MJE700G, MJE702G, MJE703G (PNP), MJE800G, MJE802G, MJE803G (NPN)

Plastic Darlington Complementary Silicon Power Transistors

These devices are designed for general−purpose amplifier and low−speed switching applications.

Features

- High DC Current Gain − h_{FE} = 2000 (Typ) @ I_C = 2.0 Adc
- Monolithic Construction with Built−in Base−Emitter Resistors to Limit Leakage − Multiplication
- Choice of Packages − MJE700 and MJE800 Series
- These Devices are Pb−Free and are RoHS Compliant*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage MJE700G, MJE800G MJE702G, MJE703G, MJE802G, MJE803G	V_{CEO}	 60 80	Vdc
Collector−Base Voltage MJE700G, MJE800G MJE702G, MJE703G, MJE802G, MJE803G	V_{CB}	 60 80	Vdc
Emitter−Base Voltage	V_{EB}	5.0	Vdc
Collector Current	I_C	4.0	Adc
Base Current	I_B	0.1	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	 40 0.32	 W mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

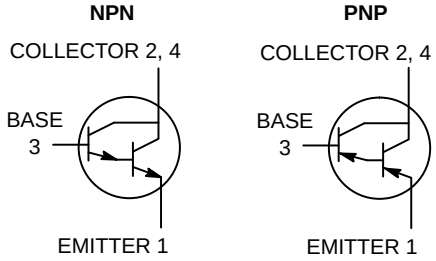
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	3.12	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	83.3	°C/W

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

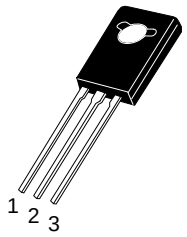
ON Semiconductor®

http://onsemi.com

4.0 AMPERE DARLINGTON POWER TRANSISTORS COMPLEMENTARY SILICON 40 WATT

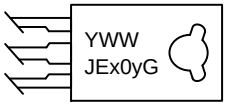


MJE800 MJE802 MJE803 | **MJE700 MJE702 MJE703**



TO−225
CASE 77−09
STYLE 1

MARKING DIAGRAM



Y = Year
WW = Work Week
JEx0y = Device Code
x = 7 or 8
y = 0, 2, or 3
G = Pb−Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Breakdown Voltage (Note 1)	$V_{(BR)CEO}$			Vdc
(I_C = 50 mAdc, I_B = 0)				
MJE700G, MJE800G		60	−	
MJE702G, MJE703G, MJE802G, MJE803G		80	−	
Collector Cutoff Current	I_{CEO}			μAdc
(V_{CE} = 60 Vdc, I_B = 0)				
MJE700G, MJE800G		−	100	
(V_{CE} = 80 Vdc, I_B = 0)				
MJE702G, MJE703G, MJE802G, MJE803G		−	100	
Collector Cutoff Current	I_{CBO}			μAdc
(V_{CB} = Rated BV_{CEO}, I_E = 0)		−	100	
(V_{CB} = Rated BV_{CEO}, I_E = 0, T_C = 100°C)		−	500	
Emitter Cutoff Current	I_{EBO}			mAdc
(V_{BE} = 5.0 Vdc, I_C = 0)		−	2.0	
ON CHARACTERISTICS				
DC Current Gain (Note 1)	h_{FE}			−
(I_C = 1.5 Adc, V_{CE} = 3.0 Vdc)				
MJE700G, MJE702G, MJE800G, MJE802G		750	−	
(I_C = 2.0 Adc, V_{CE} = 3.0 Vdc)				
MJE703G, MJE803G		750	−	
(I_C = 4.0 Adc, V_{CE} = 3.0 Vdc)				
All devices		100	−	
Collector−Emitter Saturation Voltage (Note 1)	$V_{CE(sat)}$			Vdc
(I_C = 1.5 Adc, I_B = 30 mAdc)				
MJE700G, MJE702G, MJE800G, MJE802G		−	2.5	
(I_C = 2.0 Adc, I_B = 40 mAdc)				
MJE703G, MJE803G		−	2.8	
(I_C = 4.0 Adc, I_B = 40 mAdc)				
All devices		−	3.0	
Base−Emitter On Voltage (Note 1)	$V_{BE(on)}$			Vdc
(I_C = 1.5 Adc, V_{CE} = 3.0 Vdc)				
MJE700G, MJE702G, MJE800G, MJE802G		−	2.5	
(I_C = 2.0 Adc, V_{CE} = 3.0 Vdc)				
MJE703G, MJE803G		−	2.5	
(I_C = 4.0 Adc, V_{CE} = 3.0 Vdc)				
All devices		−	3.0	
DYNAMIC CHARACTERISTICS				
Small−Signal Current Gain	h_{fe}			−
(I_C = 1.5 Adc, V_{CE} = 3.0 Vdc, f = 1.0 MHz)		1.0	−	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

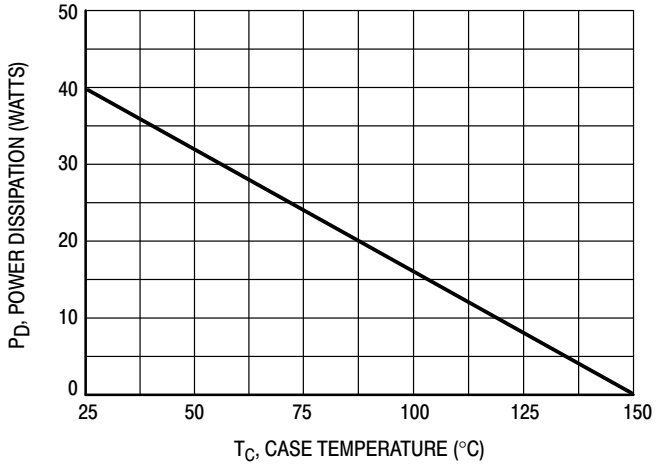


Figure 1. Power Derating

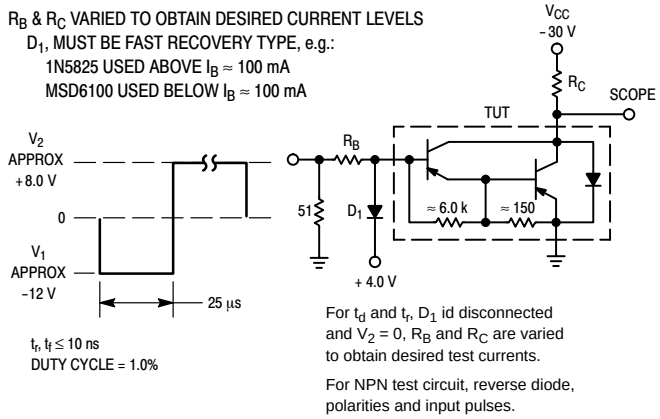


Figure 2. Switching Times Test Circuit

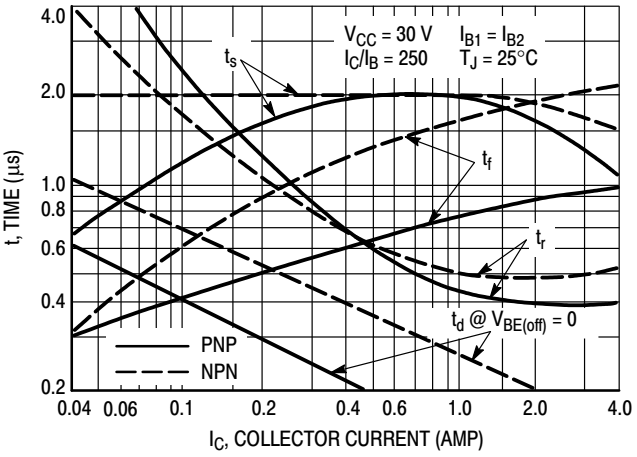


Figure 3. Switching Times

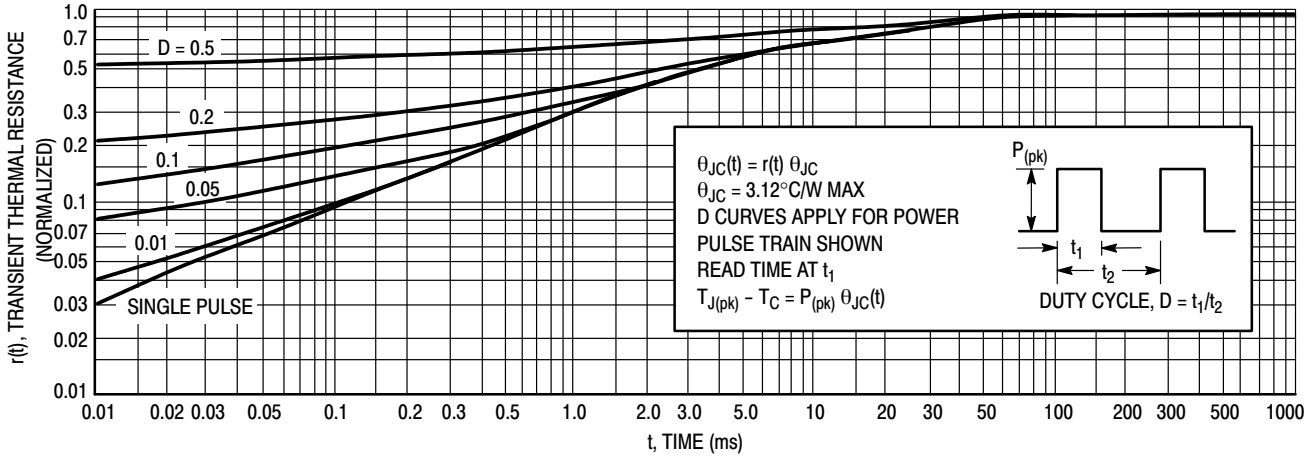


Figure 4. Thermal Response (MJE700, 800 Series)

ACTIVE−REGION SAFE−OPERATING AREA

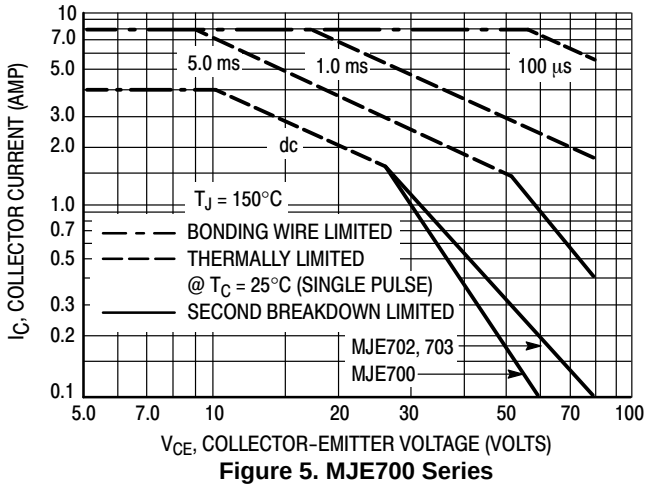


Figure 5. MJE700 Series

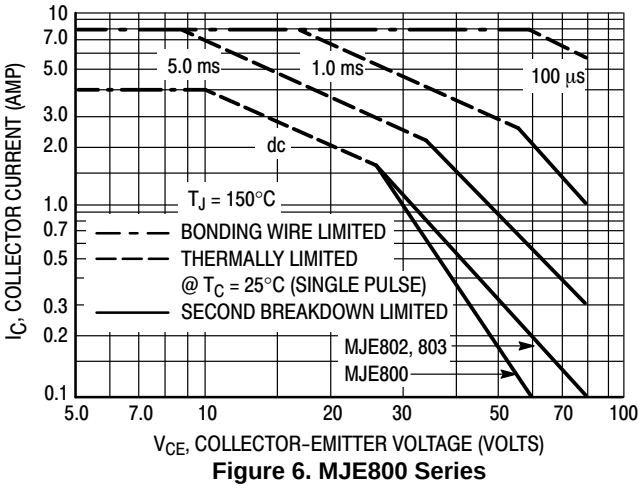
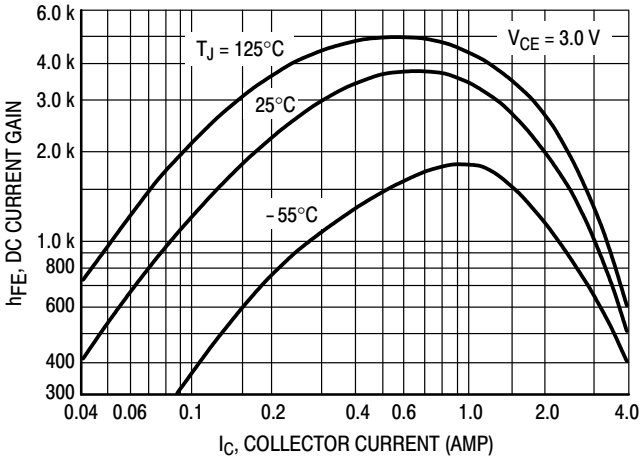


Figure 6. MJE800 Series

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 Figures 5 and 6 are 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 $T_{J(pk)} < 150°C$. $T_{J(pk)}$ 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.

PNP
MJE700 Series



NPN
MJE800 Series

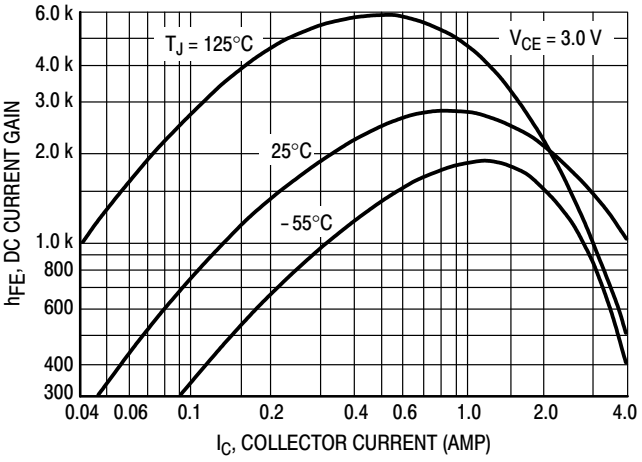
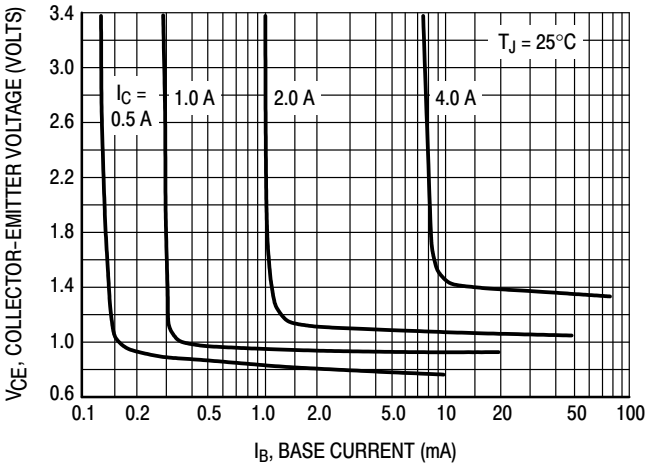


Figure 7. DC Current Gain



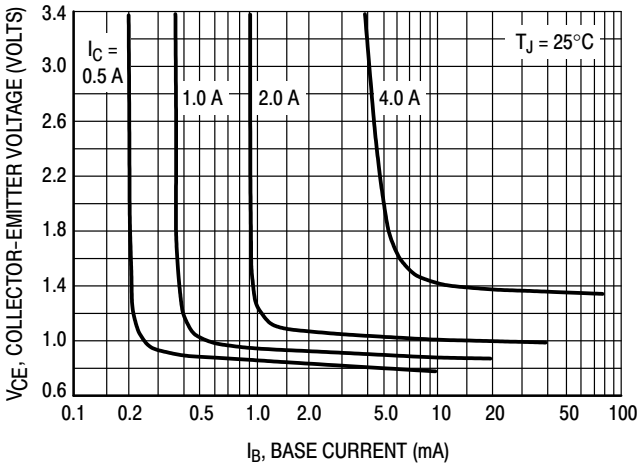
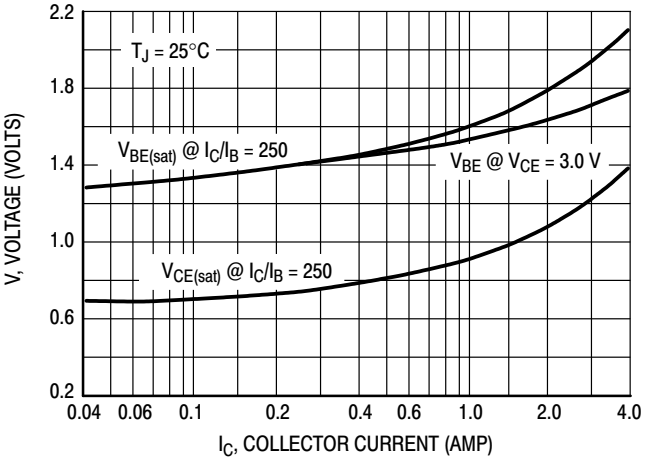


Figure 8. Collector Saturation Region



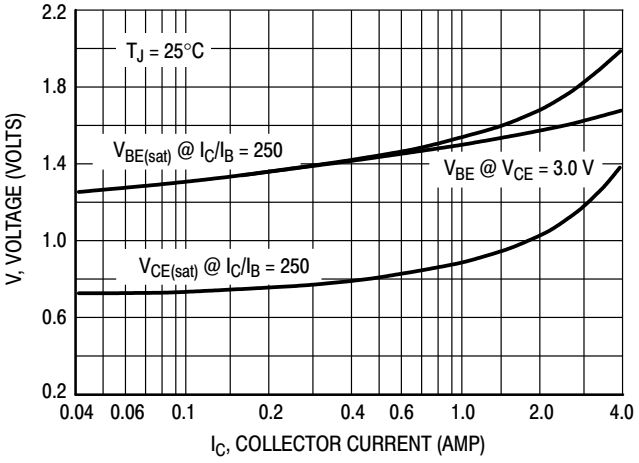


Figure 9. “On” Voltages

ORDERING INFORMATION

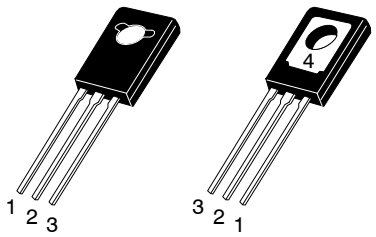
Device	Package	Shipping
MJE700G	TO−225 (Pb−Free)	50 Units / Bulk
MJE702G	TO−225 (Pb−Free)	50 Units / Bulk
MJE703G	TO−225 (Pb−Free)	50 Units / Bulk
MJE800G	TO−225 (Pb−Free)	50 Units / Bulk
MJE802G	TO−225 (Pb−Free)	50 Units / Bulk
MJE803G	TO−225 (Pb−Free)	50 Units / Bulk

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®

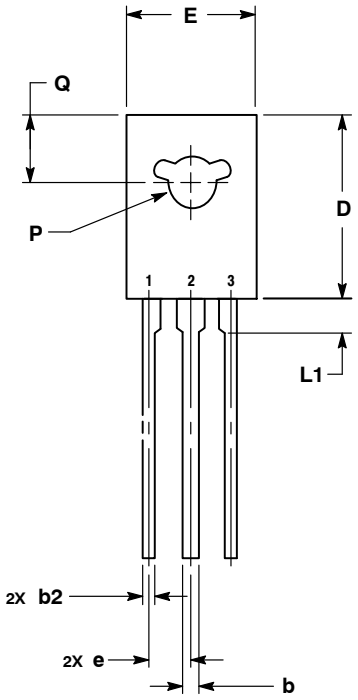
TO−225
CASE 77−09
ISSUE AD

DATE 25 MAR 2015

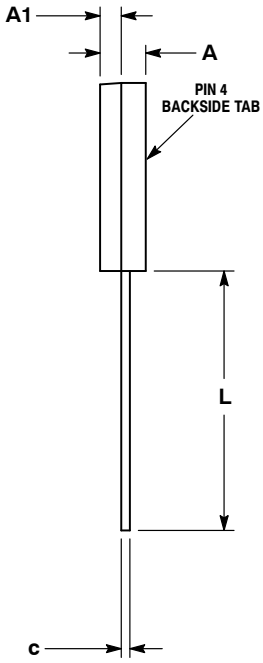


FRONT VIEW **BACK VIEW**

SCALE 1:1



FRONT VIEW

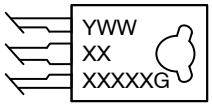


SIDE VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

	MILLIMETERS	
DIM	MIN	MAX
A	2.40	3.00
A1	1.00	1.50
b	0.60	0.90
b2	0.51	0.88
c	0.39	0.63
D	10.60	11.10
E	7.40	7.80
e	2.04	2.54
L	14.50	16.63
L1	1.27	2.54
P	2.90	3.30
Q	3.80	4.20

GENERIC MARKING DIAGRAM*



Y = Year
WW = Work Week
XXXXX = Device Code
G = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

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

STYLE 2:
PIN 1. CATHODE
2., 4. ANODE
3. GATE

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

STYLE 4:
PIN 1. ANODE 1
2., 4. ANODE 2
3. GATE

STYLE 5:
PIN 1. MT 1
2., 4. MT 2
3. GATE

STYLE 6:
PIN 1. CATHODE
2., 4. GATE
3. ANODE

STYLE 7:
PIN 1. MT 1
2., 4. GATE
3. MT 2

STYLE 8:
PIN 1. SOURCE
2., 4. GATE
3. DRAIN

STYLE 9:
PIN 1. GATE
2., 4. DRAIN
3. SOURCE

STYLE 10:
PIN 1. SOURCE
2., 4. DRAIN
3. GATE

DOCUMENT NUMBER:	**98ASB42049B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**TO−225**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales