2N2955 (GERMANIUM)
2N2956
2N2957

CASE 22
(TO-18)

Collector connected to case

PNP germanium epitaxial mesa transistors for high-speed switching applications.

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Base Voltage	V_{CB}	40	Vdc
Emitter-Base Voltage	V_{EB}	3.5	Vdc
Collector-Emitter Voltage 2N2955 2N2956 2N2957	V_{CEO}	25 20 18	Vdc
Collector Current	I_C	100	mAdc
Junction Temperature	T_J	100	°C
Storage Temperature	T_{stg}	-65 to +100	°C
Total Device Dissipation at 25°C Case Temperature (Derate 4 mW/°C above 25°C)	P_D	300	mW
Total Device Dissipation at 25°C Ambient Temperature (Derate 2 mW/°C above 25°C)	P_D	150	mW

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Fig. No.	Symbol	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)			BV_{CBO}	40	60	---	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)			BV_{EBO}	3.5	5.0	---	Vdc
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, Emitter-Base Termination - Open)	2N2955 2N2956 2N2957	8	BV_{CEO}	25 20 18	35 28 25	--- --- ---	Vdc
Collector-Emitter Reverse Current (V_{CE} = 25 Vdc, V_{EB} = 0.5 Vdc)			I_{CEX}	---	---	10	μAdc
Base Leakage Current (V_{CE} = 25 Vdc, V_{EB} = 0.5 Vdc)		9	I_{BL}	---	---	10	μAdc

ELECTRICAL CHARACTERISTICS (continued)

Characteristic		Fig. No.	Symbol	Min	Typ	Max	Unit
On Characteristics							
Forward Current Transfer Ratio			h_{FE}				---
(I_C = 10 mAdc, V_{CE} = 1 Vdc)	2N2955	1		20	43	---	
	2N2956	2		30	64	---	
	2N2957	3		60	105	---	
(I_C = 50 mAdc, V_{CE} = 1 Vdc)	2N2955			20	43	60	
	2N2956			40	76	120	
	2N2957			100	130	---	
(I_C = 100 mAdc, V_{CE} = 1 Vdc)	2N2956			30	69	---	
	2N2957			60	115	---	
Collector-Emitter Saturation Voltage			$V_{CE(sat)}$				Vdc
(I_C = 10 mAdc, I_B = 1 mAdc)	2N2955	5		---	0.12	0.20	
	2N2956	6		---	0.12	0.18	
	2N2957	7		---	0.09	0.15	
(I_C = 50 mAdc, I_B = 5 mAdc)	2N2955			---	0.20	0.30	
	2N2956			---	0.16	0.25	
	2N2957			---	0.13	0.20	
(I_C = 100 mAdc, I_B = 10 mAdc)	2N2956			---	0.23	0.34	
	2N2957			---	0.18	0.26	
Base-Emitter Voltage		4	V_{BE}				Vdc
(I_C = 10 mAdc, I_B = 1 mAdc)	2N2955			---	0.38	0.50	
	2N2956			---	0.37	0.47	
	2N2957			---	0.36	0.44	
(I_C = 50 mAdc, I_B = 5 mAdc)	2N2955			---	0.51	0.65	
	2N2956			---	0.48	0.60	
	2N2957			---	0.45	0.55	
(I_C = 100 mAdc, I_B = 10 mAdc)	2N2956			---	0.56	0.70	
	2N2957			---	0.52	0.65	
Transient Characteristics							
Output Capacitance (V_{CB} = 5 Vdc, I_E = 0, f = 1 MHz)		10	C_{ob}	---	2.5	4.0	pF
Input Capacitance (V_{BE} = 1 Vdc, I_C = 0, f = 1 MHz)		10	C_{ib}	---	3.3	---	pF
Small Signal Forward Current Transfer Ratio (V_{CE} = 5 Vdc, I_C = 10 mAdc, f = 100 MHz)	2N2955		$\lvert h_{fe} \rvert$	2.0	3.5	---	---
	2N2956			2.5	3.75	---	
	2N2957			3.0	4.0	---	
Delay Time (V_{CC} =12 Vdc, I_{CS} = 50 mAdc, I_{B1} = 5 mAdc, V_{BE} (Off) = 2.2 Vdc)		12	t_d	---	7.0	15	ns
Rise Time (same conditions as t_d)	2N2955	12, 13	t_r	---	25	40	ns
	2N2956			---	18	30	
	2N2957			---	15	25	
Storage Time (V_{CC} = 12 Vdc, I_{CS} = 50 mAdc, I_{B1} = 5 mAdc, I_{B2} = 5 mAdc)	2N2955	12,16	t_s	---	28	40	ns
	2N2956			---	37	55	
	2N2957			---	42	60	
Fall Time (same conditions as t_s)	2N2955	12, 15	t_f	---	25	40	ns
	2N2956			---	18	35	
	2N2957			---	18	35	
Total Control Charge (I_C = 10 mAdc, I_B = 1 mAdc)	2N2955	17	Q_T	---	84	---	pc
	2N2956			---	88	---	
	2N2957			---	88	---	
Active Region Time Constant (I_C = 10 mAdc)		14	τ_A	---	2.9	---	ns

FIGURE 1 — CURRENT GAIN CHARACTERISTICS

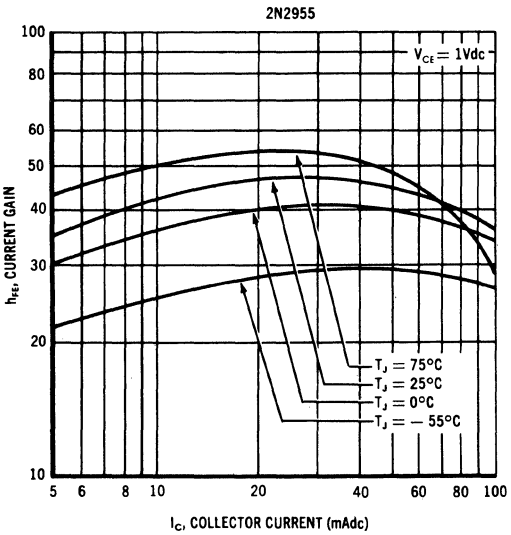


FIGURE 2 — CURRENT GAIN CHARACTERISTICS

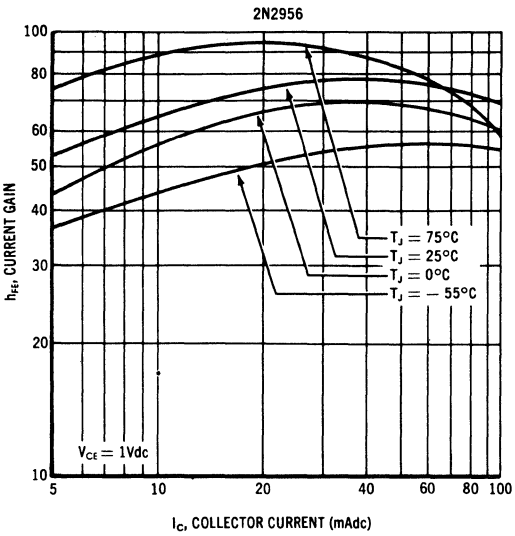


FIGURE 3 — CURRENT GAIN CHARACTERISTICS

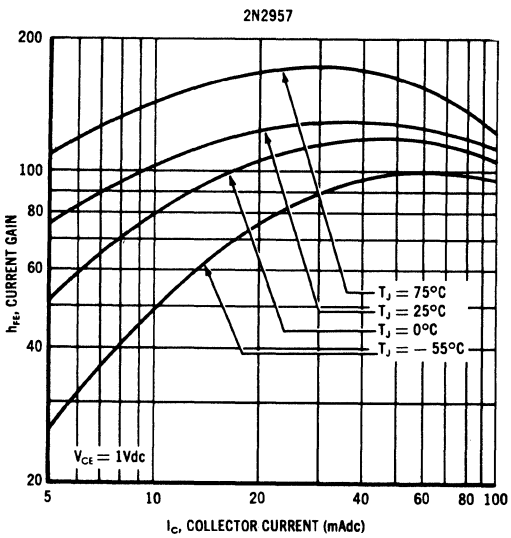
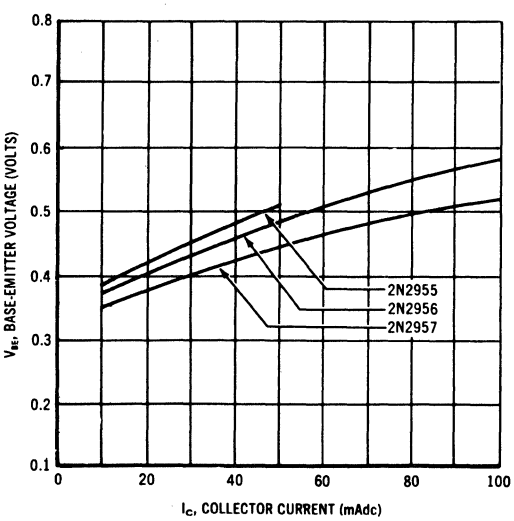


FIGURE 4 — BASE EMITTER VOLTAGE versus COLLECTOR CURRENT



COLLECTOR-EMITTER SATURATION VOLTAGE versus BASE CURRENT

FIGURE 5 —2N2955

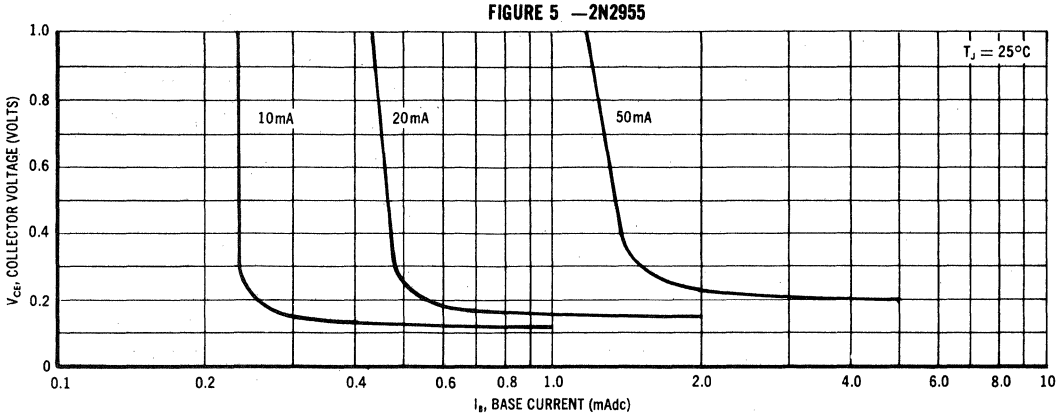


FIGURE 6 —2N2956

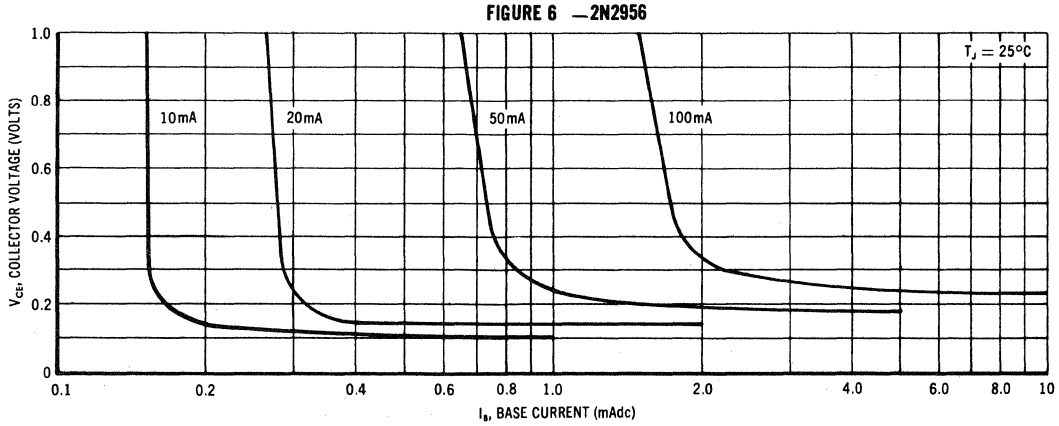


FIGURE 7 —2N2957

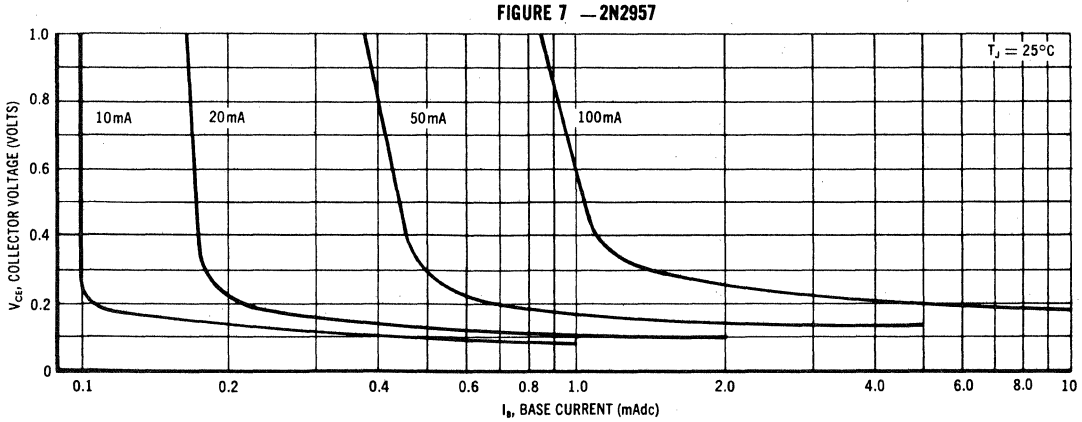
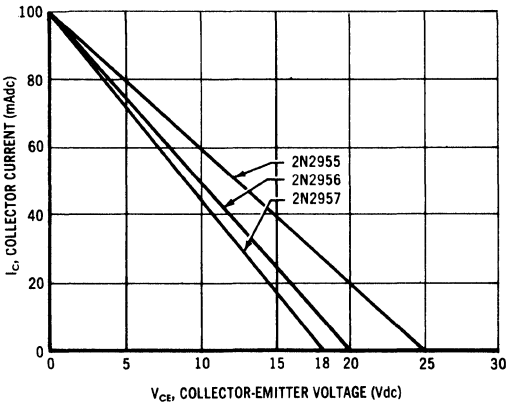
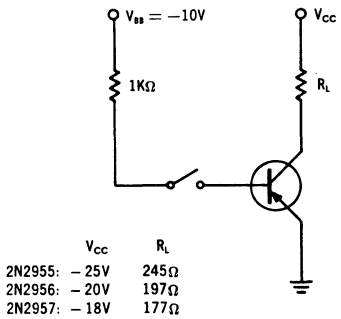


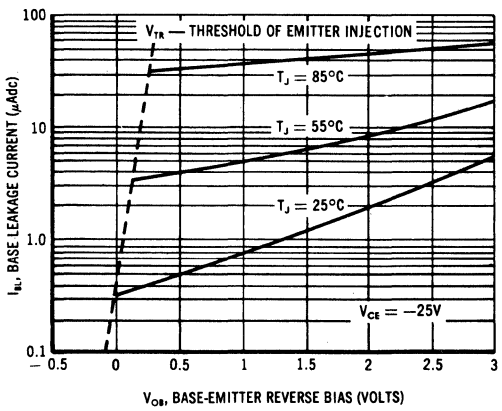
FIGURE 8 — OPEN BASE LOAD LINE RATING & TEST CIRCUIT



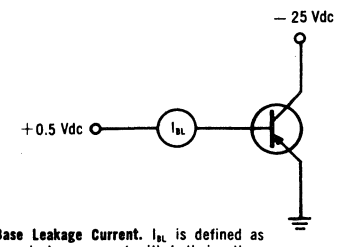


	V_{CC}	R_L
2N2955:	−25V	245Ω
2N2956:	−20V	197Ω
2N2957:	−18V	177Ω

FIGURE 9 — COMMON EMITTER DC LEAKAGE CHARACTERISTICS



BASE LEAKAGE CURRENT TEST CIRCUIT



Base Leakage Current. I_{BL} is defined as base leakage current with both junctions reverse biased. I_C is always less than I_{BL} for $V_{OB} > V_T$. (V_{OB} is off condition base bias, V_T is base voltage at threshold of condition.)

FIGURE 10 — JUNCTION CAPACITANCE versus REVERSE BIAS

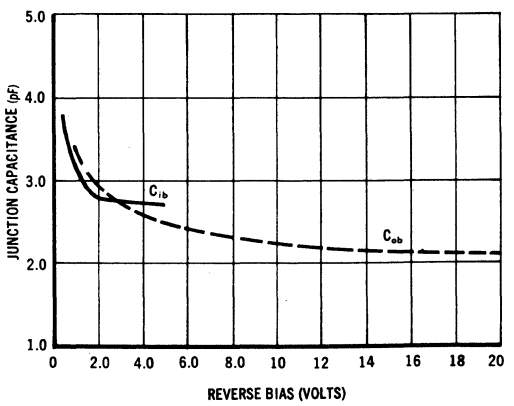


FIGURE 11 — TEMPERATURE COEFFICIENTS

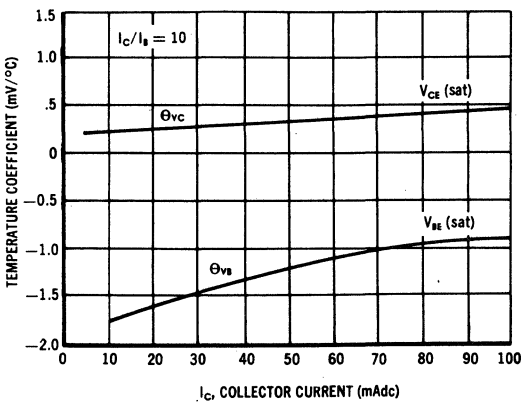


FIGURE 12 — SWITCHING TIME TEST CIRCUIT

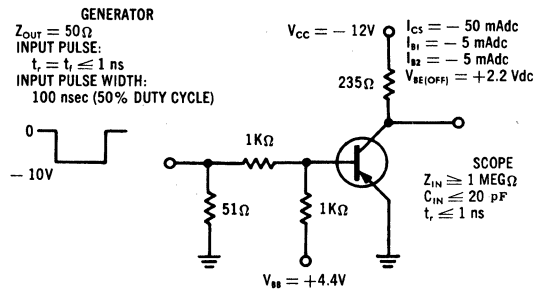


FIGURE 13 — RISE TIME FACTOR

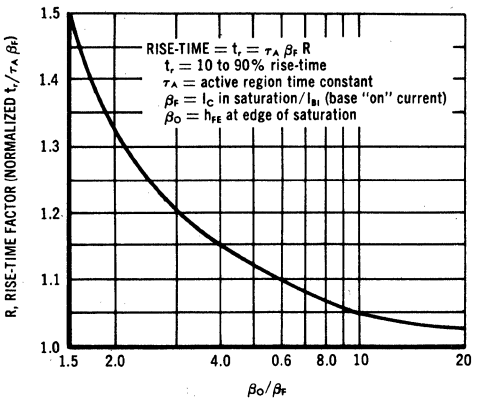


FIGURE 14 — ACTIVE REGION TIME CONSTANT

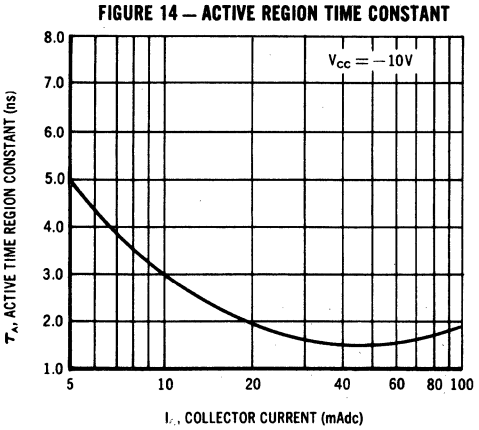


FIGURE 15 — FALL TIME FACTOR

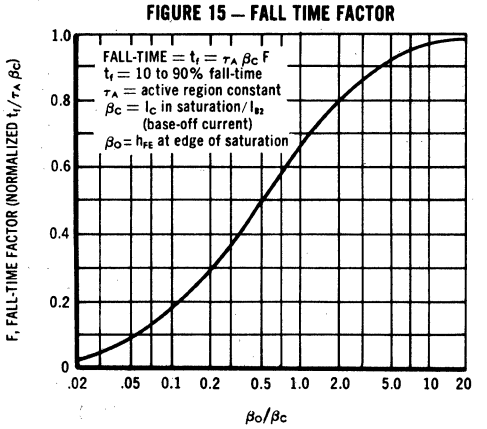


FIGURE 16 — STORAGE TIME

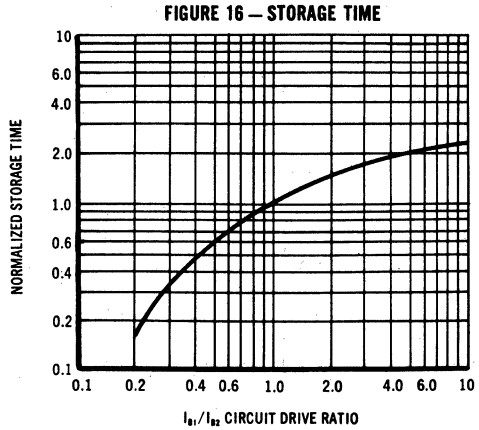


FIGURE 17 — TOTAL CONTROL CHARGE