2N398*	K	.....	20	5	.....	50	105
2N398A	K	.....	20	5	.....	150	105
2N398B	K	1	20	5	.....	250	105
2N586	E	.....	30	250	.....	250	45

MEDIUM-SPEED COMPUTER SWITCHING

RCA Type	Fig.	Minimum fhfb Mc	Minimum hFE at IC hFE	Minimum hFE at IC mA	Maximum Cob pF	Maximum PT mW	Maximum VCB V
2N388**	K	5	30	200	20	150	25
2N388A*	K	5	30	200	20	150	40
2N395	K	3	20	10	20	150	30
2N396	K	5	30	10	20	150	30
2N396A	K	5	30	10	20	200	30
2N397	K	10	40	10	20	150	30
2N404*	K	4	24	24	20	150	25
2N404A	K	4	24	24	20	150	40
2N414	K	8†	80	1	11	150	30
2N581	K	4	20	20	20	150	18
2N582	K	14	40	24	20	150	25
2N585*	K	3	20	20	25	120	25
2N1090*	K	5	30	20	25	120	25
2N1091*	K	10	40	20	25	120	25
2N1300	K	25‡	30	10	12	150	13
2N1301	K	35‡	30	10	12	150	13
2N1302**	K	3	20	10	20	150	25
2N1303*	K	3	20	10	20	150	30
2N1304**	K	5	40	10	20	150	25
2N1305*	K	5	40	10	20	150	30
2N1306**	K	10	60	10	20	120	25
2N1307*	K	10	60	10	20	150	30
2N1308**	K	15	80	10	20	150	25
2N1309*	K	15	80	10	20	150	30
2N1384	L	20‡	20	200	.....	240	30
2N1605*	K	4	24	24	20	150	25
2N1605A*	K	4	24	24	20	200	40
2N1683	K	50‡	50	10	12	150	13
2N1853*	K	.....	30	6	.....	150	18
2N1854*	K	40‡	40	20	12	150	18
40269	K	4	50	12	.....	150	25

*NPN. †Typical. ‡Minimum fT. *MIL type also available.