NPN Plastic Silicon Power Transistor

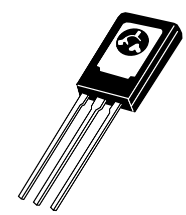
. . . designed for low power audio amplifier and low–current, high speed switching applications.

- High Collector–Emitter Sustaining Voltage — $V_{CEO(sus)}$ = 100 Vdc (Min)
- High DC Current Gain @ I_C = 200 mAdc h_{FE} = 40–250
- Low Collector–Emitter Saturation Voltage — $V_{CE(sat)}$ = 0.5 Vdc (Max) @ I_C = 500 mAdc
- High Current Gain — Bandwidth Product — f_T = 40 MHz (Min) @ I_C = 100 mAdc)

BD791

ON Semiconductor Preferred Device

4 AMPERE
POWER TRANSISTOR
SILICON
100 VOLTS
15 WATTS



CASE 77–09
TO–225AA TYPE

*MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Collector–Emitter Voltage	V_{CEO}	100	Vdc
Collector–Base Voltage	V_{CB}	100	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	Vdc
Collector Current — Continuous — Peak	I_C	4.0 8.0	Adc
Base Current	I_B	1.0	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	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

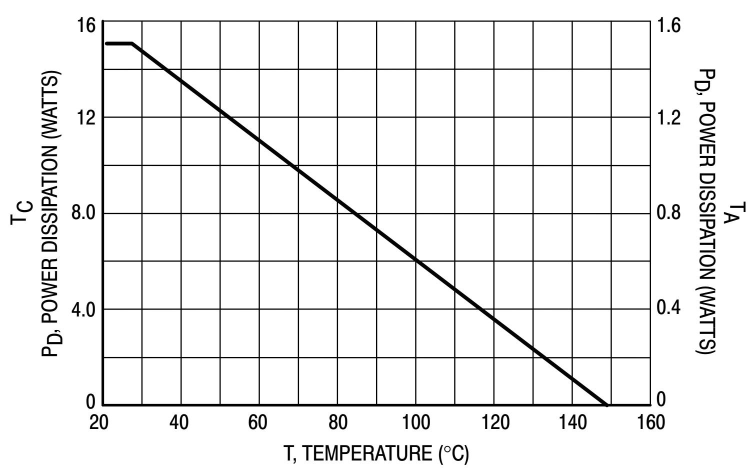


Figure 1. Power Derating

Preferred devices are ON Semiconductor recommended choices for future use and best overall value.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (1) (I_C = 10 mAdc, I_B = 0)	$V_{CEO(sus)}$	100	—	Vdc
Collector Cutoff Current (V_{CE} = 50 Vdc, I_B = 0)	I_{CEO}	—	100	µAdc
Collector Cutoff Current (V_{CE} = 100 Vdc, $V_{BE(off)}$ = 1.5 Vdc) (V_{CE} = 50 Vdc, $V_{BE(off)}$ = 1.5 Vdc, T_C = 125°C)	I_{CEX}	— —	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 (I_C = 200 mAdc, V_{CE} = 3 0 Vdc) (I_C = 1.0 Adc, V_{CE} = 3.0 Vdc) (I_C = 2.0 Adc, V_{CE} = 3.0 Vdc) (I_C = 4.0 Adc, V_{CE} = 3.0 Vdc)	h_{FE}	40 20 10 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)	$V_{CE(sat)}$	— — — —	0.5 1.0 2.5 3.0	Vdc
Base–Emitter Saturation Voltage (I_C = 2.0 Adc, I_B = 200 mAdc)	$V_{BE(sat)}$	—	1.8	Vdc
Base–Emitter On Voltage (I_C = 200 mAdc, V_{CE} = 3.0 Vdc)	$V_{BE(on)}$	—	1.5	Vdc
DYNAMIC CHARACTERISTICS				
Current–Gain — Bandwidth Product (I_C = 100 mAdc, V_{CE} = 10 Vdc, f = 10 MHz)	f_T	40	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_C = 0, f = 0.1 MHz)	C_{ob}	—	50	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 ≤ 300 µs, Duty Cycle ≤ 2.0%.

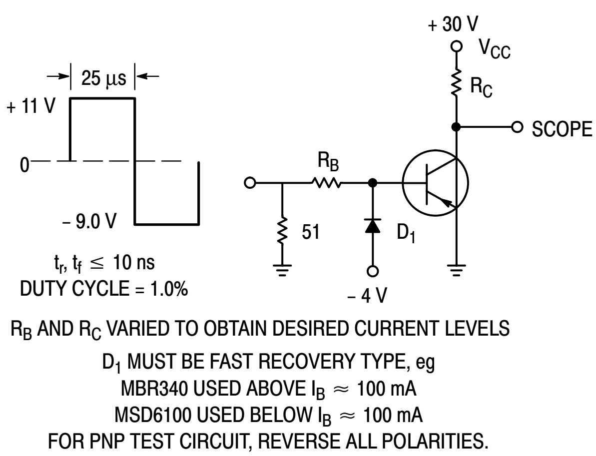


Figure 2. Switching Time Test Circuit

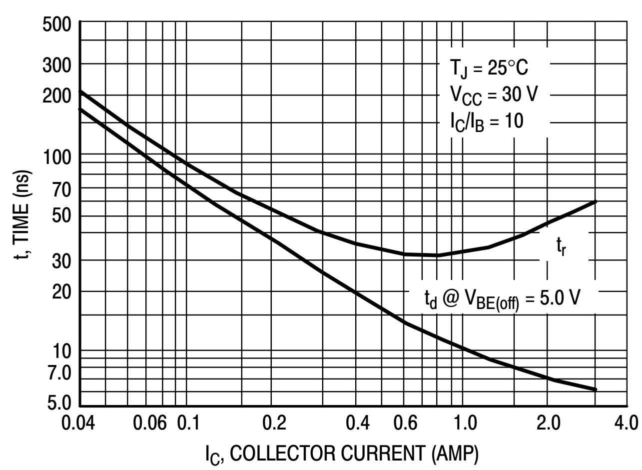


Figure 3. Turn–On Time

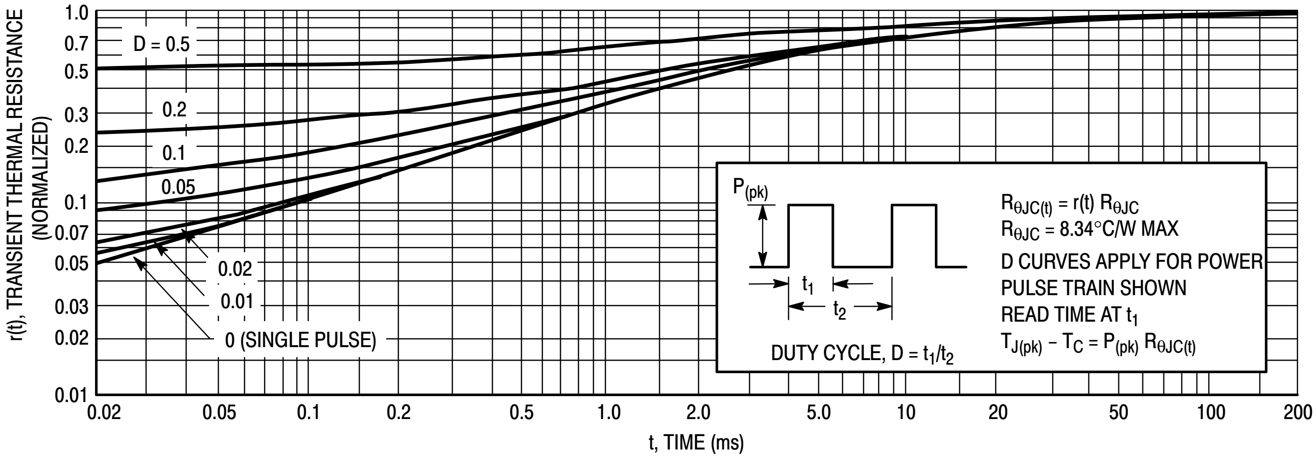


Figure 4. Thermal Response

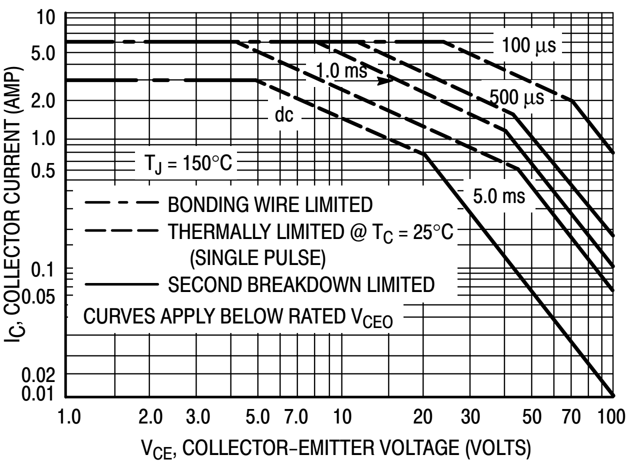


Figure 5. Active Region Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ 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 $T_{J(pk)} = 150°C$: T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150°C$, $T_{J(pk)}$ 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.

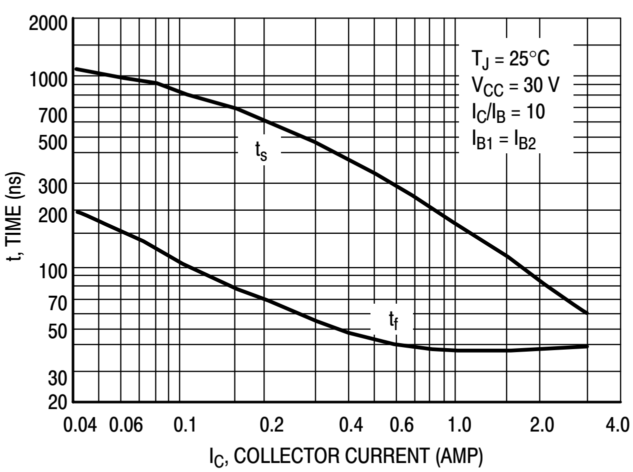


Figure 6. Turn−Off Time

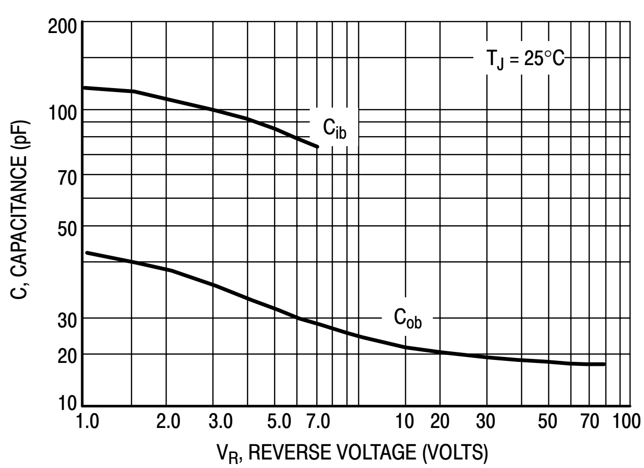


Figure 7. Capacitance

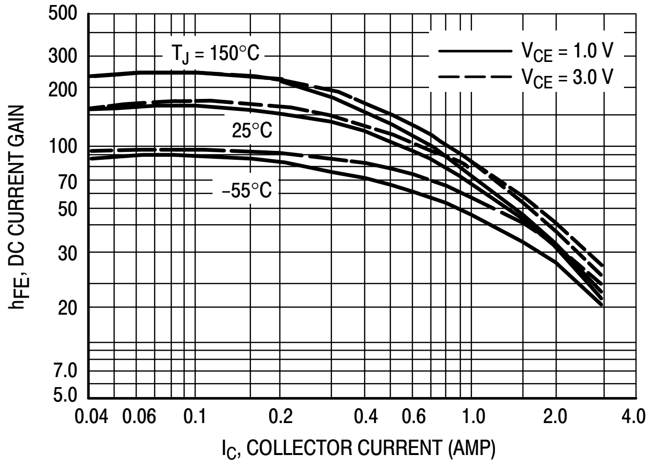


Figure 8. DC Current Gain

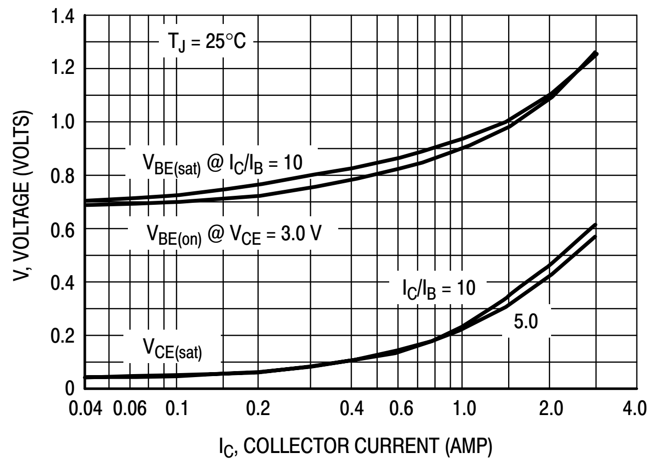


Figure 9. “On” Voltage

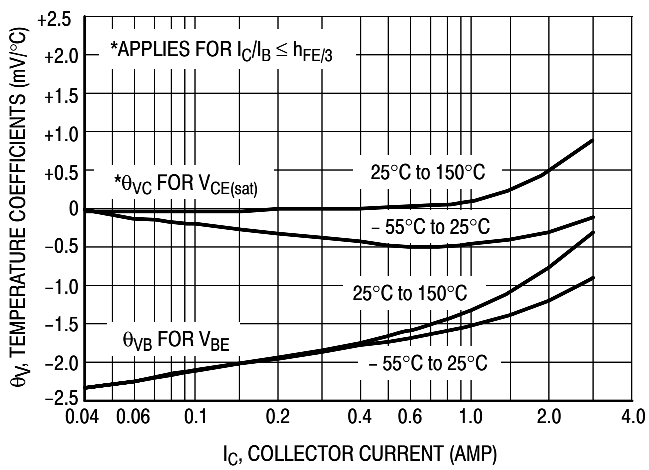
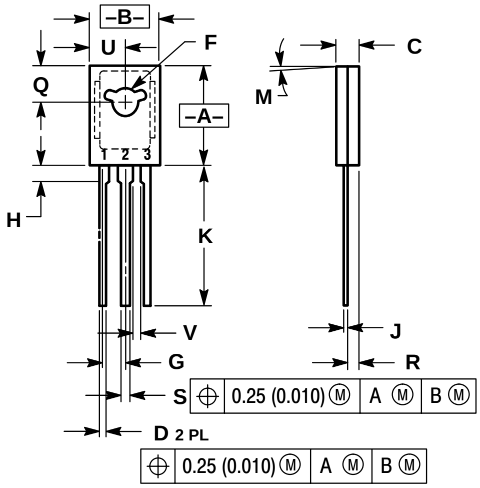


Figure 10. Temperature Coefficient

PACKAGE DIMENSIONS

CASE 77–09
TO–225AA TYPE
ISSUE W



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

DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	0.425	0.435	10.80	11.04
B	0.295	0.305	7.50	7.74
C	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	
H	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	0.065	1.15	1.65
S	0.025	0.035	0.64	0.88
U	0.145	0.155	3.69	3.93
V	0.040	---	1.02	---

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PIN 1. EMITTER
2. COLLECTOR
3. BASE

Notes

Notes

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