



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001 Certified Company



High-Current Complementary Darlington Silicon Transistors

30 AMPERE, 60~120 VOLTS, 200 WATTS

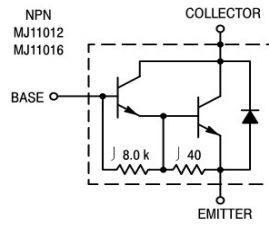
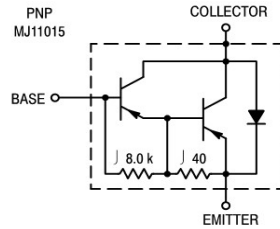
MJ11015 PNP

MJ11012 NPN

MJ11016 NPN



TO-3



**TO-3
Metal Can Package
RoHS compliant**

FEATURES:

1. High DC Current Gain - $h_{FE} = 1000$ (Min) @ $I_C = 20$ Adc
2. Monolithic Construction with Built-in Base Emitter Shunt Resistor
3. Junction Temperature to $+200^\circ$ C

APPLICATIONS:

Used for output devices in complementary general purpose amplifier applications.



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ABSOLUTE MAXIMUM RATING ($T_A=25^\circ\text{C}$ unless otherwise specified)

Rating	Symbol	MJ11012	MJ11015 MJ11016	Unit
Collector–Emitter Voltage	V_{CEO}	60	120	Vdc
Collector–Base Voltage	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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C @ $T_C = 100^\circ\text{C}$	P_D	200 1.15		Watts W/ $^\circ\text{C}$
Operating Storage Junction Temperature Range	T_J, T_{stg}	–55 to +200		$^\circ\text{C}$

THERMAL CHARACTERISTICS

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



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ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise specified)

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

(1) Pulse Test: Pulse Width 300 s, Duty Cycle $\leq 2.0\%$.

TYPICAL CHARACTERISTIC CURVES

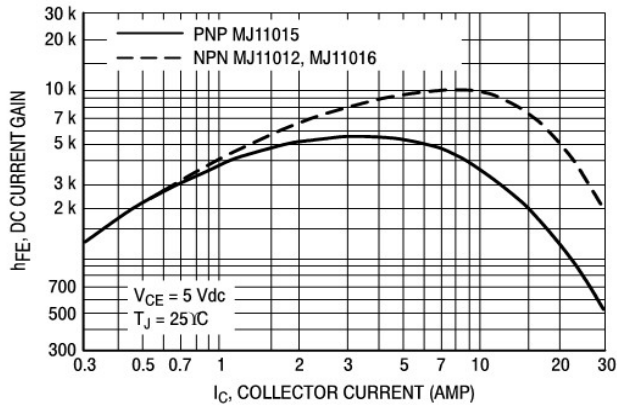


Figure 2. DC Current Gain (1)

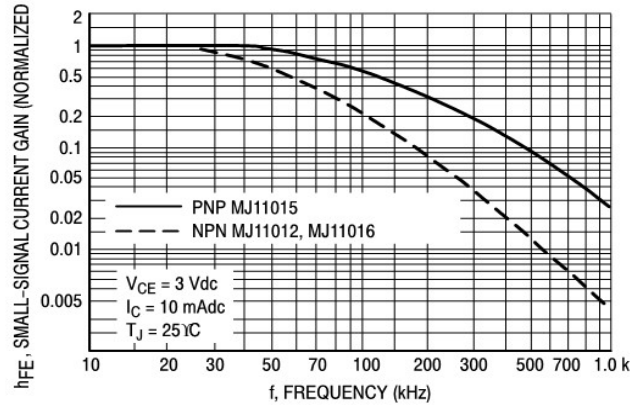


Figure 3. Small-Signal Current Gain

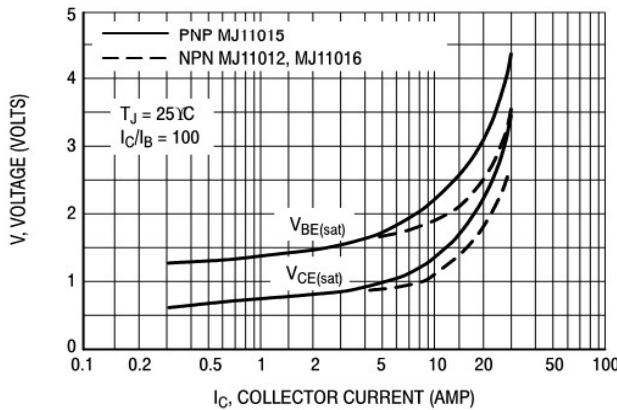


Figure 4. "On" Voltages (1)

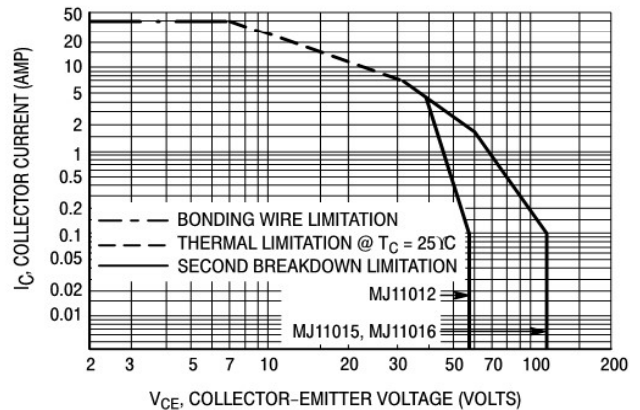
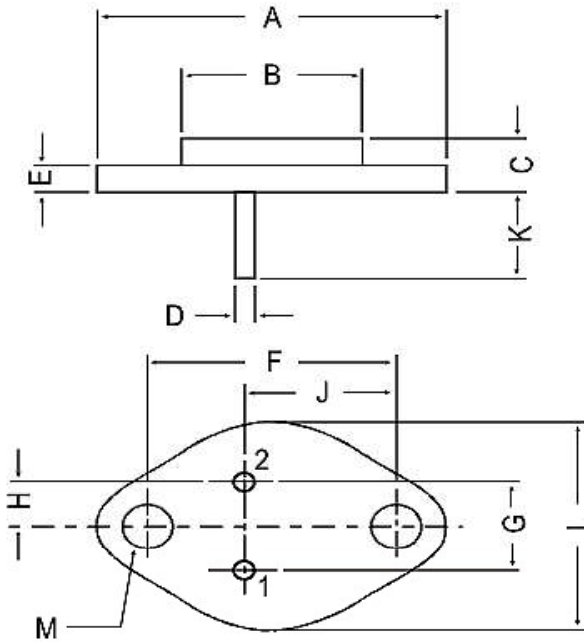


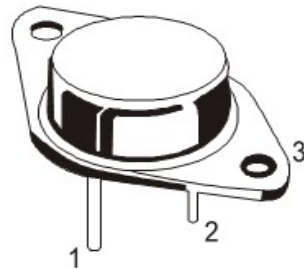
Figure 5. Active Region DC Safe Operating Area

Package Details



All dimensions in mm.

DIM	MIN.	MAX.
A	—	39.37
B	—	22.22
C	6.35	8.50
D	0.96	1.09
E	—	1.77
F	29.90	30.40
G	10.69	11.18
H	5.20	5.72
J	16.64	17.15
K	11.15	12.25
L	—	26.67
M	3.84	4.19



PIN CONFIGURATION

1. BASE
2. EMITTER
3. COLLECTOR

Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-3	100 pcs/pkt	1.3 kg/100 pcs	12.5" x 8" x 1.8"	0.1K	17" x 11.5" x 21"	2K	27.5 kgs



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Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH



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Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information.

Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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