2N711, A, B (GERMANIUM)

CASE 22
(TO-18)
Collector
connected to case

PNP germanium mesa transistors for high-speed switching applications.

MAXIMUM RATINGS

Rating	Symbol	2N711	2N711A	2N711B	Unit
Collector-Base Voltage	V_{CB}	12	15	18	Vdc
Collector-Emitter Voltage	V_{CES}	12	14	15	Vdc
Collector-Emitter Voltage	V_{CEO}	—	7.0	7.0	Vdc
Emitter-Base Voltage	V_{EB}	1.0	1.5	2.0	Vdc
Collector Current (Continuous)	I_C	50	100	100	mAdc
Emitter Current (Continuous)	I_E	50	100	100	mAdc
Junction Temperature	T_J	← 100 →			°C
Storage Temperature	T_{stg}	← -65 to +100 →			°C
Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	← 300 → ← 4.0 →			mW mW/°C
Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	← 150 → ← 2.0 →			mW mW/°C

2N711,A,B (continued)

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

Characteristic		Sym	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage		BV_{CBO}				Vdc
(I_C = 100 μAdc, I_E = 0)	2N711		12	—	—	
	2N711A		15	—	—	
(I_C = 20 μAdc, I_E = 0)	2N711B		18	—	—	
Collector-Emitter Breakdown Voltage		BV_{CES}				Vdc
(I_C = 100 μAdc)	2N711		12	—	—	
	2N711A		14	—	—	
(I_C = 20 μAdc)	2N711B		15	—	—	
Collector-Emitter Breakdown Voltage		BV_{CEO}				Vdc
(I_C = 5 mAdc, I_B = 0)	2N711A, 2N711B		7.0	—	—	
Emitter-Base Breakdown Voltage		BV_{EBO}				Vdc
(I_E = 0.1 mAdc, I_C = 0)	2N711		1.0	—	—	
	2N711A		1.5	—	—	
	2N711B		2.0	—	—	
Collector-Base Cutoff Current		I_{CBO}				μAdc
(V_{CB} = 5 Vdc, I_E = 0)	2N711		—	0.2	3.0	
	2N711A		—	—	1.5	
(V_{CB} = 10 Vdc, I_E = 0)	2N711B		—	—	1.5	
Emitter-Base Cutoff Current		I_{EBO}				μAdc
(V_{EB} = 1 Vdc)	2N711A		—	—	100	
	2N711B		—	—	20	
DC Current Gain		h_{FE}				—
(I_C = 10 mAdc, V_{CE} = 0.5 Vdc)	2N711		20	30	—	
	2N711A		25	—	150	
	2N711B		30	—	150	
(I_C = 50 mAdc, V_{CE} = 0.7 Vdc)	2N711A, 2N711B		40	—	—	
Collector Saturation Voltage		$V_{CE(sat)}$				Vdc
(I_C = 10 mAdc, I_B = 0.5 mAdc)	2N711		—	0.2	0.5	
	2N711A		—	—	0.30	
(I_C = 10 mAdc, I_B = 0.4 mAdc)	2N711B		—	—	0.25	
(I_C = 50 mAdc, I_B = 2 mAdc)	2N711A		—	—	0.55	
	2N711B		—	—	0.45	
Small-Signal Current Gain		h_{fe}				—
(I_C = 10 mAdc, V_{CE} = 5 Vdc, f = 100 MHz)	2N711A, 2N711B		1.5	—	—	
(I_C = 10 mAdc, V_{CE} = 0.5 Vdc, f = 100 MHz)	2N711A		1.1	—	—	
	2N711B		1.2	—	—	
Base-Emitter Voltage		V_{BE}				Vdc
(I_C = 10 mAdc, I_B = 0.4 mAdc)	2N711, 2N711A		0.30	0.38	0.44	
	2N711B		0.30	—	0.44	
(I_C = 50 mAdc, I_B = 2 mAdc)	2N711A		0.40	—	0.65	
	2N711B		0.40	—	0.65	
Collector Output Capacitance		C_{ob}				pF
(V_{CB} = 5 Vdc, I_E = 0, f = 1 MHz)	2N711A, 2N711B		—	—	6.0	
(V_{CB} = 10 Vdc, I_E = 0, f = 1 MHz)	2N711		—	5.0	—	
Fall Time		t_f				ns
Figure 1:	2N711A		—	—	150	
	2N711B		—	—	110	
Figure 2:	2N711A		—	—	110	
	2N711B		—	—	100	
	2N711		—	90	150	
Minority Carrier Storage Time		t_s				ns
Figure 1:	2N711A		—	—	150	
	2N711B		—	—	140	
Figure 2:	2N711A		—	—	120	
	2N711B		—	—	100	
	2N711		—	90	200	
Delay Plus Rise Time		$t_d + t_r$				ns
Figure 1:	2N711A, 2N711B		—	—	100	
Figure 2:	2N711A, 2N711B		—	—	75	
	2N711		—	70	100	

SWITCHING CIRCUITS

FIGURE 1

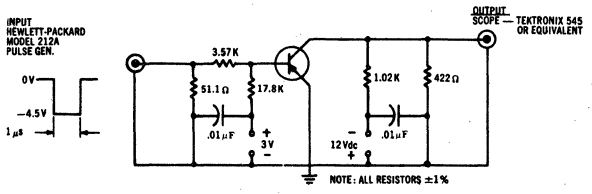
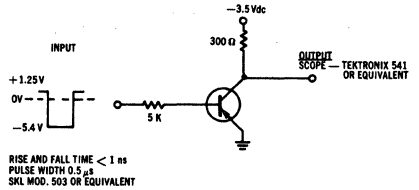
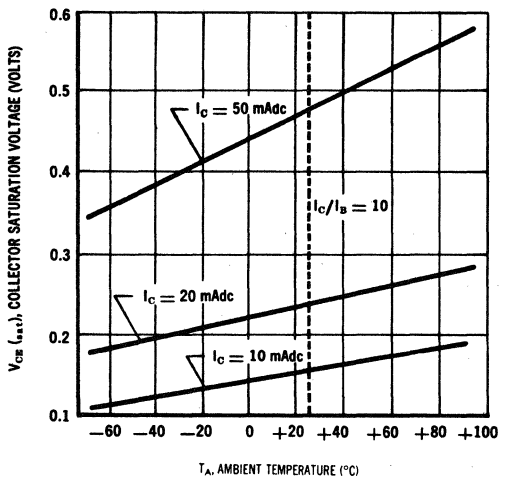


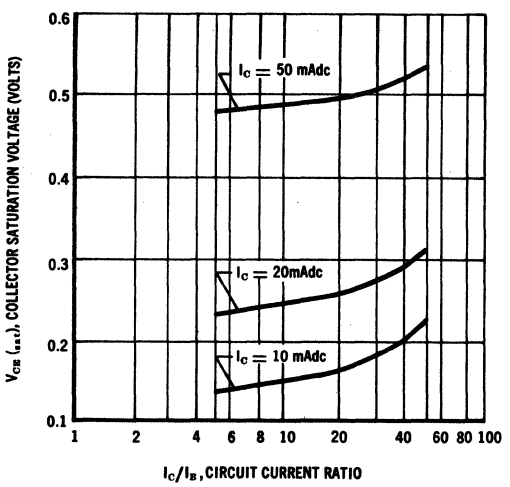
FIGURE 2



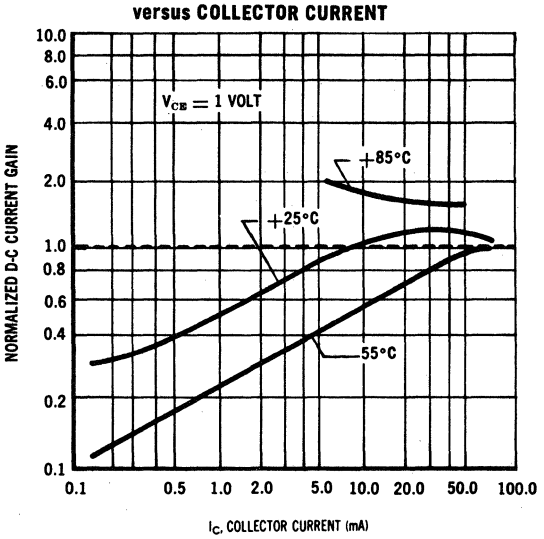
COLLECTOR SATURATION VOLTAGE versus AMBIENT TEMPERATURE



COLLECTOR SATURATION VOLTAGE STORAGE TIME versus CIRCUIT CURRENT RATIO



NORMALIZED DC CURRENT GAIN versus COLLECTOR CURRENT



STORAGE TIME versus CIRCUIT CURRENT RATIO