MJE5730, MJE5731, MJE5731A

High Voltage PNP Silicon Plastic Power Transistors

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

Features

- 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
- Pb−Free Packages are Available*

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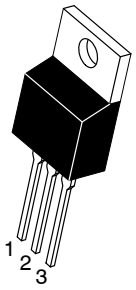
1.0 AMPERE
POWER TRANSISTORS
PCP SILICON
300−350−400 VOLTS
50 WATTS



TO−220AB
CASE 221A−09
STYLE 1

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Collector−Emitter Voltage	MJE5730 MJE5731 MJE5731A	V_{CEO}	300 350 375	Vdc
Collector−Base Voltage	MJE5730 MJE5731 MJE5731A	V_{CB}	300 350 375	Vdc
Emitter−Base Voltage		V_{EB}	5.0	Vdc
Collector Current	− Continuous − Peak	I_C I_{CM}	1.0 3.0	Adc
Base Current		I_B	1.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C		P_D	40 0.32	W W/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C		P_D	2.0 0.016	W 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

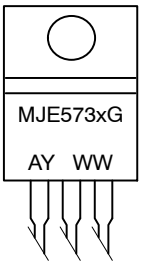
THERMAL CHARACTERISTICS

Characteristics	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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MARKING DIAGRAM



MJE573x = Device Code
x = 0, 1, or 1A
G = Pb−Free Package
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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

Characteristic			Symbol	Min	Max	Unit
OFF CHARACTERISTICS						
Collector−Emitter Sustaining Voltage (Note 1)	(I_C = 30 mAdc, I_B = 0)	MJE5730 MJE5731 MJE5731A	$V_{CEO(sus)}$	300 350 375	– – –	Vdc
Collector Cutoff Current	(V_{CE} = 200 Vdc, I_B = 0) (V_{CE} = 250 Vdc, I_B = 0) (V_{CE} = 300 Vdc, I_B = 0)	MJE5730 MJE5731 MJE5731A	I_{CEO}	– – –	1.0 1.0 1.0	mAdc
Collector Cutoff Current	(V_{CE} = 300 Vdc, V_{BE} = 0) (V_{CE} = 350 Vdc, V_{BE} = 0) (V_{CE} = 400 Vdc, V_{BE} = 0)	MJE5730 MJE5731 MJE5731A	I_{CES}	– – –	1.0 1.0 1.0	mAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)			I_{EBO}	–	1.0	mAdc
ON CHARACTERISTICS (Note 1)						
DC Current Gain (I_C = 0.3 Adc, V_{CE} = 10 Vdc) (I_C = 1.0 Adc, V_{CE} = 10 Vdc)			h_{FE}	 30 10	 150 –	–
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%.

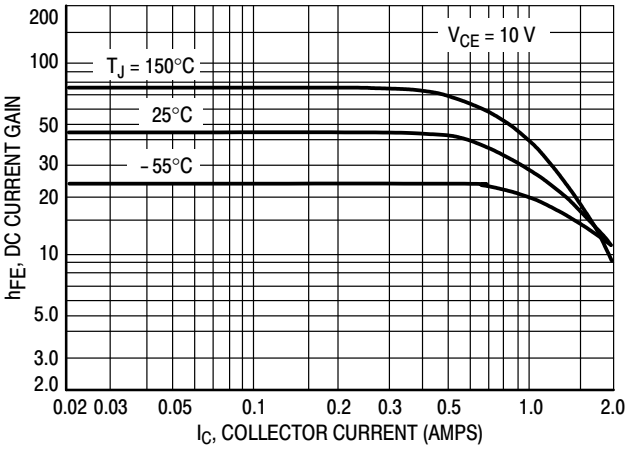


Figure 1. DC Current Gain

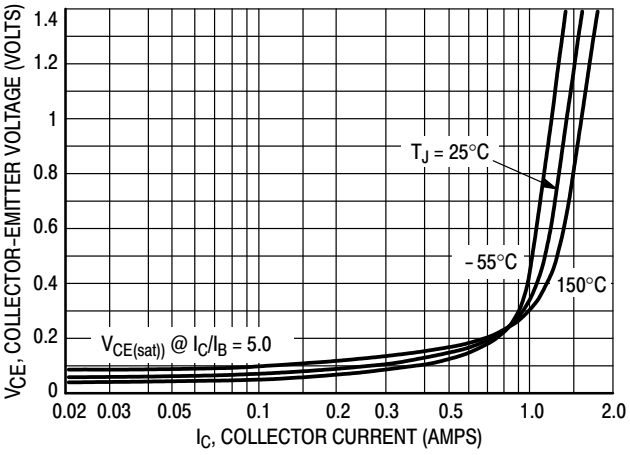


Figure 2. Collector−Emitter Saturation Voltage

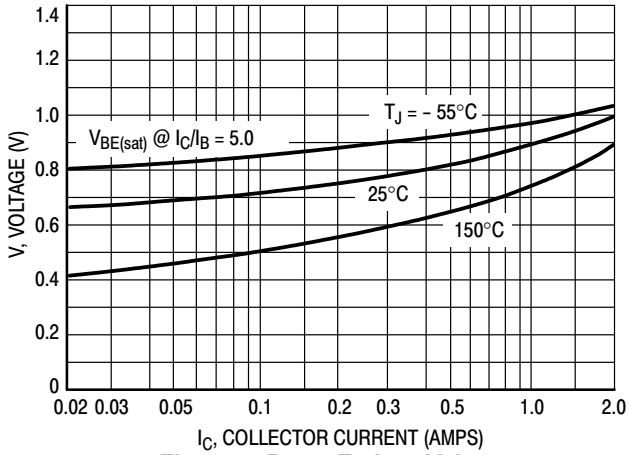


Figure 3. Base−Emitter Voltage

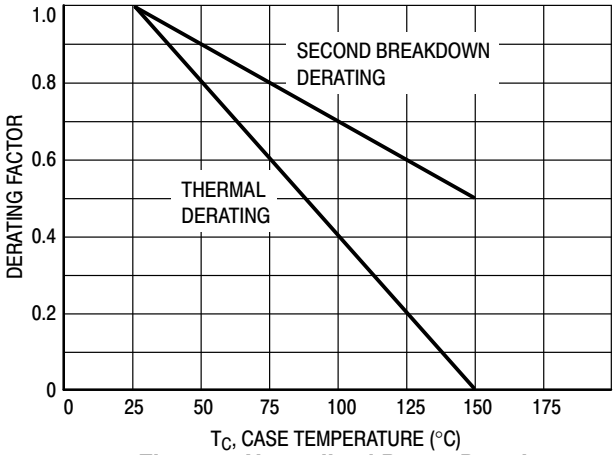


Figure 4. Normalized Power Derating

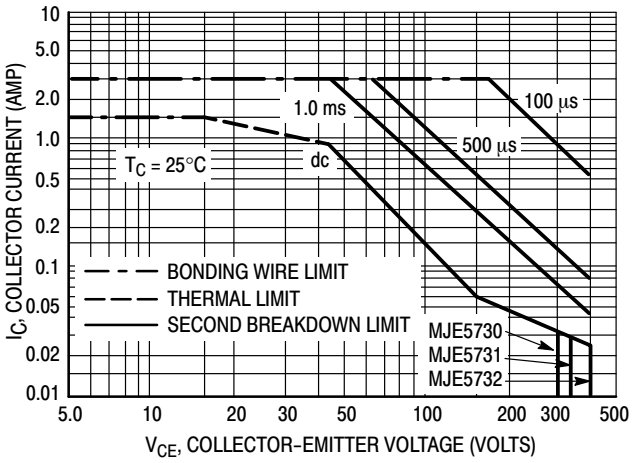


Figure 5. Forward Bias Safe Operating Area

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.

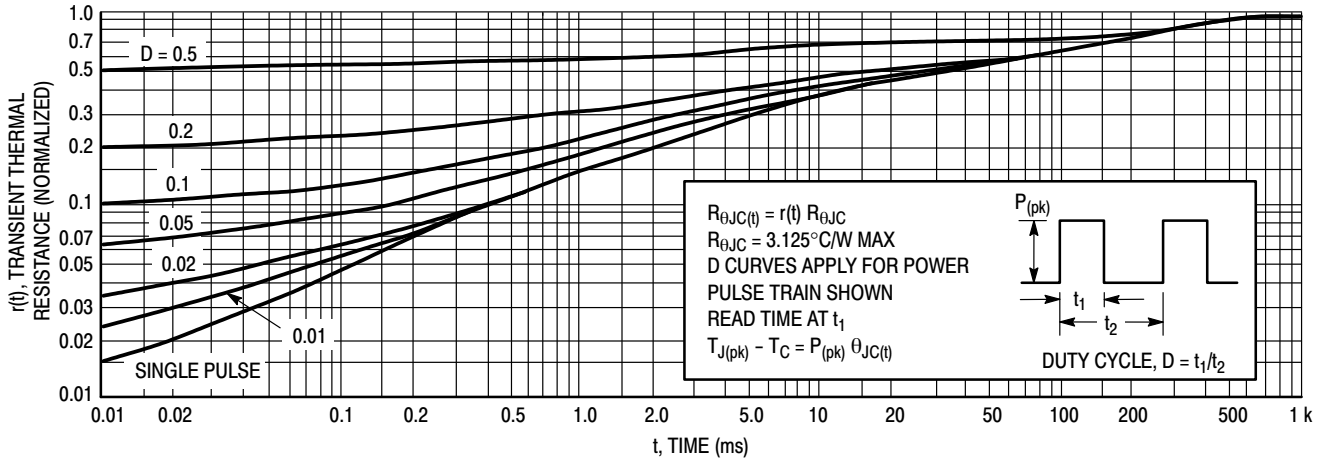


Figure 6. Thermal Response

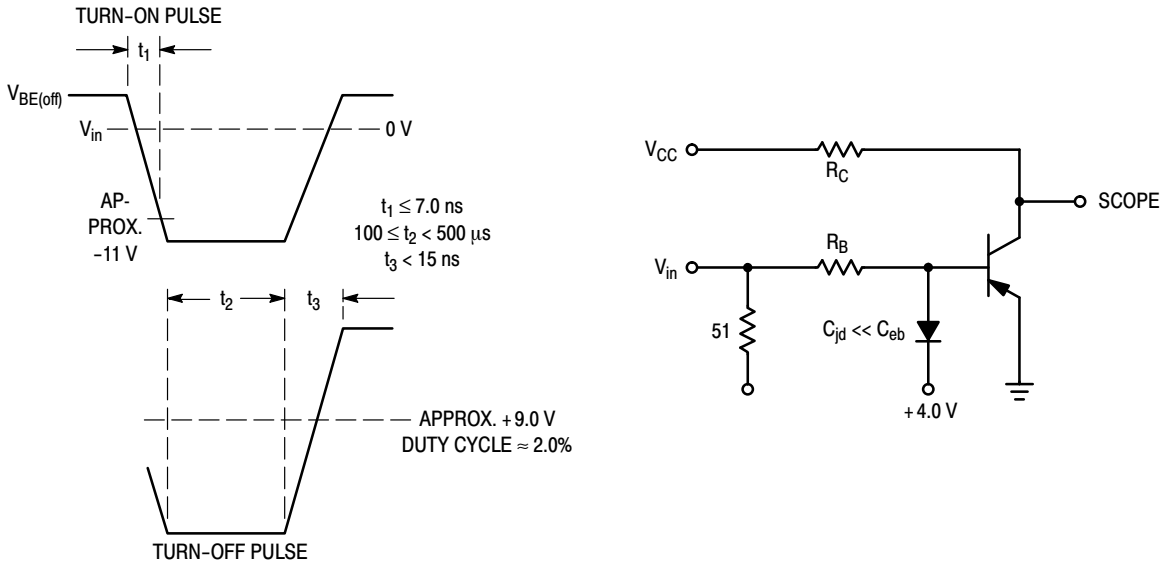


Figure 7. Switching Time Equivalent Circuit

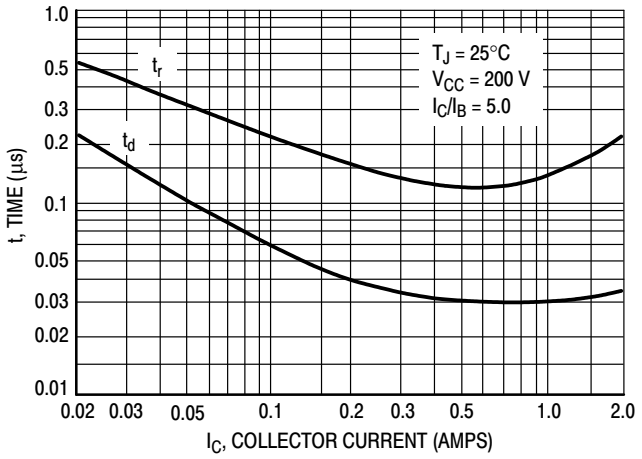


Figure 8. Turn−On Resistive Switching Times

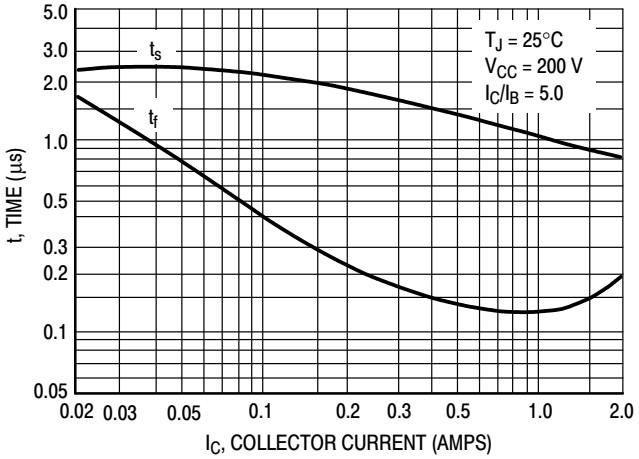
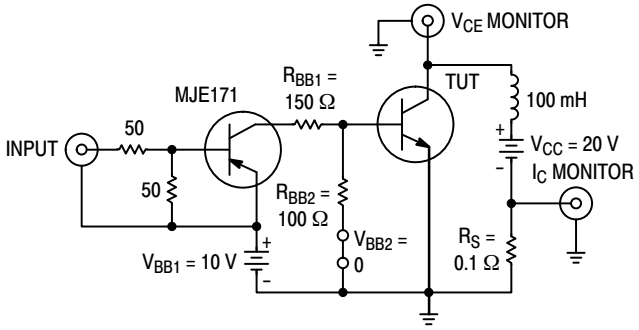


Figure 9. Resistive Turn−Off Switching Times

Test Circuit



Voltage and Current Waveforms

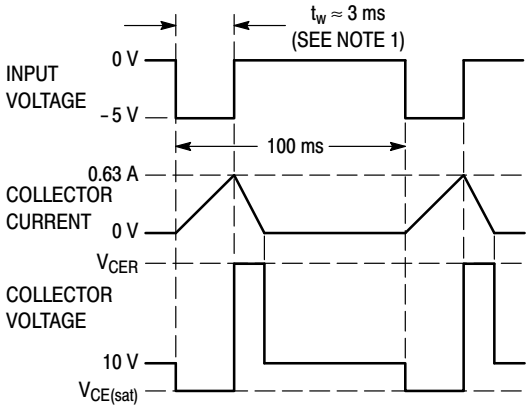


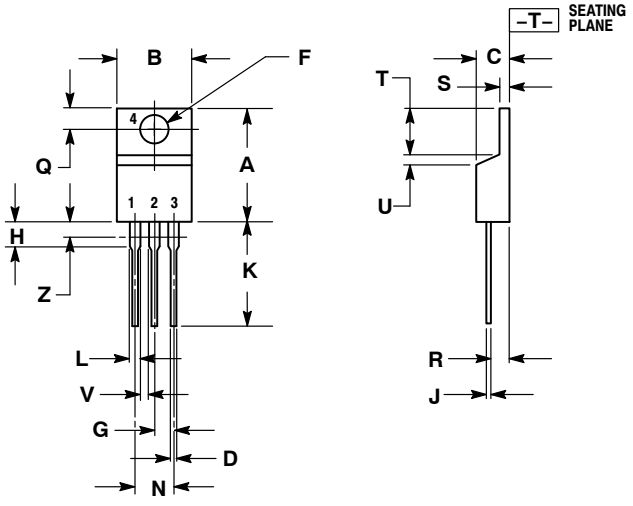
Figure 10. Inductive Load Switching

ORDERING INFORMATION

Device	Package	Shipping
MJE5730	TO−220	50 Units / Rail
MJE5730G	TO−220 (Pb−Free)	
MJE5731	TO−220	
MJE5731G	TO−220 (Pb−Free)	
MJE5731A	TO−220	
MJE5731AG	TO−220 (Pb−Free)	

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AG



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	0.036	0.64	0.91
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.025	0.36	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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
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