

100V NPN DARLINGTON MEDIUM POWER TRANSISTOR IN SOT23
Description

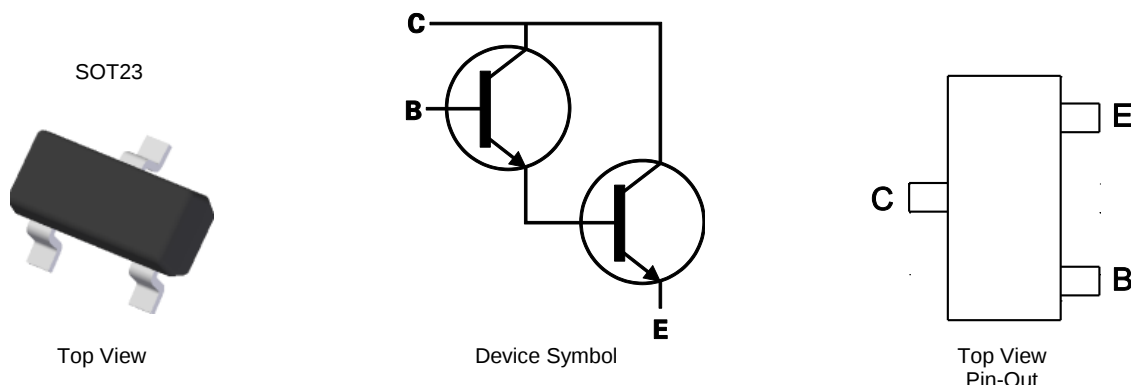
This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

Features

- $BV_{CEO} > 100V$
- $I_C = 0.5A$ High Continuous Collector Current
- $I_{CM} = 2A$ Peak Pulse Current
- 500mW Power Dissipation
- Darlington transistor with high h_{FE} up to 5k at $I_C = 0.5A$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

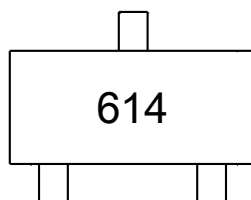
Mechanical Data

- Case: SOT23
- Case material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.008 grams (Approximate)


Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT614QTA	Automotive	614	7	8	3,000
FMMT614QTC	Automotive	614	13	8	10,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


614 = Product Type Marking Code

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	120	V
Collector-Emitter Voltage	V _{CEO}	100	V
Emitter-Base Voltage	V _{EBO}	10	V
Continuous Collector Current	I _C	500	mA
Peak Pulse Current	I _{CM}	2	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

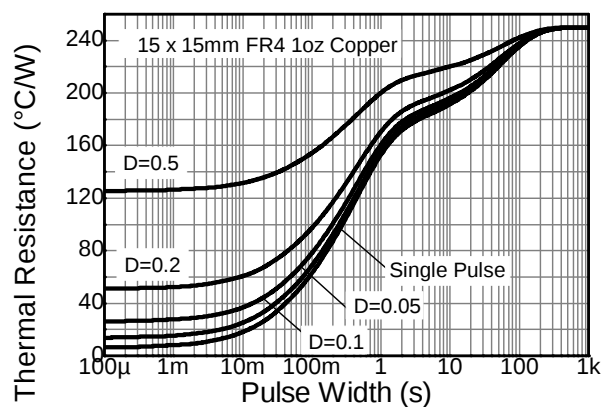
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	500	mW
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	250	°C/W
Thermal Resistance, Junction to Lead (Note 7)	R _{θJL}	197	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

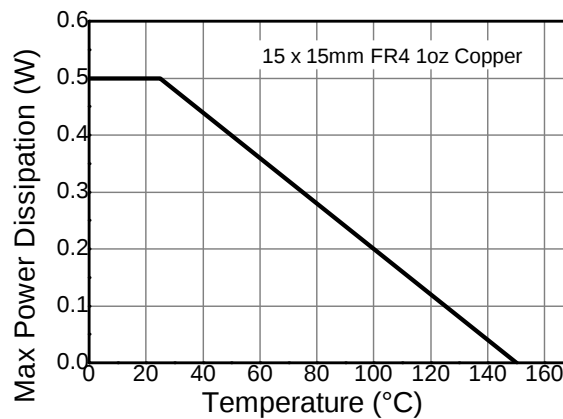
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

- Notes:
- For a device mounted on 15mm X 15mm 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions while operating in a steady-state.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

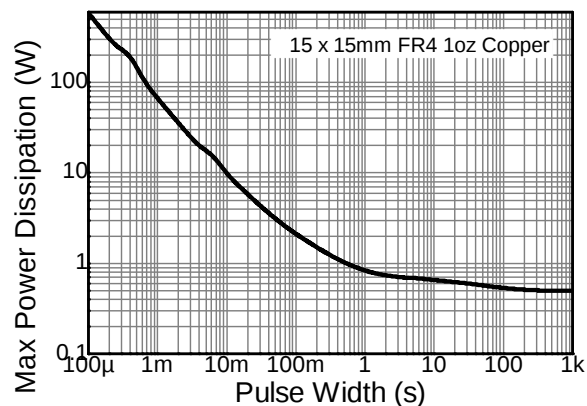
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



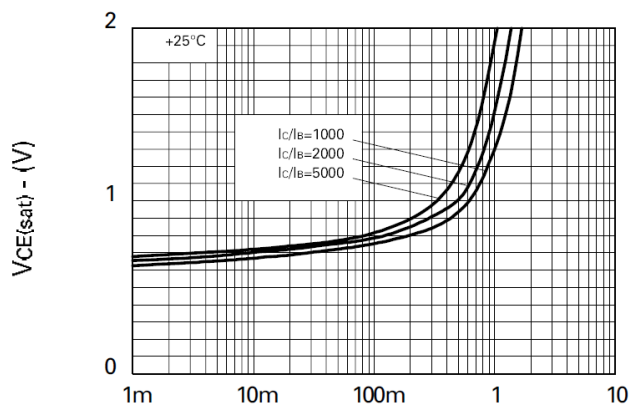
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	120	300	—	V	I _C = 10μA
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	100	130	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	10	14	—	V	I _E = 10μA
Collector Cutoff Current	I _{CBO}	—	0.02	10	nA	V _{CB} = 100V
Emitter Cutoff Current	I _{EBO}	—	—	100	nA	V _{EB} = 8V
Collector Emitter Cutoff Current	I _{CES}	—	—	10	μA	V _{CE} = 100V
Static Forward Current Transfer Ratio (Note 9)	h _{FE}	15k 5k	— —	— —	—	I _C = 100mA, V _{CE} = 5V I _C = 500mA, V _{CE} = 5V
Collector-Emitter Saturation Voltage (Note 9)	V _{CE(sat)}	—	0.9 0.78	1.0 0.9	V V	I _C = 500mA, I _B = 5mA I _C = 100mA, I _B = 0.1mA
Base-Emitter Turn-On Voltage(Note 9)	V _{BE(on)}	—	1.5	1.8	V	I _C = 500mA, V _{CE} = 5V
Base-Emitter Saturation Voltage(Note 9)	V _{BE(sat)}	—	1.7	1.9	V	I _C = 500mA, I _B = 5mA
Output Capacitance	C _{obo}	—	6	—	pF	V _{CB} = 10V, f = 100mHz
Switching Times	t _{on}	—	0.7	—	μs	I _C = 100μA, I _B = 0.1mA,
	t _{off}	—	2.5	—	μs	V _S = 10V

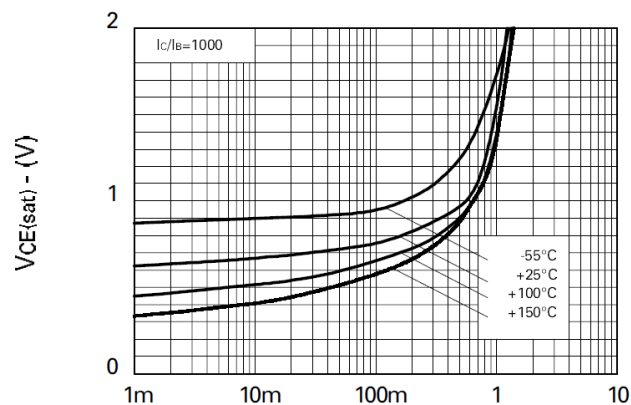
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



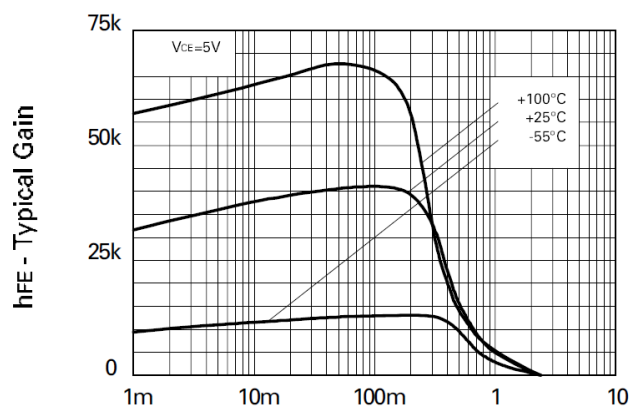
I_C - Collector Current (A)

$V_{CE(sat)}$ v I_C



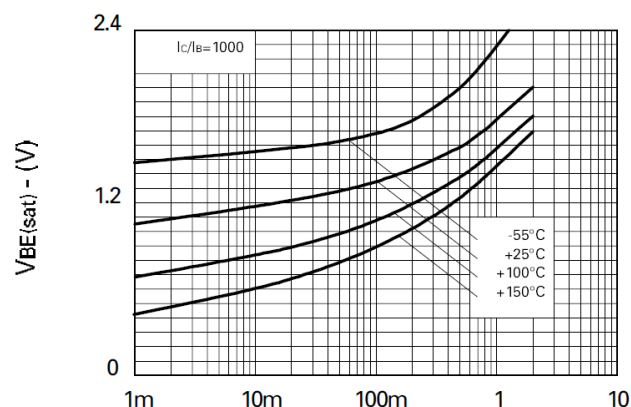
I_C - Collector Current (A)

$V_{CE(sat)}$ v I_C



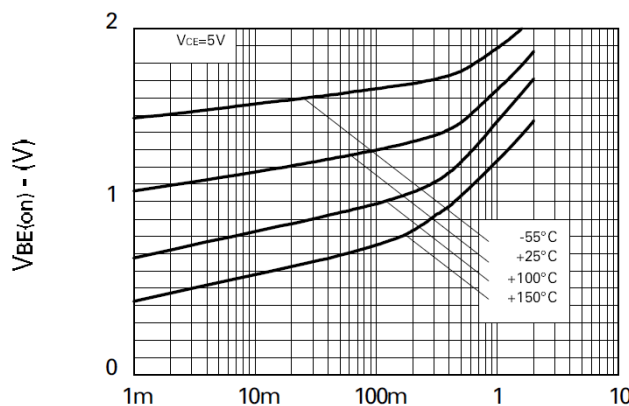
I_C - Collector Current (A)

h_{FE} v I_C



I_C - Collector Current (A)

$V_{BE(sat)}$ v I_C

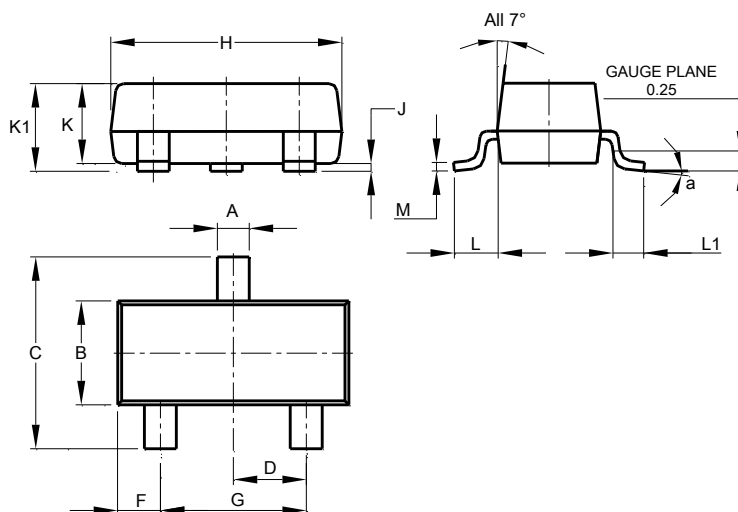


I_C - Collector Current (A)

$V_{BE(on)}$ v I_C

Package Outline Dimensions

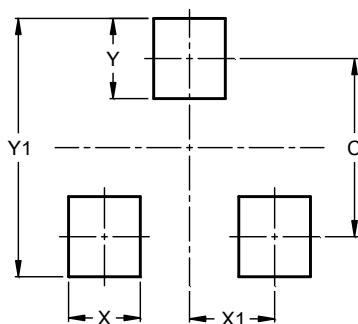
Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf for the latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

Note : For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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