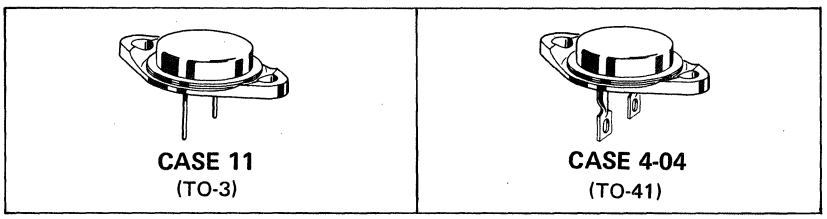
2N3615 thru 2N3618 (GERMANIUM)

PNP germanium power transistors for switching and amplifier applications.



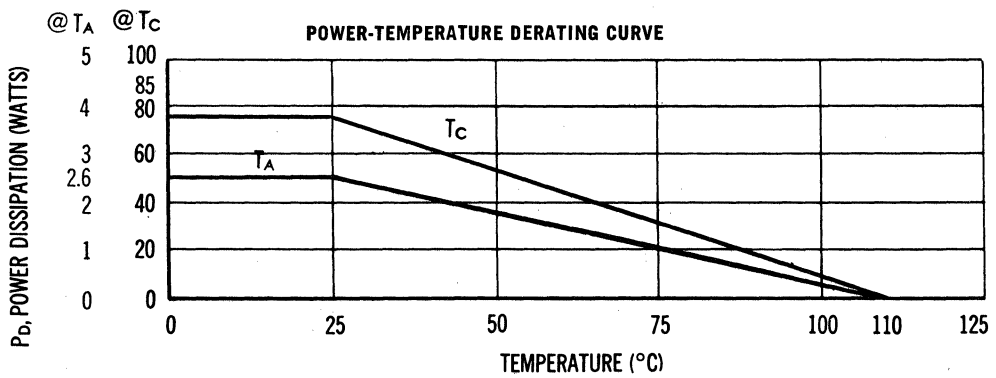
CASE 11
(TO-3)

CASE 4-04
(TO-41)

For units with solder lugs attached, specify devices MP3615 etc. (TO-41 package)

MAXIMUM RATINGS

Rating	Symbol	2N3615 2N3617	2N3616 2N3618	Unit
Collector-Emitter Voltage	V_{CES}	60	75	Vdc
Collector-Emitter Voltage (Open Base)	V_{CEO}	50	60	Vdc
Collector-Base Voltage	V_{CB}	80	100	Vdc
Emitter-Base Voltage	V_{EB}	40	50	Vdc
Collector Current (Continuous)	I_C	7.0		Adc
Peak Collector Current (PW ≦ 5 msec)	I_C	15		Adc
Base Current (Continuous)	I_B	2.0		Adc
Storage Temperature	T_{stg}	-65 to +110		°C
Operating Case Temperature	T_C	-65 to +110		°C
Total Device Dissipation @T_C = 25°C Derate above 25°C	P_D	77 1.0		Watts W/°C
Thermal Resistance, Junction to Case	θ_{JC}	1.0		°C/W
Thermal Resistance, Case to Ambient	θ_{CA}	32.7		°C/W



These transistors are also subject to safe area curves. Both limits are applicable and must be observed.

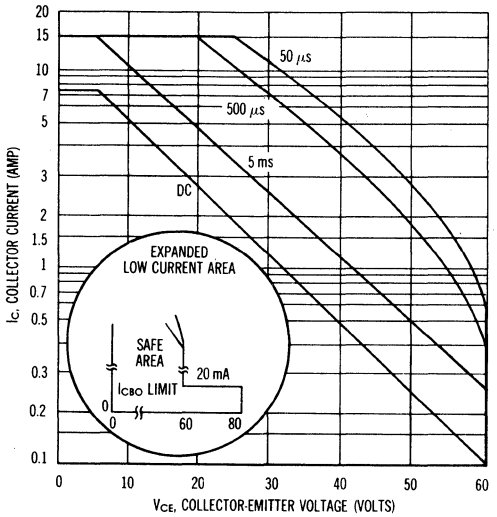
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
Collector-Emitter Breakdown Voltage* (I_C = 250 mAdc)	2N3615, 2N3617	BV_{CES}*	60	-	Vdc
	2N3616, 2N3618		75	-	
Collector-Emitter Breakdown Voltage* (I_C = 300 mAdc)	2N3615, 2N3617	BV_{CEO}*	50	-	Vdc
	2N3616, 2N3618		60		
Floating Potential (V_{CB} = V_{CB} max)		V_{EBF}	-	1.0	Vdc
Collector-Emitter Leakage Current (V_{CE} = 1/2 V_{CEO} max)		I_{CEO}	-	30	mAdc
Collector-Emitter Leakage Current (V_{CE} = V_{CE} max, V_{BE} = 1.0 Vdc, T_C = +100°C)		I_{CEX}	-	10	mAdc
Collector-Base Cutoff Current (V_{CB} = 2.0 Vdc)		I_{CBO}	-	0.060	mAdc
(V_{CB} = 55 Vdc)	2N3615, 2N3617		-	1.0	
(V_{CB} = 65 Vdc)	2N3616, 2N3618		-	1.0	
(V_{CB} = V_{CB} max)			-	5.0	
Emitter-Base Cutoff Current (V_{EB} = V_{EB} max)		I_{EBO}		500	μAdc
(V_{EB} = 12 Vdc)			-		
Collector-Emitter Saturation Voltage (I_C = 3.0 Adc, I_B = 300 mAdc)		$V_{CE(sat)}$	-	0.25	Vdc
(I_C = 7.0 Adc, I_B = 700 mAdc)			-	0.35	
Base Emitter Saturation Voltage (I_C = 3.0 Adc, I_B = 300 mAdc)	2N3615, 2N3616	$V_{BE(sat)}$	-	0.7	Vdc
	2N3617, 2N3618		-	0.6	
(I_C = 7.0 Adc, I_B = 700 mAdc)	2N3615, 2N3616		-	1.1	
	2N3617, 2N3618		-	0.9	
Transconductance (I_C = 3.0 A, V_{CE} = 2.0 V)	2N3615, 2N3616	g_{FE}	3.0	-	mhos
	2N3617, 2N3618		3.5	-	
Small Signal Current Gain (I_C = 0.5 A, V_{CE} = 12 V, f = 20 kHz)		h_{fe}	15	-	-
(I_C = 0.5 A, V_{CE} = 2.0 V, f = 1.0 kHz)	2N3615, 2N3616		40	100	
	2N3617, 2N3618		60	150	
DC Current Gain (I_C = 3.0 Adc, V_{CE} = 2.0 Vdc)	2N3615, 2N3616	h_{FE}	30	60	-
	2N3617, 2N3618		45	90	
(I_C = 7.0 Adc, V_{CE} = 2.0 Vdc)	2N3615, 2N3616		20	-	
	2N3617, 2N3618		30	-	
Current-Gain–Bandwidth Product (I_C = 0.5 Adc, V_{CE} = 2.0 Vdc)		f_T	Typ 600		kHz

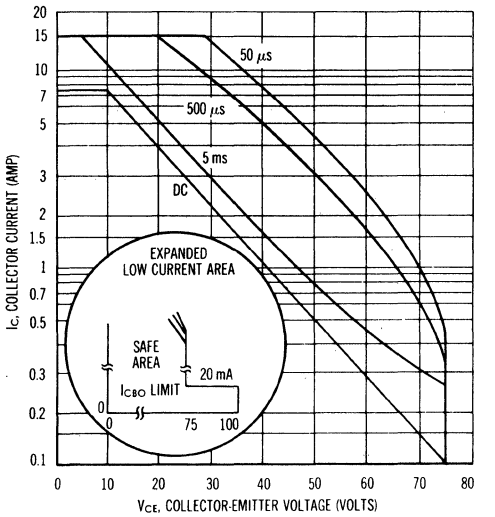
*Sweep Test: 1/2 sine wave, 60 Hz

SAFE OPERATING AREAS

2N3615 and 2N3617

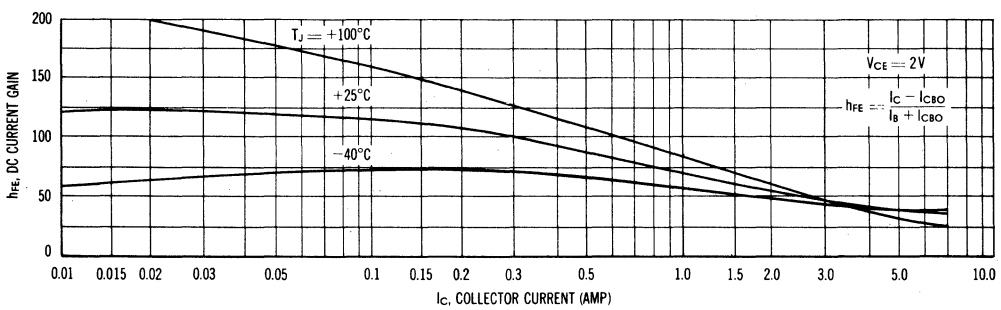


2N3616 and 2N3618

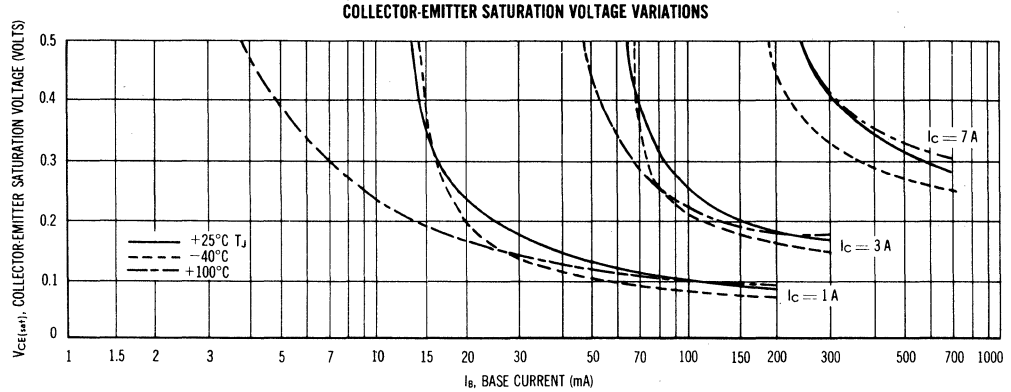


NOTE The Safe Operating Area Curves indicate I_C-V_{CE} limits below which the device will not go into secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a collector-emitter short. (Case temperature and duty cycle of the excursions make no significant change in these safe areas.) The load line may exceed the BV_{CES} voltage limit only if the collector current has been reduced to 20 mA or less before or at the BV_{CES} limit; then and only then may the load line be extended to the absolute maximum voltage rating of BV_{CBO}. To insure operation below the maximum T_J, the power-temperature derating curve must be observed for both steady state and pulse power conditions.

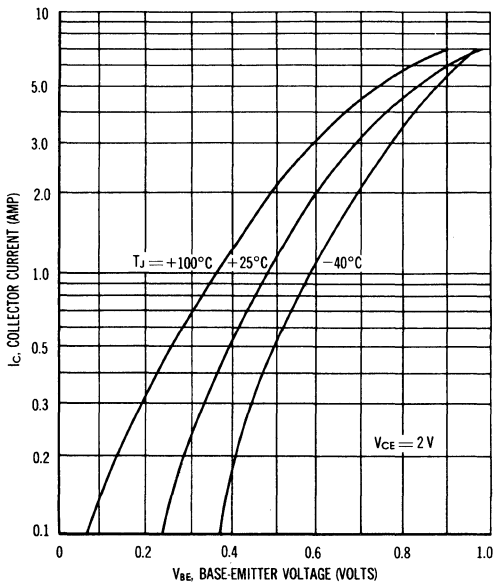
DC CURRENT GAIN versus COLLECTOR CURRENT



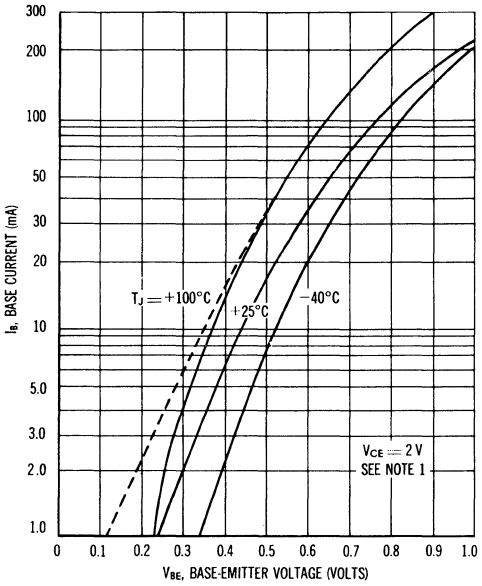
COLLECTOR-EMITTER SATURATION VOLTAGE VARIATIONS



COLLECTOR CURRENT versus BASE-EMITTER VOLTAGE

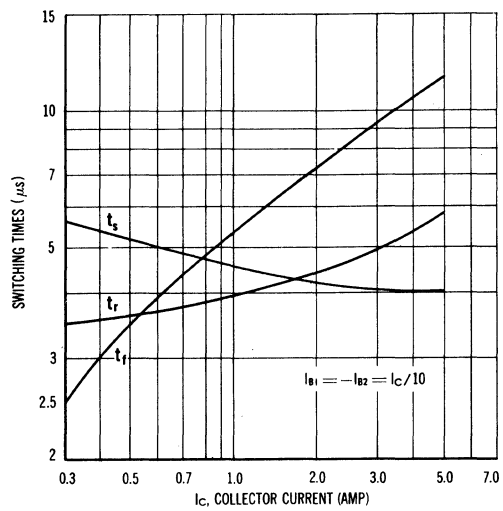


BASE CURRENT versus BASE-EMITTER VOLTAGE



NOTE 1 — Dotted line indicates Metered Base Current plus the I_{CBO} of the transistor at 100°C.

TYPICAL SWITCHING TIMES



COLLECTOR CURRENT versus BASE-EMITTER VOLTAGE