

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*

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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C		P_D	40 0.32	W W/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C		P_D	2.0 0.016	W W/ $^\circ\text{C}$
Unclamped Inducting Load Energy (See Figure 10)		E	20	mJ
Operating and Storage Junction Temperature Range		T_J, T_{stg}	–65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	3.125	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$

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.

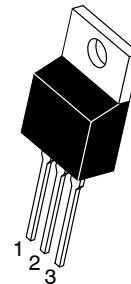
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

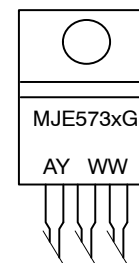
<http://onsemi.com>

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



TO–220AB
CASE 221A–09
STYLE 1

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.

MJE5730, MJE5731, MJE5731A

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)	MJE5730	I _{CEO}	-	1.0	mAdc
(V _{CE} = 250 Vdc, I _B = 0)	MJE5731		-	1.0	
(V _{CE} = 300 Vdc, I _B = 0)	MJE5731A		-	1.0	
Collector Cutoff Current (V _{CE} = 300 Vdc, V _{BE} = 0)	MJE5730	I _{CES}	-	1.0	mAdc
(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 (Note 1)					
DC Current Gain (I _C = 0.3 Adc, V _{CE} = 10 Vdc)		h _{FE}	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%.

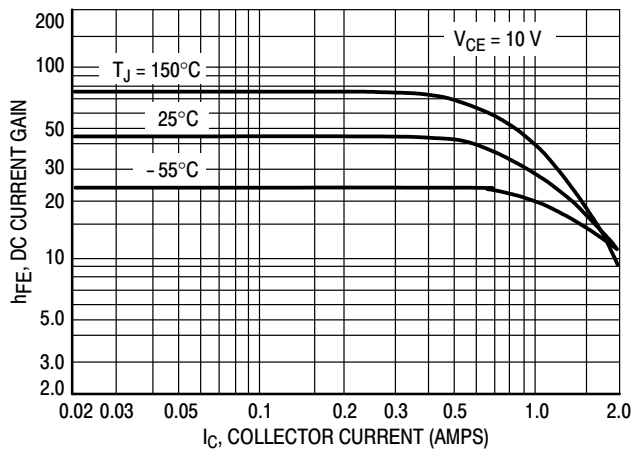


Figure 1. DC Current Gain

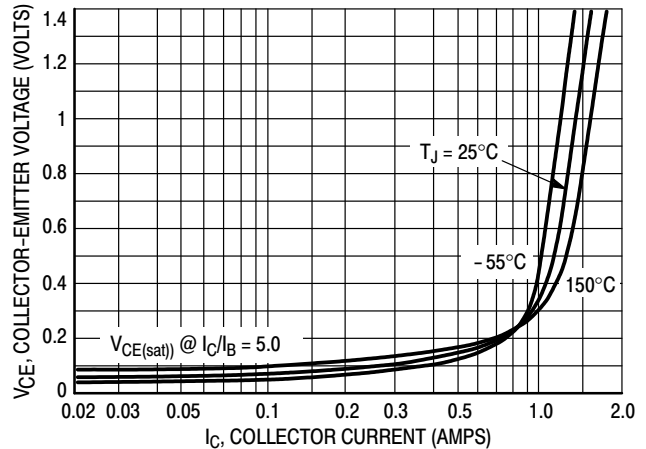


Figure 2. Collector-Emitter Saturation Voltage

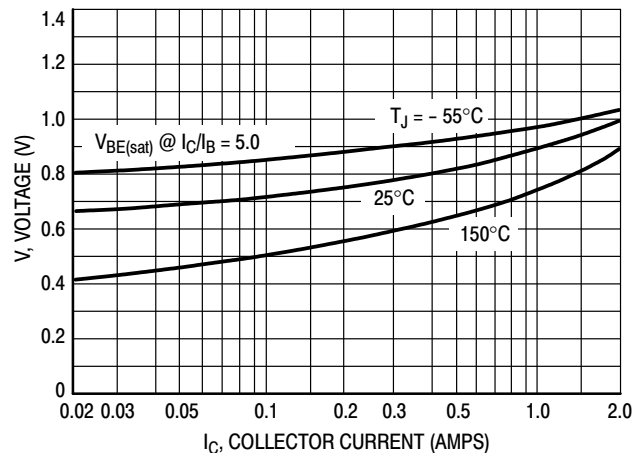


Figure 3. Base-Emitter Voltage

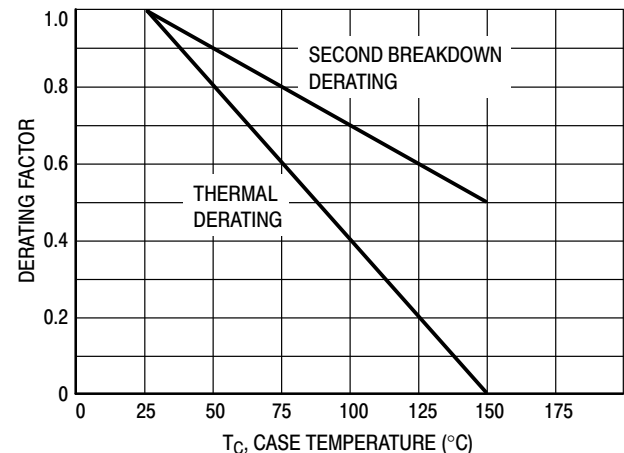


Figure 4. Normalized Power Derating

MJE5730, MJE5731, MJE5731A

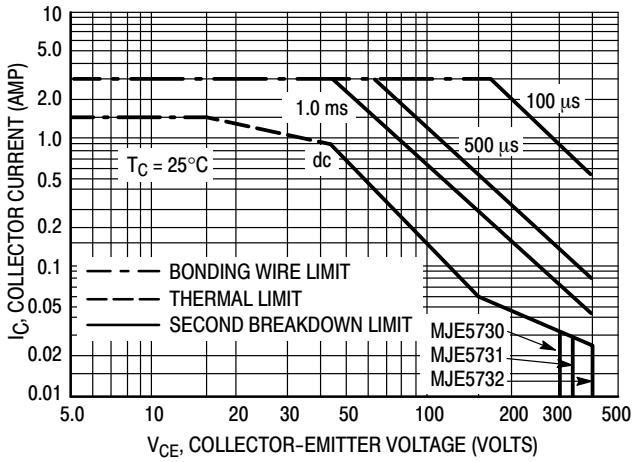


Figure 5. Forward Bias Safe Operating Area

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 $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ 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.

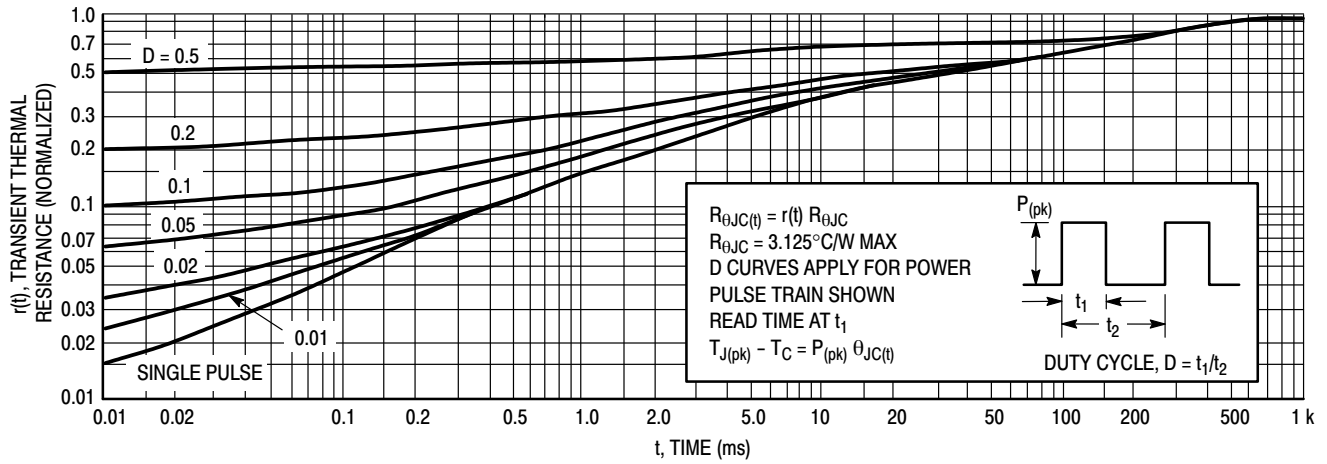


Figure 6. Thermal Response

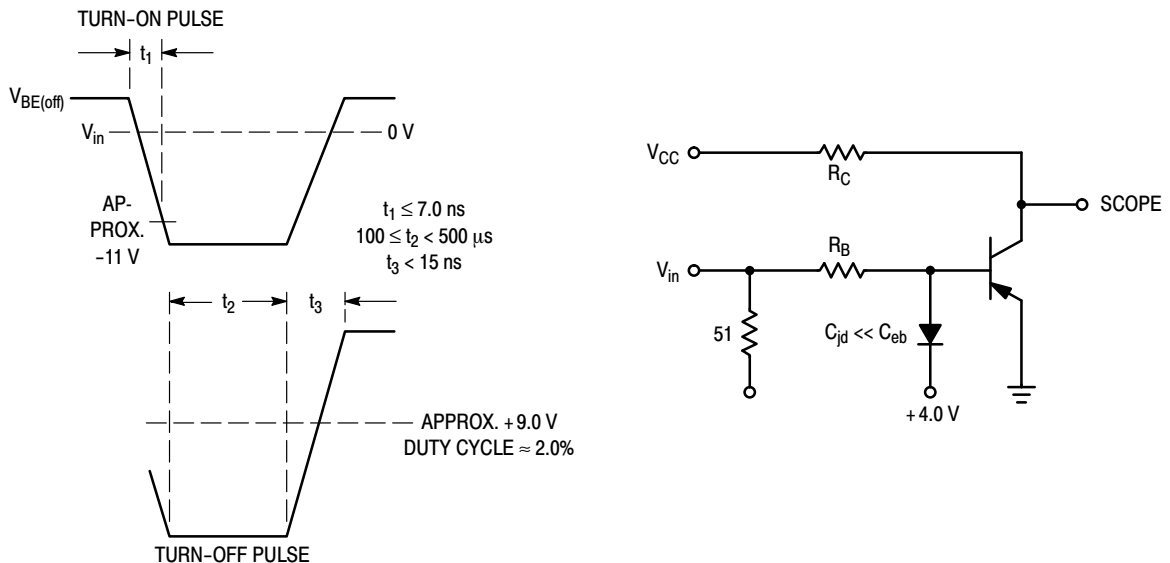


Figure 7. Switching Time Equivalent Circuit

MJE5730, MJE5731, MJE5731A

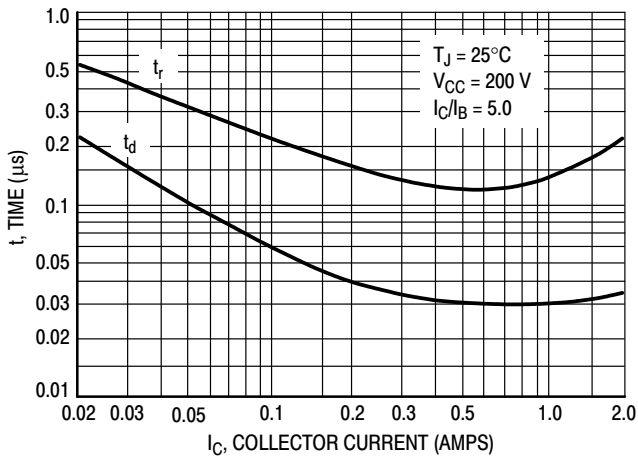


Figure 8. Turn-On Resistive Switching Times

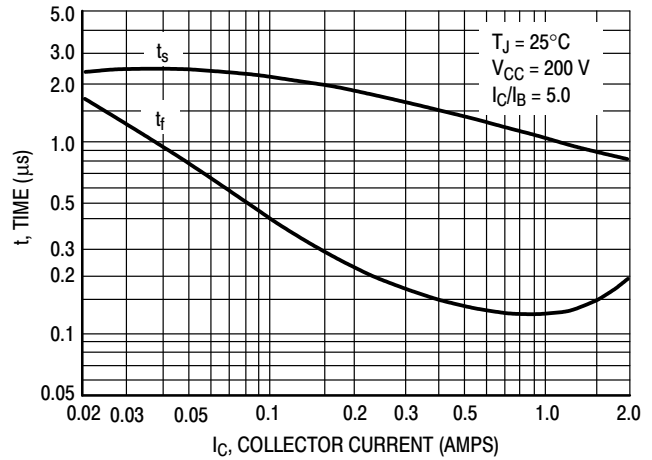
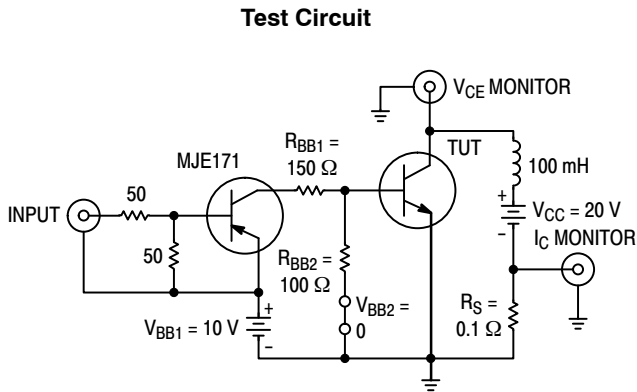


Figure 9. Resistive Turn-Off Switching Times



Voltage and Current Waveforms

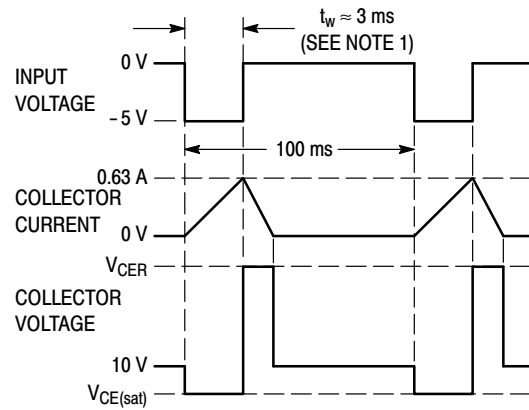


Figure 10. Inductive Load Switching

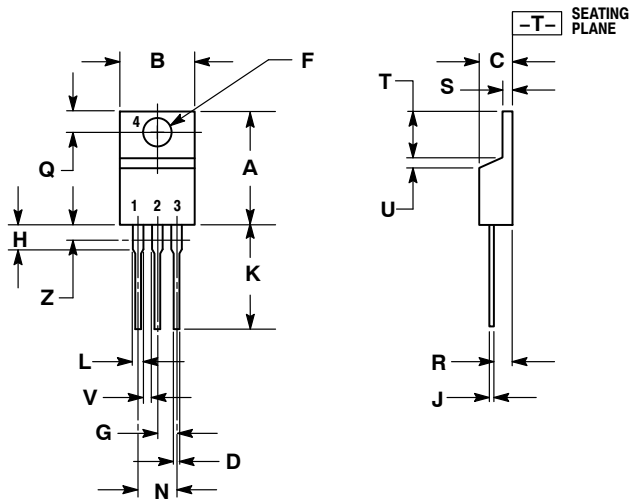
ORDERING INFORMATION

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)	

MJE5730, MJE5731, MJE5731A

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.

DIM	INCHES		MILLIMETERS	
	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
- COLLECTOR
- EMITTER
- COLLECTOR

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative