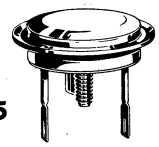
2N441 (GERMANIUM)
2N442
2N443

PNP germanium power transistors for power switching and amplifier applications. Power and temperature ratings exceed EIA registration.



CASE 5
(TO-36)

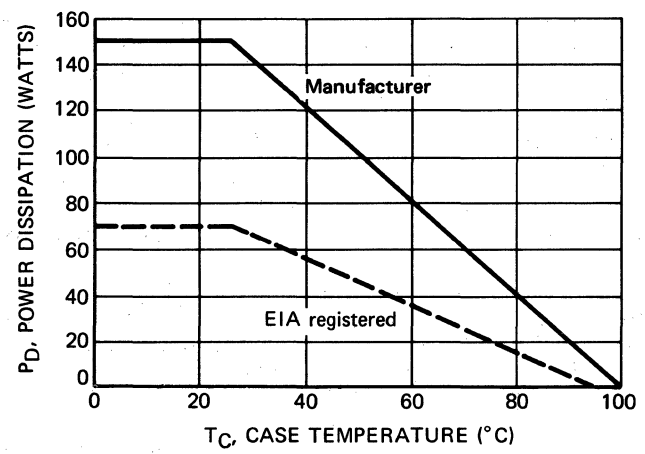
MAXIMUM RATINGS

Rating	Symbol	2N441	2N442	2N443	Unit
Collector-Emitter Voltage	V_{CES}	40	45	50	Vdc
Collector-Base Voltage	V_{CB}	40	50	60	Vdc
Emitter-Base Voltage	V_{EB}	20	30	40	Vdc
Base Current — Continuous	I_B	4.0			Adc
Emitter Current — Continuous	I_E	15			Adc
Total Device Dissipation @ T_C = 25°C	P_D	150			Watts
Operating Junction Temperature Range (EIA Registered)	T_J	-65 to +95			°C
Operating Junction Temperature Range	T_J	-65 to +100			°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction to Case (EIA Registered)	θ_{JC}	1.0	°C/W
Thermal Resistance, Junction to Case	θ_{JC}	0.5	°C/W

FIGURE 1 — POWER-TEMPERATURE DERATING CURVE



The maximum continuous power is related to maximum junction temperature, by the thermal resistance factor.

This curve has a value of 150 Watts at case temperatures of 25°C and is 0 Watts at 100°C with a linear relation between the two temperatures such that

$$P_D \text{ allowable} = \frac{100^\circ - T_C}{0.5}.$$

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage* (I_C = 1.0 Adc, I_B = 0)	2N441	BV_{CEO}*	25	-	-	Vdc
	2N442		30	-	-	
	2N443		45	-	-	
Collector-Emitter Breakdown Voltage* (I_C = 300 mAdc, V_{BE} = 0)	2N441	BV_{CES}*	40	-	-	Vdc
	2N442		45	-	-	
	2N443		50	-	-	
Floating Potential (V_{CB} = 40 Vdc, I_E = 0)	2N441	V_{EBF}	-	-	1.0	Vdc
(V_{CB} = 50 Vdc, I_E = 0)	2N442		-	-	1.0	
(V_{CB} = 60 Vdc, I_E = 0)	2N443		-	-	1.0	
Collector Cutoff Current (V_{CB} = 2.0 Vdc, I_E = 0)		I_{CBO}	-	0.1	-	mAdc
(V_{CB} = 40 Vdc, I_E = 0)	2N441		-	2.0	8.0	
(V_{CB} = 50 Vdc, I_E = 0)	2N442		-	2.0	8.0	
(V_{CB} = 60 Vdc, I_E = 0)	2N443		-	2.0	8.0	
(V_{CB} = 40 Vdc, I_E = 0, T_B = 71°C)	2N441		-	-	15	
(V_{CB} = 50 Vdc, I_E = 0, T_B = 71°C)	2N442		-	-	15	
(V_{CB} = 50 Vdc, I_E = 0, T_B = 71°C)	2N443		-	-	15	
Emitter Cutoff Current (V_{BE} = 20 Vdc, I_C = 0)	2N441	I_{EBO}	-	1.0	8.0	mAdc
(V_{BE} = 30 Vdc, I_C = 0)	2N442		-	1.0	8.0	
(V_{BE} = 40 Vdc, I_C = 0)	2N443		-	1.0	8.0	
ON CHARACTERISTICS						
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 2.0 Vdc)		h_{FE}	20	-	40	-
(I_C = 12 Adc, V_{CE} = 2.0 Vdc)			-	20	-	
Collector-Emitter Saturation Voltage (I_C = 12 Adc, I_B = 2.0 Adc)	2N441	$V_{CE(sat)}$	-	0.3	-	Vdc
	2N442		-	0.3	-	
	2N443		-	0.3	1.0	
Base-Emitter Voltage (I_C = 5.0 Adc, V_{CE} = 2.0 Vdc)	2N441	V_{BE}	-	0.65	-	Vdc
	2N442		-	0.65	-	
	2N443		-	0.65	0.9	
DYNAMIC CHARACTERISTICS						
Common-Emitter Cutoff Frequency (I_C = 5.0 Adc, V_{CE} = 6.0 Vdc)		$f_{\alpha e}$	-	10	-	kHz
SWITCHING CHARACTERISTICS						
Rise Time (V_{CE} = 12 Vdc, I_C = 12 Adc, I_B = 2.0 Adc)		t_r	-	15	-	μs
Fall Time (I_C = 0, V_{BE} = 6.0 Vdc, R_{BE} = 10 ohms)		t_f	-	15	-	μs

* Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

TYPICAL COMMON-EMITTER CHARACTERISTICS

FIGURE 2 – OUTPUT CHARACTERISTICS

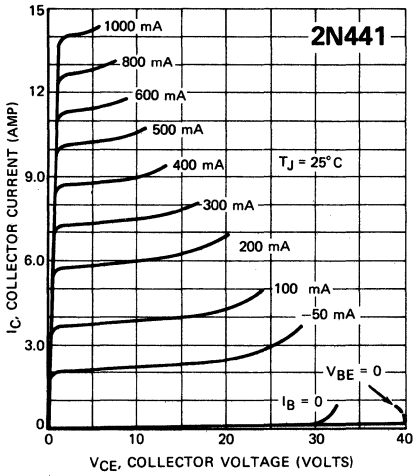


FIGURE 3 – OUTPUT CHARACTERISTICS

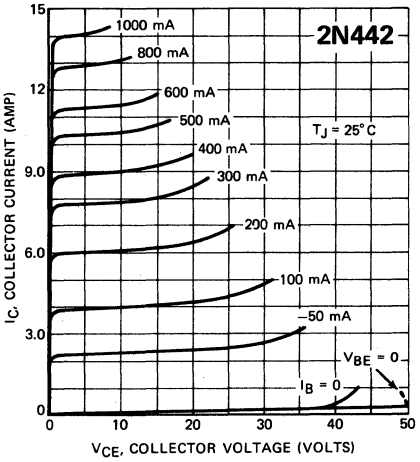


FIGURE 4 – OUTPUT CHARACTERISTICS

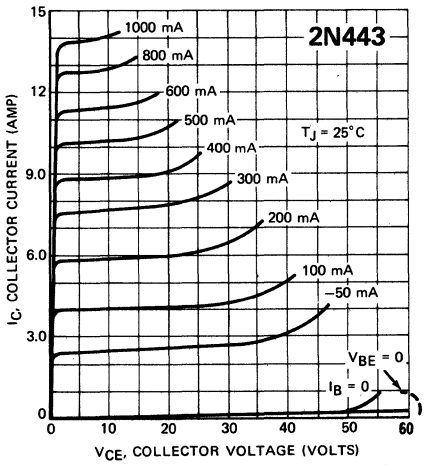


FIGURE 5 – INPUT CHARACTERISTICS

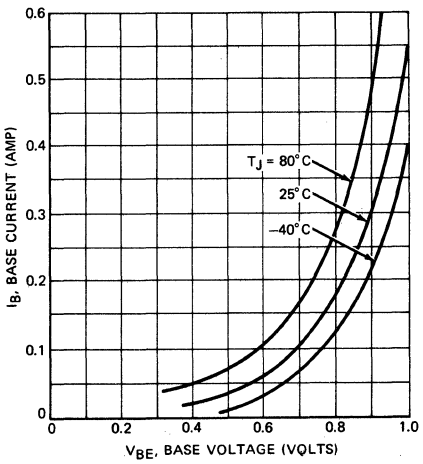


FIGURE 6 – DC CURRENT GAIN TRANSFER CHARACTERISTICS

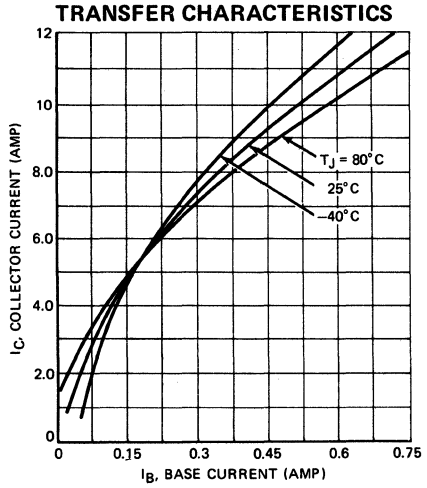


FIGURE 7 – TRANSCONDUCTANCE CHARACTERISTICS