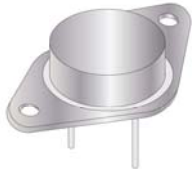


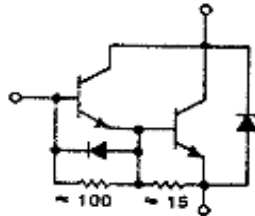
NPN SILICON POWER DARLINGTON TRANSISTOR

MJ10022

MJ10023



TO-3



TO-3
Metal Can Package
RoHS compliant

FEATURES:

1. Continuous Collector Current - $I_C = 40A$
2. Switching Regulator
3. Inverters
4. Solenoid and Relay Drivers
5. AC and DC Motor Controls

APPLICATION: General Purpose Transistor

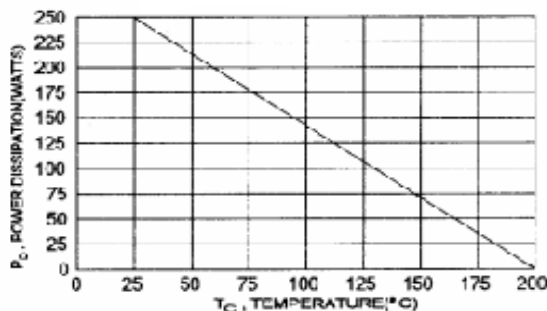
ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE		UNIT
		MJ10022	MJ10023	
Collector-Emitter Voltage	V_{CEV}	450	600	V
Collector-Emitter Voltage	$V_{CEO(SUS)}$	350	400	V
Emitter-Base Voltage	V_{EBO}	8.0		V
Collector Current-Continuous	I_C	40		A
Collector Current-Peak	I_{CM}	80		
Base Current	I_B	20.0		A
Total Power Dissipation	@ $T_C=25^\circ C$	250		W
	@ $T_C=125^\circ C$	143		W
Derate above 25°C		1.43		W/°C
Operating and Storage Junction Temperature Rang	T_J, T_{STG}	-65 to +200		°C

THERMAL CHARACTERISTICS

Thermal Resistance Junction to Case	$R_{\theta jc}$	0.7	°C/W
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Power Derating



ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	VALUE			UNIT	
			MIN	TYP	MAX		
Off Characteristics							
Collector-Emitter Sustaining Voltage	MJ10022	$V_{CEO(SUS)}$	$I_C = 100mA, I_B = 0$	350	--	--	V
	MJ10023			400	--	--	
Collector Cutoff Current	I_{CEV}	$(V_{CEV} = \text{Rated Value}, V_{BE(OFF)} = 1.5V)$	--	--	0.25	mA	
			$(V_{CEV} = \text{Rated Value}, V_{BE(OFF)} = 1.5V, T_C = 150^\circ C)$	--	--		5.0
Collector Cutoff Current	I_{CER}	$(V_{CE} = \text{Rated } V_{CEV}, R_{BE} = 50\Omega, T_C = 100^\circ C)$	--	--	5.0	mA	
Emitter Cutoff Current	I_{EBO}	$(V_{EB} = 2.0V, I_C = 0)$	--	--	175	mA	
On Characteristics ¹							
DC Current Gain	h_{FE}	$(I_C = 10A, V_{CE} = 5.0V)$	60	--	600		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$(I_C = 20A, I_B = 1.0A)$	--	--	2.2	V	
		$(I_C = 40A, I_B = 5.0A)$	--	--	5.0		
		$(I_C = 20A, I_B = 1.0A, T_C = 100^\circ C)$	--	--	2.5		
Base-Emitter saturation Voltage	$V_{BE(sat)}$	$(I_C = 20A, I_B = 1.2A)$	--	--	2.5	V	
		$(I_C = 20A, I_B = 1.2A, T_C = 100^\circ C)$	--	--	2.5		
Diode Forward Voltage	V_F	$(I_F = 20A)$	--	--	5.0	V	
Dynamic Characteristics							
Output Capacitance	C_{ob}	$(V_{CB} = 10V, I_E = 0, f = 1.0kHz)$	150	--	600	pF	
Switching Characteristics							
Delay Time	t_d	$V_{CC} = 250V, I_C = 20A, I_{B1} = 1.0A, V_{BE(off)} = 5.0V, t_p = 50\mu s, \text{Duty Cycle} \leq 2\%$	--	--	0.2	us	
Rise Time	t_r		--	--	1.5	us	
Storage Time	t_s		--	--	2.5	us	
Fall Time	t_f		--	--	1.1	us	

Notes:

1. Pulse Test Pulse width = 300 μs , Duty Cycle $\leq 2.0\%$

TYPICAL CHARACTERISTICS CURVES

Fig 1: DC current Gain

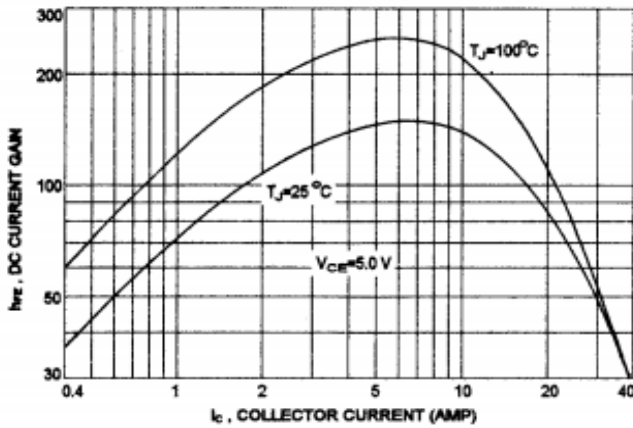


Fig 2: Collector Saturation Region

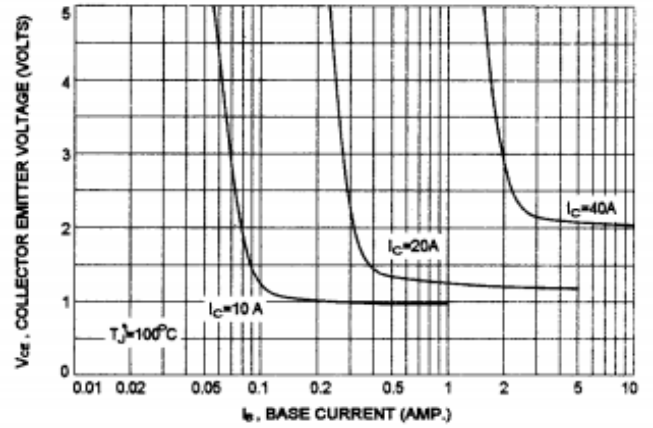


Fig 3: Collector Emitter Saturation Voltage

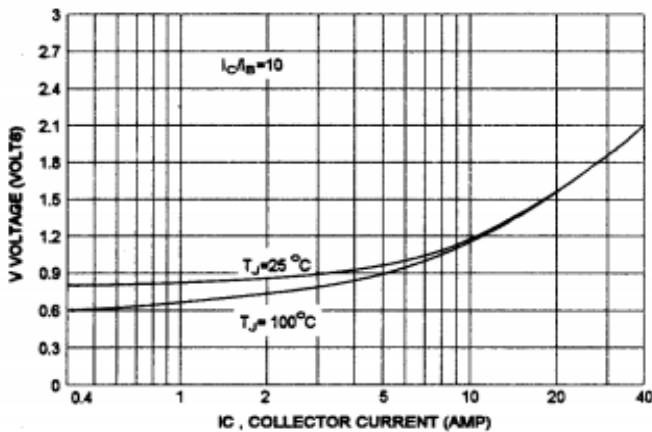


Fig 4: Base-Emitter Saturation Voltage

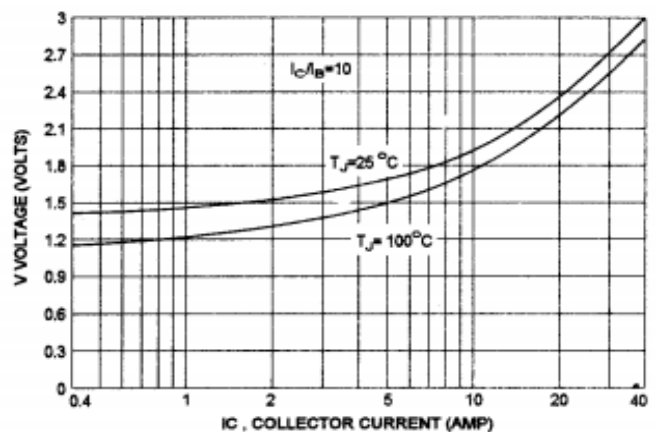


Fig 5: Collector Cut-off Region

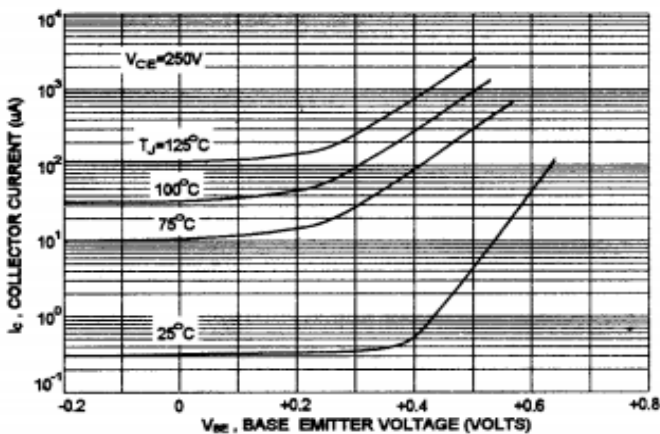
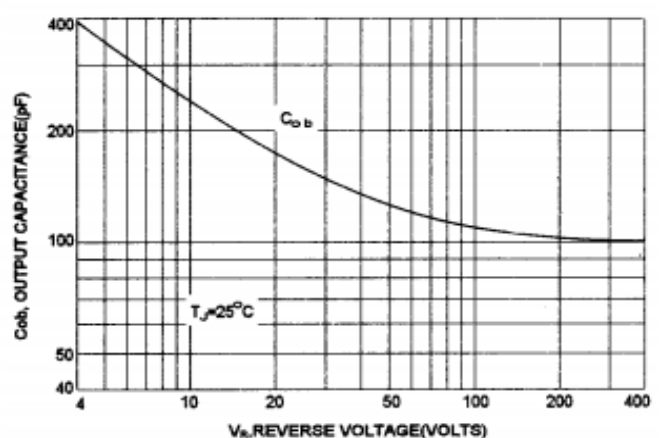


Fig 6: Output Capacitance



TYPICAL CHARACTERISTICS CURVES

Fig 7: Turn-On Time

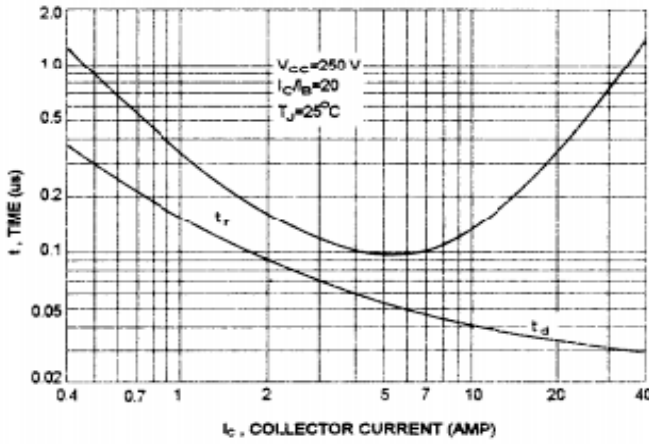


Fig 8: Turn-Off Time

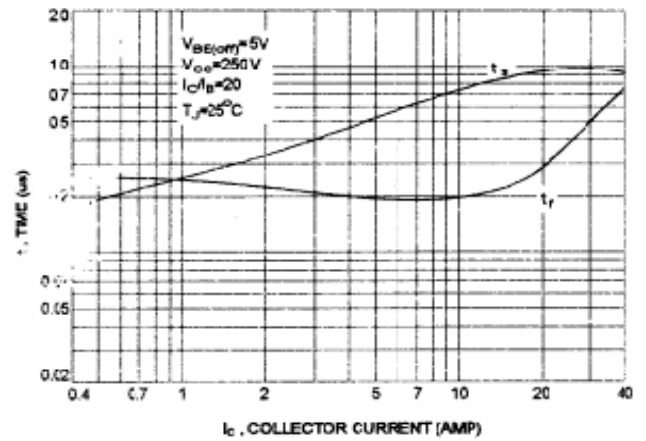


Fig 9: Active Region Safe Operating Area

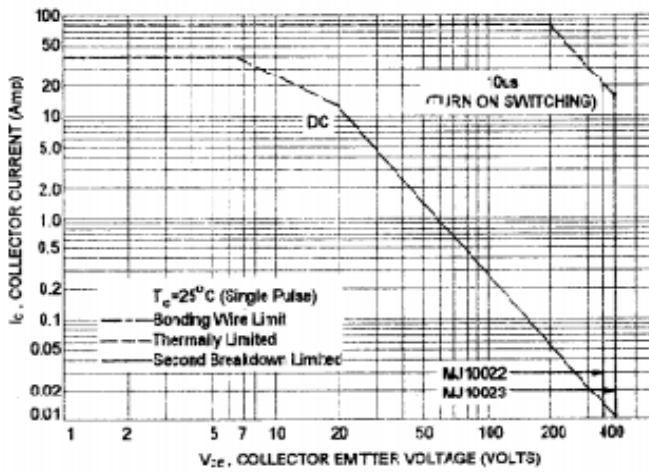
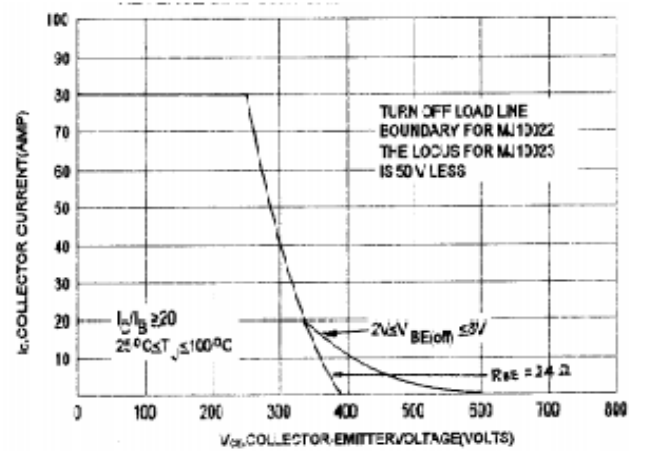
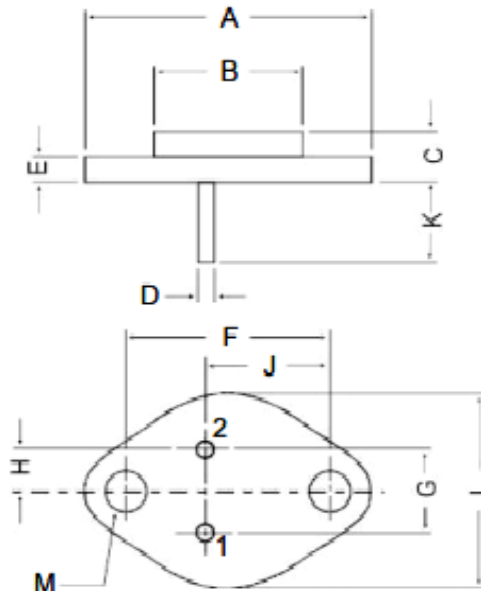


Fig 10: Reverse BIAS Switching Operating Area



PACKAGE DETAILS

TO-3 Metal Can Plastic package



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

Dimensions are in mm

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	GrWt
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

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



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001 Certified Company



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/s 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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