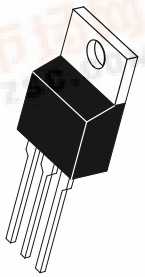
MJE5730
MJE5731
MJE5731A

High Voltage PNP Silicon Power Transistors

. . . designed for line operated audio output amplifier, SWITCHMODE power supply drivers and other switching applications.

- 300 V to 400 V (Min) — $V_{CEO(sus)}$
- 1.0 A Rated Collector Current
- Popular TO–220 Plastic Package
- PNP Complements to the TIP47 thru TIP50 Series

1.0 AMPERE
POWER TRANSISTORS
PNP SILICON
300 – 350 – 400 VOLTS
40 WATTS



CASE 221A–06
TO–220AB

MAXIMUM RATINGS

Rating	Symbol	MJE5730	MJE5731	MJE5731A	Unit
Collector–Emitter Voltage	V_{CEO}	300	350	375	Vdc
Collector–Base Voltage	V_{CB}	300	350	375	Vdc
Emitter–Base Voltage	V_{EB}	5.0			Vdc
Collector Current — Continuous Peak	I_C	1.0 3.0			Adc
Base Current	I_B	1.0			Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	40 0.32			Watts W/°C
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	2.0 0.016			Watts W/°C
Unclamped Inducting Load Energy (See Figure 10)	E	20			mJ
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	$R_{\theta JC}$	3.125	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°C/W

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (1) (I_C = 30 mAdc, I_B = 0)	MJE5730	$V_{CEO(sus)}$	300	—	Vdc
	MJE5731		350	—	
	MJE5731A		375	—	
Collector Cutoff Current		I_{CEO}			mAdc
(V_{CE} = 200 Vdc, I_B = 0)	MJE5730		—	1.0	
(V_{CE} = 250 Vdc, I_B = 0)	MJE5731		—	1.0	
(V_{CE} = 300 Vdc, I_B = 0)	MJE5731A		—	1.0	
Collector Cutoff Current		I_{CES}			mAdc
(V_{CE} = 300 Vdc, V_{BE} = 0)	MJE5730		—	1.0	
(V_{CE} = 350 Vdc, V_{BE} = 0)	MJE5731		—	1.0	
(V_{CE} = 400 Vdc, V_{BE} = 0)	MJE5731A		—	1.0	
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)		I_{EBO}	—	1.0	mAdc
ON CHARACTERISTICS (1)					
DC Current Gain		h_{FE}			
(I_C = 0.3 Adc, V_{CE} = 10 Vdc)			30	150	—
(I_C = 1.0 Adc, V_{CE} = 10 Vdc)			10	—	
Collector–Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 0.2 Adc)		$V_{CE(sat)}$	—	1.0	Vdc
Base–Emitter On Voltage (I_C = 1.0 Adc, V_{CE} = 10 Vdc)		$V_{BE(on)}$	—	1.5	Vdc
DYNAMIC CHARACTERISTICS					
Current Gain — Bandwidth Product (I_C = 0.2 Adc, V_{CE} = 10 Vdc, f = 2.0 MHz)		f_T	10	—	MHz
Small–Signal Current Gain (I_C = 0.2 Adc, V_{CE} = 10 Vdc, f = 1.0 kHz)		h_{fe}	25	—	—

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

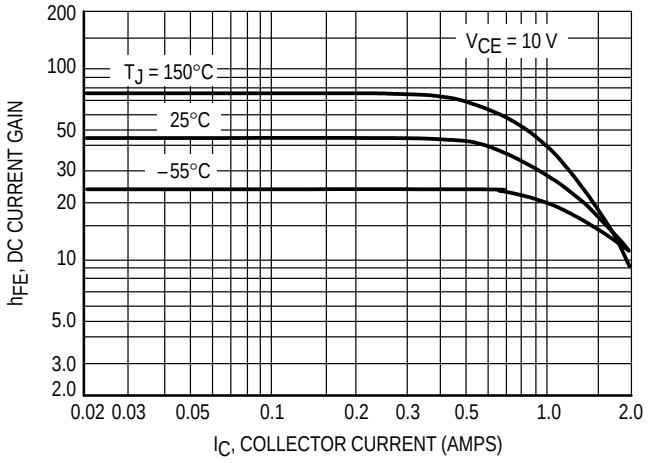


Figure 1. DC Current Gain

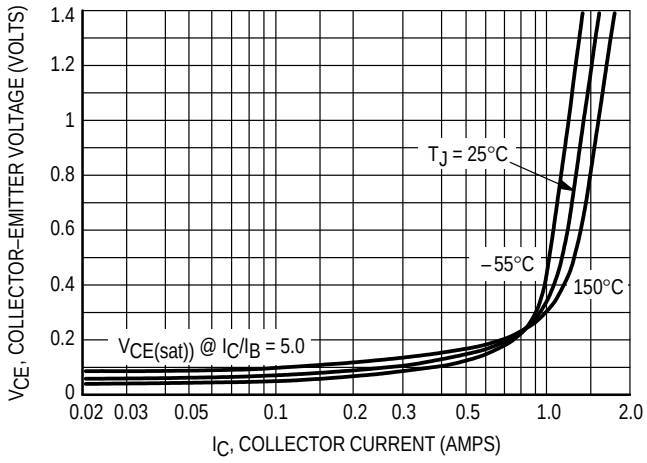


Figure 2. Collector–Emitter Saturation Voltage

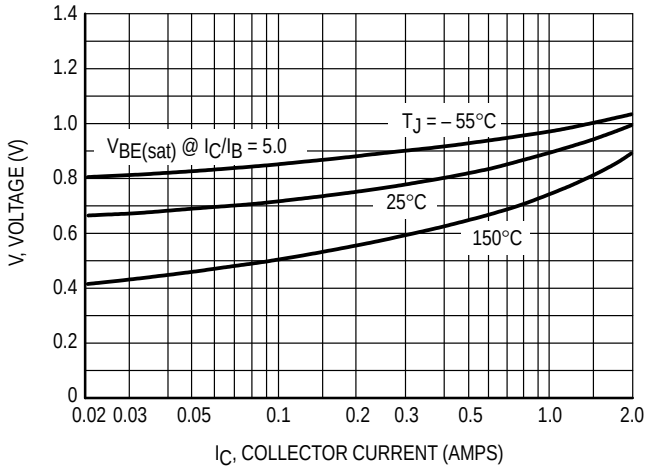


Figure 3. Base–Emitter Voltage

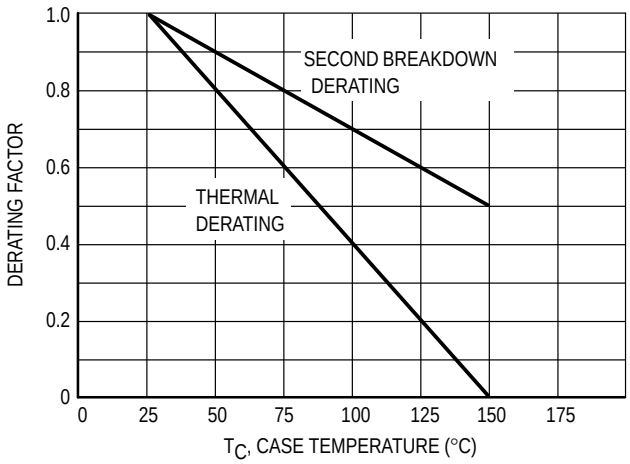


Figure 4. Normalized Power Derating

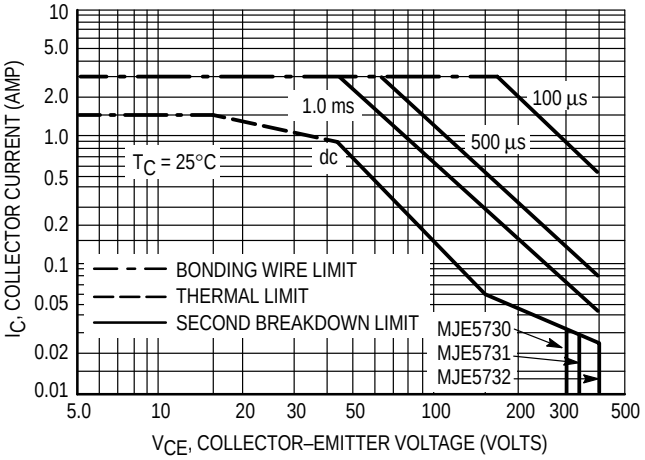


Figure 5. Forward Bias Safe Operating Area

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 6. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

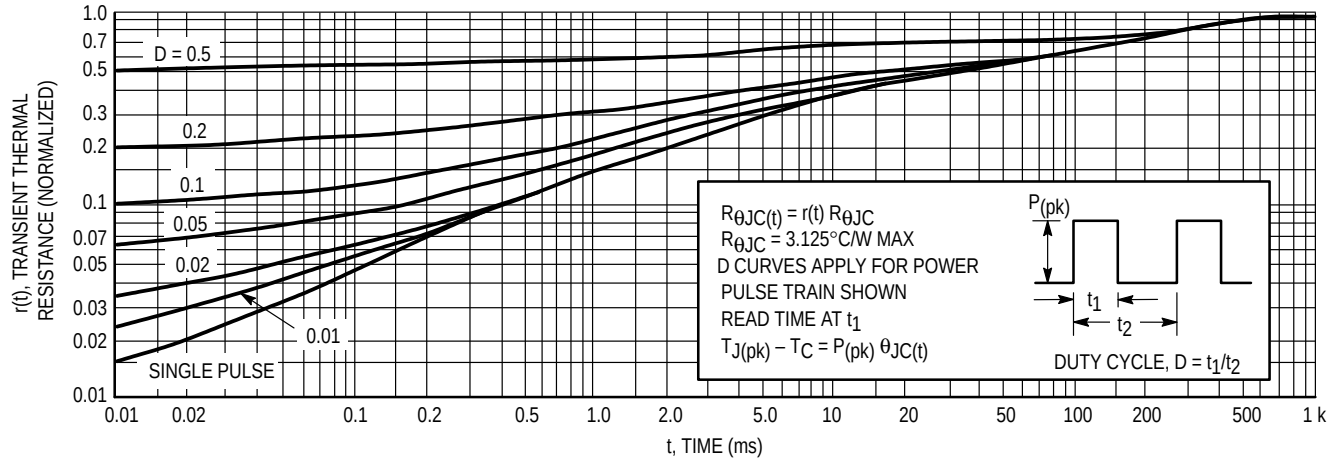


Figure 6. Thermal Response

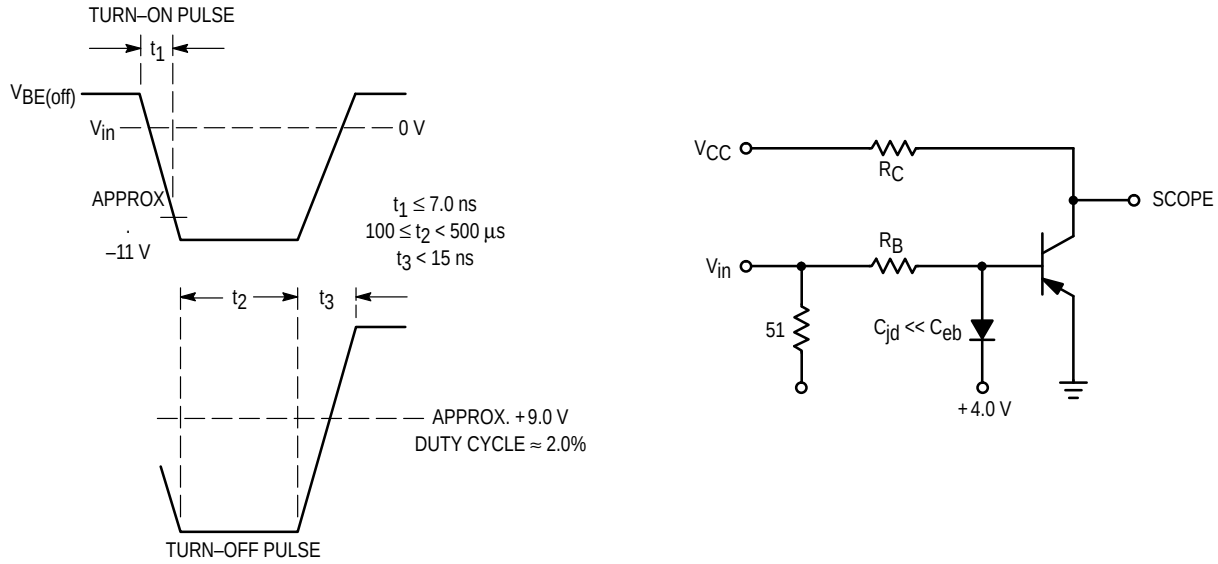


Figure 7. Switching Time Equivalent Circuit

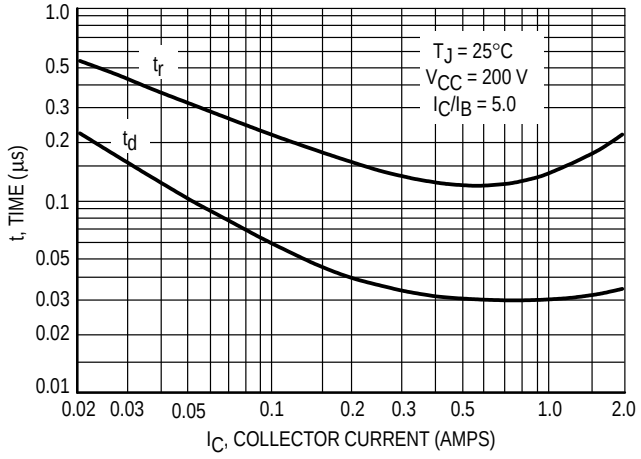


Figure 8. Turn–On Resistive Switching Times

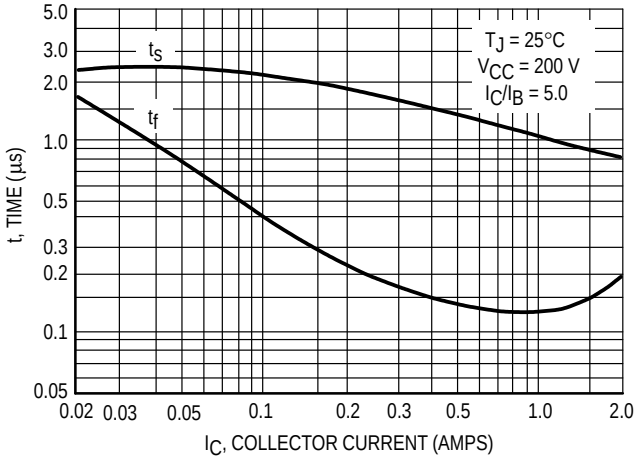
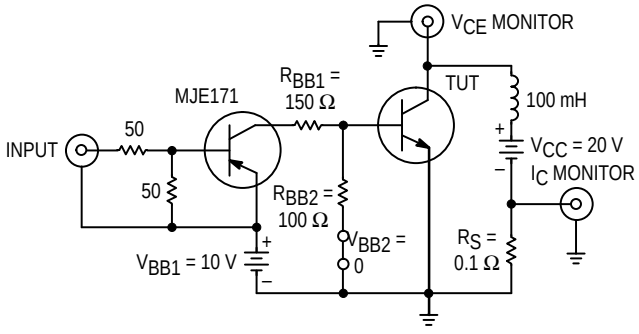


Figure 9. Resistive Turn–Off Switching Times

Test Circuit



Voltage and Current Waveforms

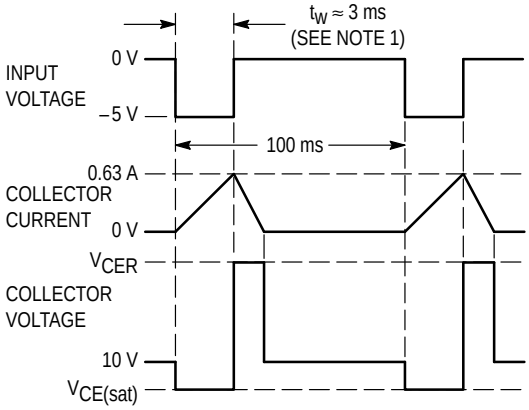
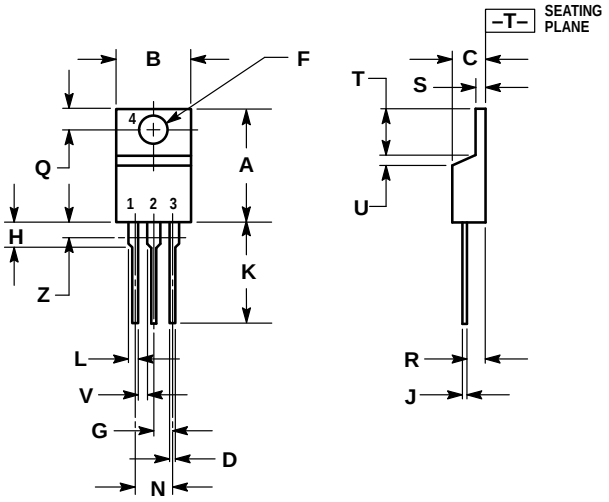


Figure 10. Inductive Load Switching

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

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

CASE 221A–06
TO–220AB
ISSUE Y

How to reach us:

USA / EUROPE / Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602–244–6609
– US & Canada ONLY 1–800–774–1848

INTERNET: http://www.mot.com/SPS/

JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, 6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 81–3–3521–8315

ASIA / PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298