Complementary Plastic Silicon Power Transistors

. . . designed for lower power audio amplifier and low current, high-speed switching applications.

- Low Collector–Emitter Sustaining Voltage VCEO(sus) 60 Vdc (Min) — BD787, BD788
- High Current–Gain Bandwidth Product —
 f_T = 50 MHz (Min) @ I_C = 100 mAdc
- Collector–Emitter Saturation Voltage Specified at 0.5, 1.0, 2.0 and 4.0 Adc

MAXIMUM RATINGS

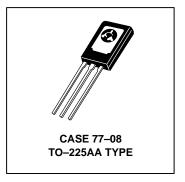
Rating	Symbol	BD787 BD788	Unit
Collector–Emitter Voltage	VCEO	60	Vdc
Collector–Base Voltage	V _{CBO}	80	Vdc
Emitter–Base Voltage	V _{EBO}	6.0	Vdc
Collector Current — Continous — Peak	IC	4.0 8.0	Adc Adc
Base Current	lΒ	1.0	Adc
Total Power Dissipation @ T _C = 25°C Derate Above 25°C	PD	15 0.12	Watts W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	8.34	°C/W

BD787 PNP BD788

4 AMPERE
POWER TRANSISTORS
COMPLEMENTARY
SILICON
60 VOLTS
15 WATTS



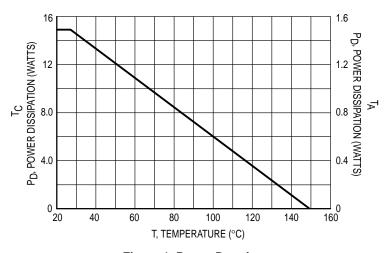


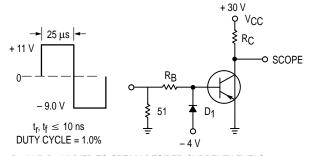
Figure 1. Power Derating

*ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}C$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (1) (IC = 10 mAdc, IB = 0)	VCEO(sus)	60	_	Vdc
Collector Cutoff Current $(V_{CE} = 20 \text{ Vdc}, I_{B} = 0)$ $(V_{CE} = 30 \text{ Vdc}, I_{B} = 0)$	ICEO	_	100	μAdc
Collector Cutoff Current (VCE = 80 Vdc, VBE(off) = 1.5 Vdc) (VCE = 40 Vdc, VBE(off) = 1.5 Vdc, TC = 125°C)	ICEX	<u>-</u>	1.0 0.1	μAdc mAdc
Emitter Cutoff Current (V _{EB} = 6.0 Vdc, I _C = 0)	I _{EBO}	_	1.0	μAdc
ON CHARACTERISTICS(1)				
DC Current Gain (IC = 200 mAdc, VCE = 3.0 Vdc) (IC = 1.0 Adc, VCE = 3.0 Vdc) (IC = 2.0 Adc, VCE = 3.0 Vdc) (IC = 4.0 Adc, VCE = 3.0 Vdc)	hFE	40 25 20 5.0	250 — — —	_
Collector-Emitter Saturation Voltage (I _C = 500 mAdc, I _B = 50 mAdc) (I _C = 1.0 Adc, I _B = 100 mAdc) (I _C = 2.0 Adc, I _B = 200 mAdc) (I _C = 4.0 Adc, I _B = 800 mAdc)	VCE(sat)	_ _ _ _	0.4 0.6 0.8 2.5	Vdc
Base–Emitter Saturation Voltage (I _C = 2.0 Adc, I _B = 200 mAdc)	V _{BE} (sat)	_	2.0	Vdc
Base–Emitter On Voltage (I _C = 2.0 Adc, V _{CE} = 3.0 Vdc)	VBE(on)	_	1.8	Vdc
DYNAMIC CHARACTERISTICS				
Current–Gain — Bandwidth Product (I _C = 100 mAdc, V _{CE} = 10 Vdc, f = 10 MHz)	fτ	50	_	MHz
Output Capacitance (V _{CB} = 10 Vdc, I _C = 0) (f = 0.1 MHz) BD788	C _{ob}	<u> </u>	50 70	pF
Small–Signal Current Gain (I _C = 200 mAdc, V _{CE} = 10 Vdc, f = 1.0 kHz)	h _{fe}	10	_	_

^{*} Indicates JEDEC Registered Data

⁽¹⁾ Pulse Test; Pulse Width \leq 300 μs , Duty Cycle \leq 2.0%.



 R_B and R_C varied to obtain desired current levels D_1 must be fast recovery type, e.g.: $1 N5825 \ \text{USED ABOVE} \ I_B \approx 100 \ \text{mA} \\ \text{MSD6100 USED BELOW} \ I_B \approx 100 \ \text{mA} \\ \text{FOR PNP TEST CIRCUIT, REVERSE ALL POLARITIES.}$

Figure 2. Switching Time Test Circuit

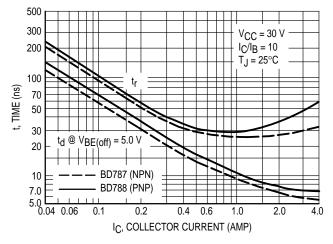


Figure 3. Turn-On Time

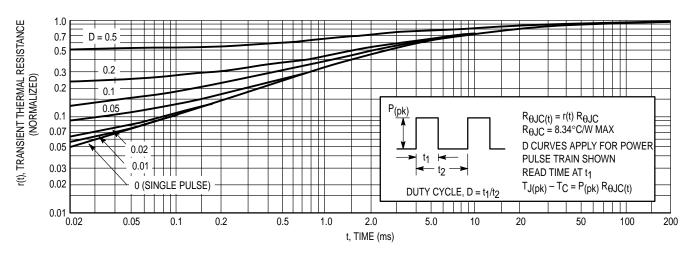


Figure 4. Thermal Response

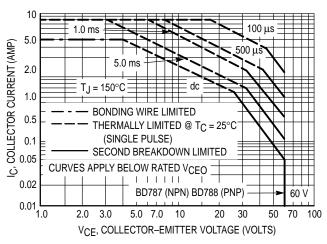


Figure 5. Active Region Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_{\text{C}} - V_{\text{CE}}$ limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on $T_{J(pk)} = 150^{\circ}C$: T_{C} is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \le 150^{\circ}C$, $T_{J(pk)}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

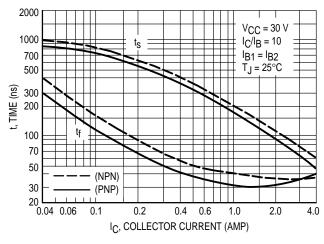


Figure 6. Turn-Off Time

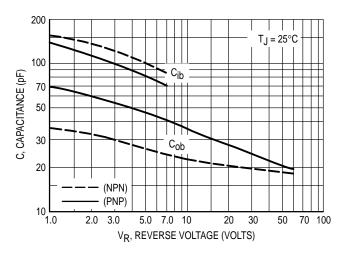


Figure 7. Capacitance

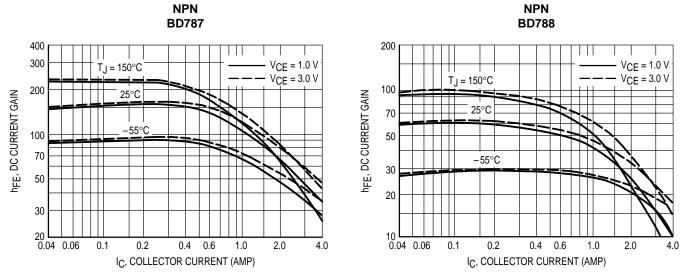


Figure 8. DC Current Gain

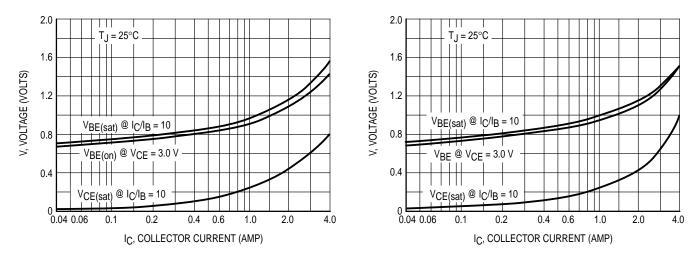


Figure 9. "On" Voltages

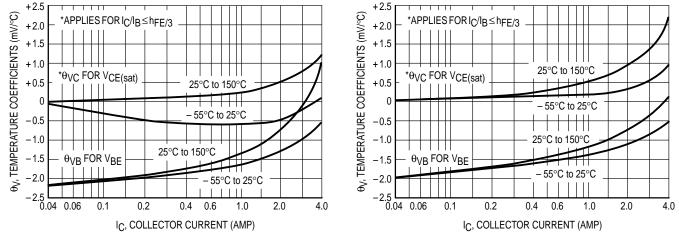
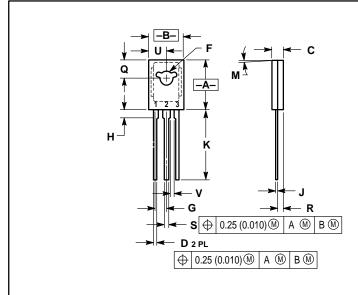


Figure 10. Temperature Coefficients

PACKAGE DIMENSIONS



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS		
DIM	MIN	MAX	MIN	MAX	
Α	0.425	0.435	10.80	11.04	
В	0.295	0.305	7.50	7.74	
С	0.095	0.105	2.42	2.66	
D	0.020	0.026	0.51	0.66	
F	0.115	0.130	2.93	3.30	
G	0.094	BSC	2.39 BSC		
Н	0.050	0.095	1.27	2.41	
J	0.015	0.025	0.39	0.63	
K	0.575	0.655	14.61	16.63	
M	5°	TYP	5 ° TYP		
Q	0.148	0.158	3.76	4.01	
R	0.045	0.055	1.15	1.39	
S	0.025	0.035	0.64	0.88	
U	0.145	0.155	3.69	3.93	
٧	0.040		1.02		

STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

CASE 77-08 TO-225AA TYPE **ISSUE V**

BD787 BD788

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