

**100V NPN DARLINGTON MEDIUM POWER TRANSISTOR IN SOT23**

**Features**

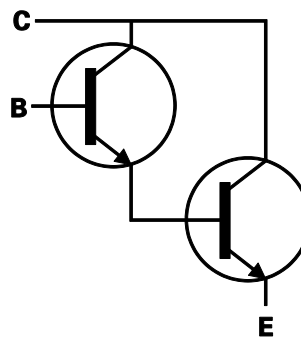
- $BV_{CEO} > 100V$
- $I_C = 0.5A$  High Continuous Collector Current
- $I_{CM} = 2A$  Peak Pulse Current
- 500mW Power Dissipation
- Darlington Transistor with High  $h_{FE}$  up to 5k at  $I_C = 0.5A$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([FMMT614Q](#))**

**Mechanical Data**

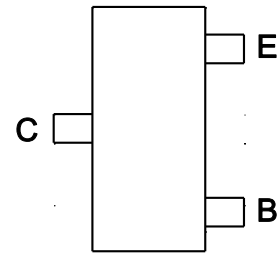
- Case: SOT23
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 <sup>Ⓔ</sup>
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



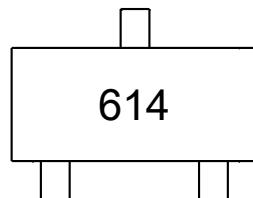
Top View Pin-Out

**Ordering Information** (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FMMT614TA	AEC-Q101	614	7	8	3,000
FMMT614TC	AEC-Q101	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](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. 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage	V <sub>EBO</sub>	10	V
Continuous Collector Current	I <sub>C</sub>	500	mA
Peak Pulse Current	I <sub>CM</sub>	2	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

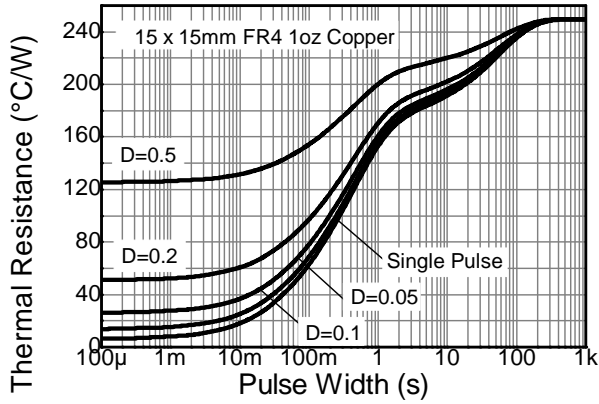
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	500	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	250	°C/W
Thermal Resistance, Junction to Lead (Note 6)	R <sub>θJL</sub>	197	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 7)

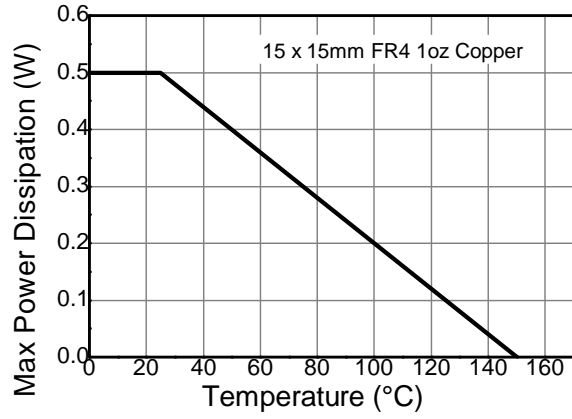
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge – Machine Model	ESD MM	200	V	B

- Notes:
5. 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 whilst operating in a steady-state.
  6. Thermal resistance from junction to solder-point (at the end of the collector lead).
  7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

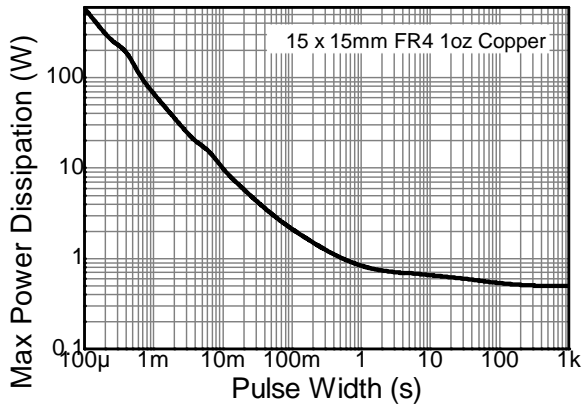
**Thermal Characteristics and Derating Information**



**Transient Thermal Impedance**



**Derating Curve**



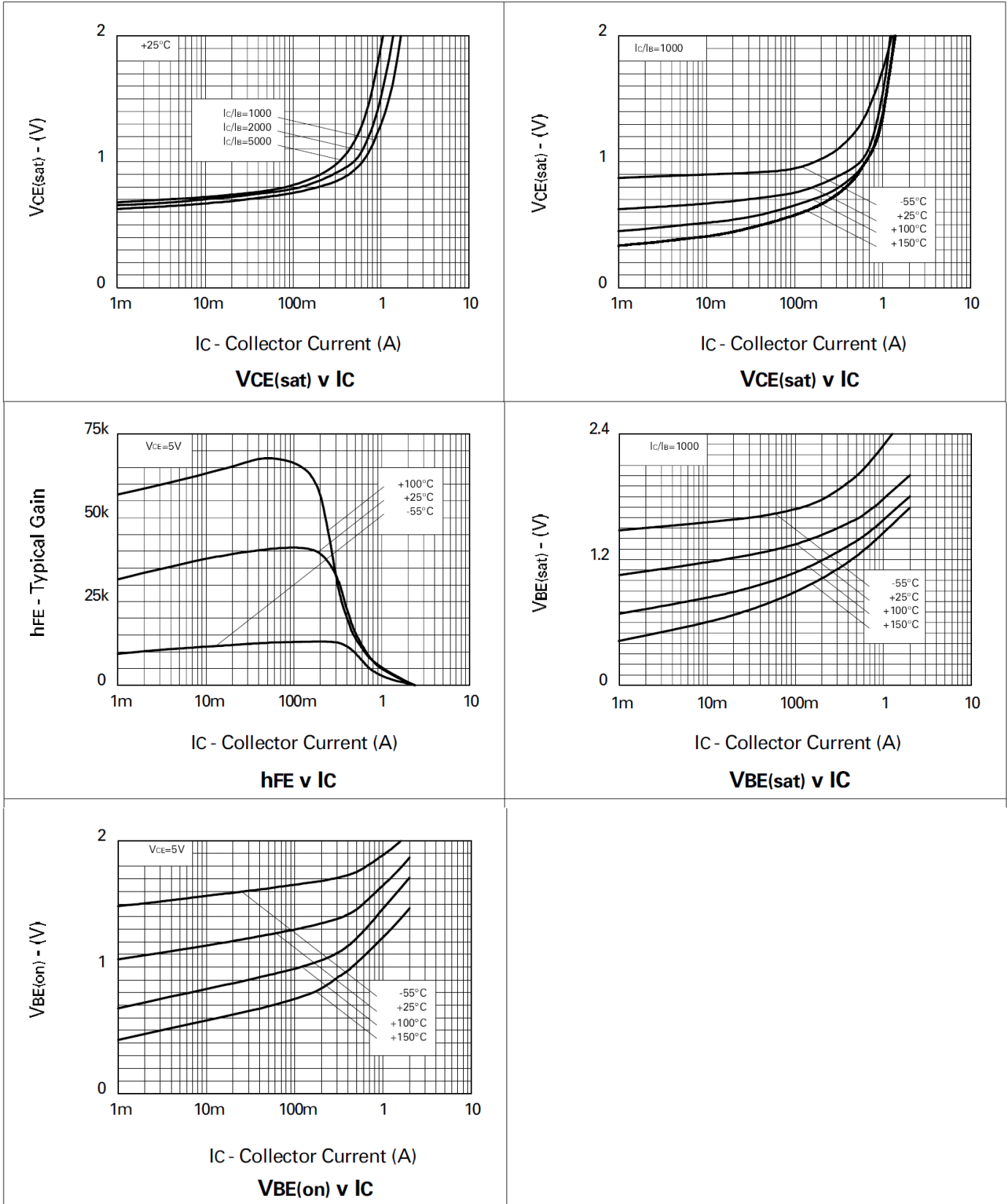
**Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	120	300	—	V	$I_C = 10\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 8)	$BV_{CEO}$	100	130	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	10	14	—	V	$I_E = 10\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	0.02	10	nA	$V_{CB} = 100\text{V}$
Emitter Cutoff Current	$I_{EBO}$	—	—	100	nA	$V_{EB} = 8\text{V}$
Collector Emitter Cutoff Current	$I_{CES}$	—	—	10	$\mu\text{A}$	$V_{CE} = 100\text{V}$
Static Forward Current Transfer Ratio (Note 8)	$h_{FE}$	15k 5k	— —	— —	—	$I_C = 100\text{mA}, V_{CE} = 5\text{V}$ $I_C = 500\text{mA}, V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(SAT)}$	—	0.9 0.78	1.0 0.9	V V	$I_C = 500\text{mA}, I_B = 5\text{mA}$ $I_C = 100\text{mA}, I_B = 0.1\text{mA}$
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(ON)}$	—	1.5	1.8	V	$I_C = 500\text{mA}, V_{CE} = 5\text{V}$
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(SAT)}$	—	1.7	1.9	V	$I_C = 500\text{mA}, I_B = 5\text{mA}$
Output Capacitance	$C_{OBO}$	—	6	—	pF	$V_{CB} = 10\text{V}, f = 100\text{MHz}$
Switching Times	$t_{ON}$	—	0.7	—	$\mu\text{s}$	$I_C = 100\mu\text{A}, I_B = 0.1\text{mA},$ $V_S = 10\text{V}$
	$t_{OFF}$	—	2.5	—	$\mu\text{s}$	

Note: 8. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

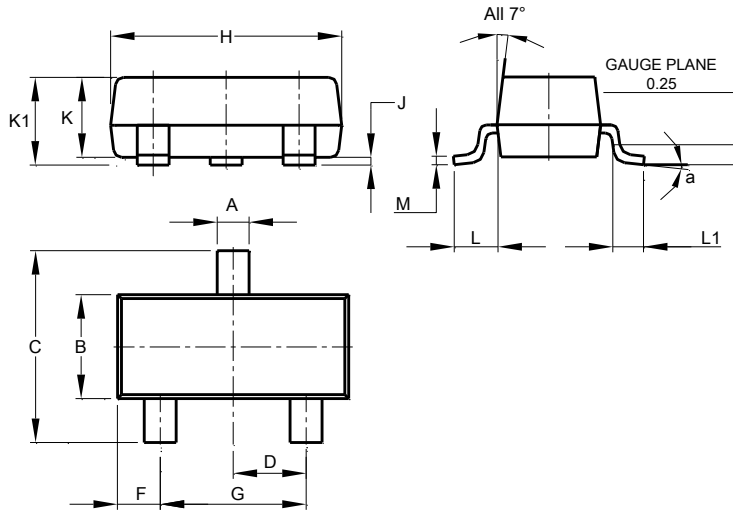
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.

**SOT23**

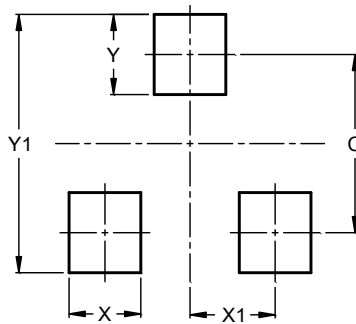


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.

**SOT23**



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.