High-Current Complementary Silicon Transistors

MJ11015 (PNP); MJ11012, MJ11016 (NPN)

. . . for use as output devices in complementary general purpose amplifier applications.

- High DC Current Gain -
  h_{FE} = 1000 (Min) @ I_C – 20 Adc
- Monolithic Construction with Built-in Base Emitter Shunt Resistor
- Junction Temperature to +200°C

MAXIMUM RATINGS

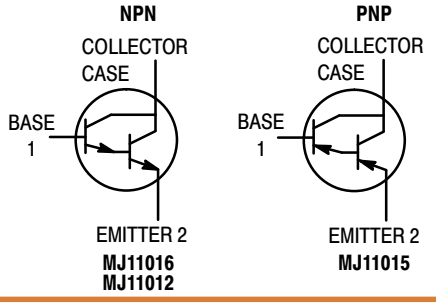
Rating	Symbol	Value	Unit
Collector–Emitter Voltage MJ11012 MJ11015/6	V_{CEO}	 60 120	Vdc
Collector–Base Voltage MJ11012 MJ11015/6	V_{CB}	 60 120	Vdc
Emitter-Base Voltage	V_{EB}	5	Vdc
Collector Current	I_C	30	Adc
Base Current	I_B	1	Adc
Total Device Dissipation @ T_C = 25 °C Derate above 25 °C @ T_C = 100 °C	P_D	200 1.15	W W/°C
Operating Storage Junction Temperature Range	T_J, T_{stg}	–55 to +200	°C

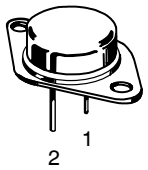
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.87	°C/W
Maximum Lead Temperature for Soldering Purposes for ≤ 10 Seconds	T_L	275	°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.

30 AMPERE DARLINGTON POWER TRANSISTORS COMPLEMENTARY SILICON 60 – 120 VOLTS, 200 WATTS





TO-204AA (TO-3)
CASE 1-07
STYLE 1

MJ1101x = Device Code
x = 2, 5 or 6
G = Pb-Free Package
A = Location Code
YY = Year
WW = Work Week
MEX = Country of Orgin

MARKING DIAGRAM

ORDERING INFORMATION

Device	Package	Shipping
MJ11012G	TO-3 (Pb-Free)	100 Units/Tray
MJ11015G	TO-3 (Pb-Free)	100 Units/Tray
MJ11016G	TO-3 (Pb-Free)	100 Units/Tray

DISCONTINUED (Note 1)

MJ11012	TO-3	100 Units/Tray
MJ11015	TO-3	100 Units/Tray
MJ11016	TO-3	100 Units/Tray

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

1. **DISCONTINUED:** This device is not available. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

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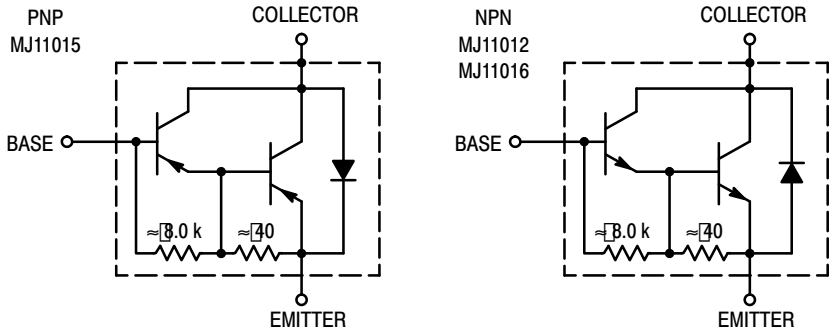

Figure 1. Darlington Circuit Schematic

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

Characteristics		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(1) (I_C = 100 mAdc, I_B = 0)	 MJ11012 MJ11015, MJ11016	$V_{(BR)CEO}$	 60 120	 – –	Vdc
Collector-Emitter Leakage Current (V_{CE} = 60 Vdc, R_{BE} = 1k ohm) (V_{CE} = 120 Vdc, R_{BE} = 1k ohm) (V_{CE} = 60 Vdc, R_{BE} = 1k ohm, T_C = 150°C) (V_{CE} = 120 Vdc, R_{BE} = 1k ohm, T_C = 150°C)	 MJ11012 MJ11015, MJ11016 MJ11012 MJ11015, MJ11016	I_{CER}	 – – – –	 1 1 5 5	mAdc
Emitter Cutoff Current (V_{BE} = 5 Vdc, I_C = 0)		I_{EBO}	–	5	mAdc
Collector−Emitter Leakage Current (V_{CE} = 50 Vdc, I_B = 0)		I_{CEO}	–	1	mAdc
ON CHARACTERISTICS(1)					
DC Current Gain (I_C = 20 Adc,V_{CE} = 5 Vdc) (I_C = 30 Adc, V_{CE} = 5 Vdc)		h_{FE}	 1000 200	 – –	–
Collector−Emitter Saturation Voltage (I_C = 20 Adc, I_B = 200 mAdc) (I_C = 30 Adc, I_B = 300 mAdc)		$V_{CE(sat)}$	 – –	 3 4	Vdc
Base−Emitter Saturation Voltage (I_C = 20 A, I_B = 200 mAdc) (I_C = 30 A, I_B = 300 mAdc)		$V_{BE(sat)}$	 – –	 3.5 5	Vdc
DYNAMIC CHARACTERISTICS					
Current−Gain Bandwidth Product (I_C = 10 A, V_{CE} = 3 Vdc, f = 1 MHz)		h_{fe}	4	–	MHz

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

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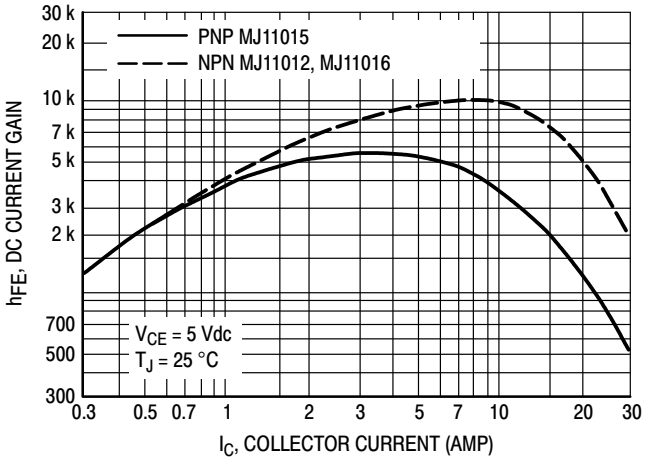

Figure 2. DC Current Gain (1)

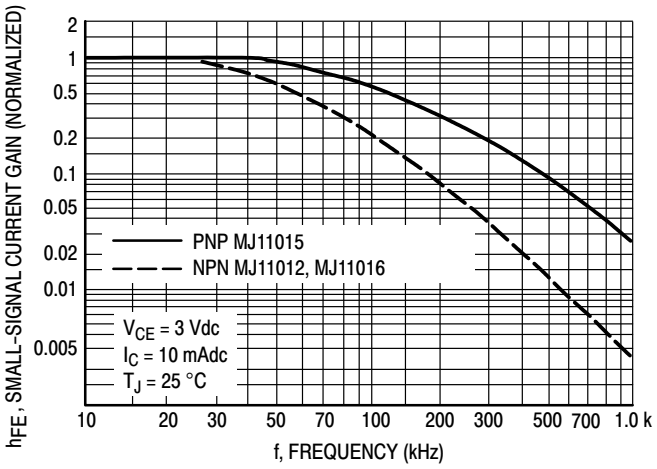

Figure 3. Small−Signal Current Gain

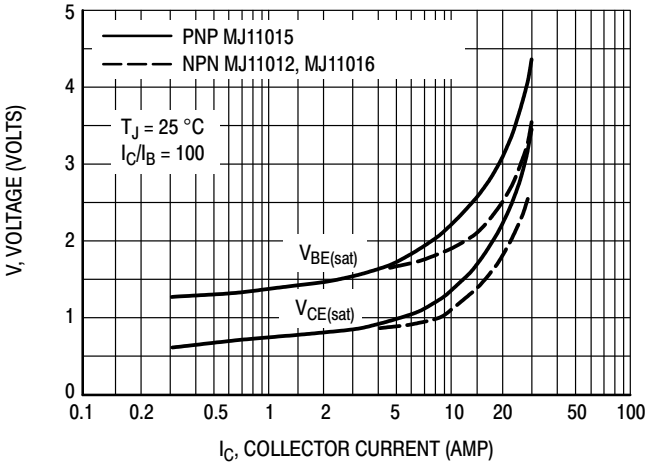

Figure 4. “On” Voltages (1)

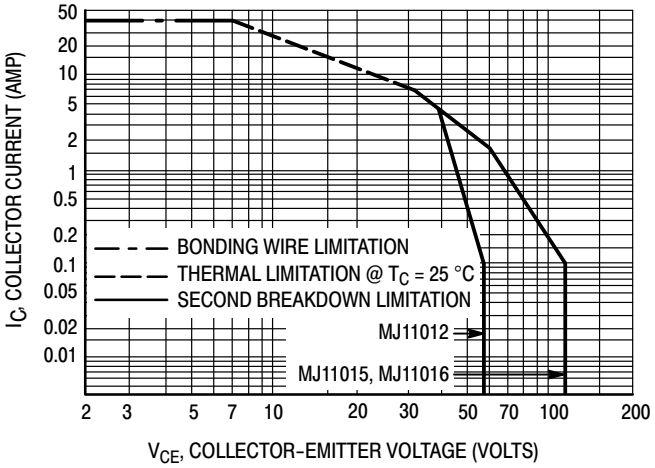

Figure 5. Active Region DC Safe Operating Area

There are two limitations on the power handling ability of a transistor average junction temperature and secondary breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operations e.g., the transistor must not be subjected to greater dissipation than the curves indicate.

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

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REVISION HISTORY

Revision	Description of Changes	Date
6	MJ11012, MJ11015, MJ11016, OPN Marked as Discontinued + Rebranded the Data Sheet to **onsemi** format	10/3/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

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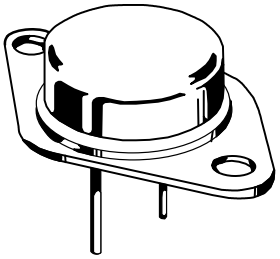
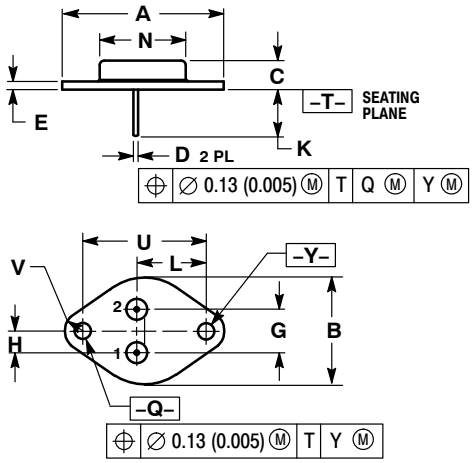


SCALE 1:1

TO−204 (TO−3)
CASE 1−07
ISSUE Z

DATE 10 MAR 2000



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO−204AA OUTLINE SHALL APPLY.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	1.550 REF		39.37 REF	
B	---	1.050	---	26.67
C	0.250	0.335	6.35	8.51
D	0.038	0.043	0.97	1.09
E	0.055	0.070	1.40	1.77
G	0.430 BSC		10.92 BSC	
H	0.215 BSC		5.46 BSC	
K	0.440	0.480	11.18	12.19
L	0.665 BSC		16.89 BSC	
N	---	0.830	---	21.08
Q	0.151	0.165	3.84	4.19
U	1.187 BSC		30.15 BSC	
V	0.131	0.188	3.33	4.77

STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR

STYLE 2:
PIN 1. BASE
2. COLLECTOR
CASE: EMITTER

STYLE 3:
PIN 1. GATE
2. SOURCE
CASE: DRAIN

STYLE 4:
PIN 1. GROUND
2. INPUT
CASE: OUTPUT

STYLE 5:
PIN 1. CATHODE
2. EXTERNAL TRIP/DELAY
CASE: ANODE

STYLE 6:
PIN 1. GATE
2. EMITTER
CASE: COLLECTOR

STYLE 7:
PIN 1. ANODE
2. OPEN
CASE: CATHODE

STYLE 8:
PIN 1. CATHODE #1
2. CATHODE #2
CASE: ANODE

STYLE 9:
PIN 1. ANODE #1
2. ANODE #2
CASE: CATHODE

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