

**100V NPN DARLINGTON TRANSISTOR IN SOT23**

**Features**

- $BV_{CEO} > 100V$
- $I_C = 900mA$  high Continuous Collector Current
- $I_{CM} = 5A$  Peak Pulse Current
- 625mW Power dissipation
- $h_{FE} > 5k$  up to 2A for high current gain hold up
- Complementary PNP Type: FMMT734
- **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**

**Mechanical Data**

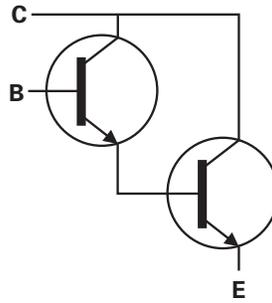
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per  
MIL-STD-202, Method 208 
- Weight 0.008 grams (approximate)

**Applications**

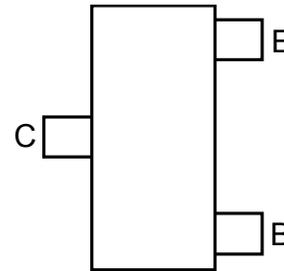
- Lamp
- Relay
- Solenoid Driving



Top View



Device Symbol



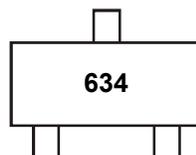
Top View  
Pin-Out

**Ordering Information** (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT634TA	AEC-Q101	634	7	8	3,000

- 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**



634 = 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>CB0</sub>	120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage	V <sub>EBO</sub>	12	V
Continuous Collector Current	I <sub>C</sub>	900	mA
Peak Pulse Current	I <sub>CM</sub>	5	A

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

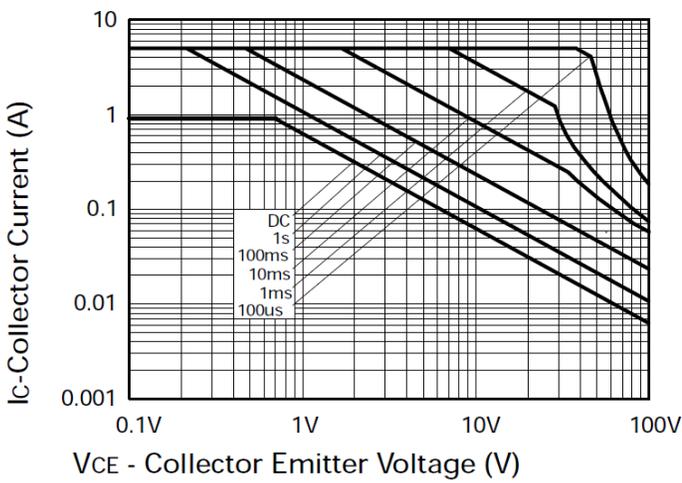
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	625	mW
Power Dissipation (Note 6)	P <sub>D</sub>	806	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	155	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R <sub>θJL</sub>	194	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 8)

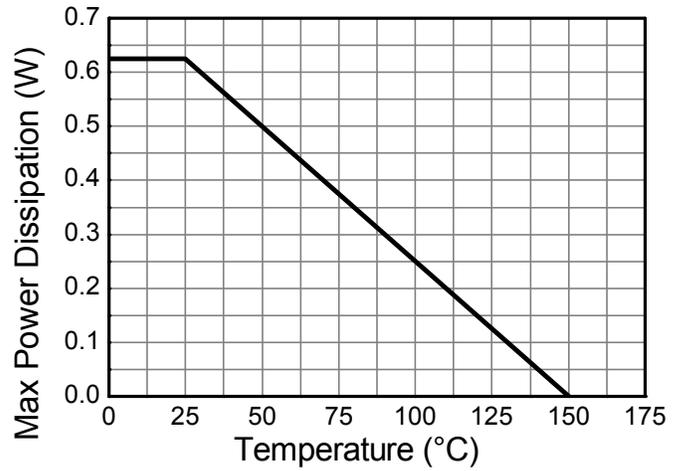
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

- Notes:
5. For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as note (5), except the device is measured at t ≤ 5 sec.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

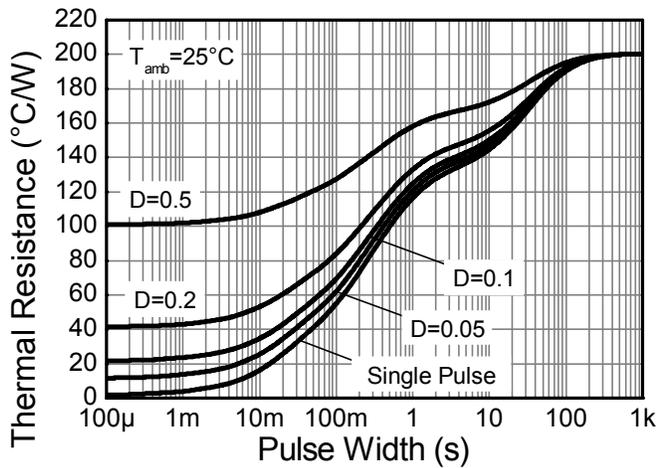
**Thermal Characteristics and Derating information**



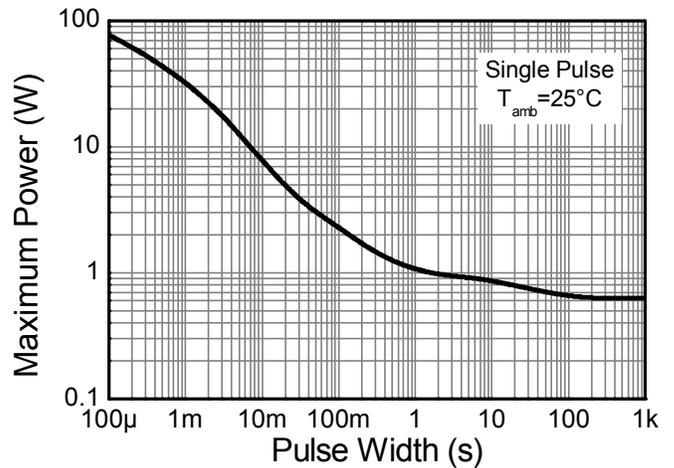
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



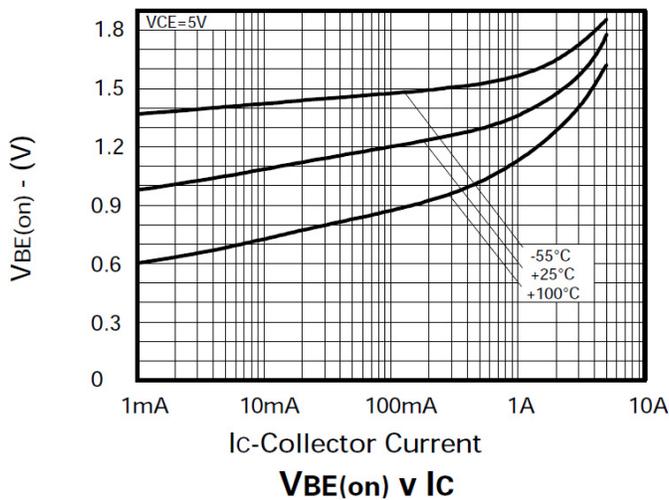
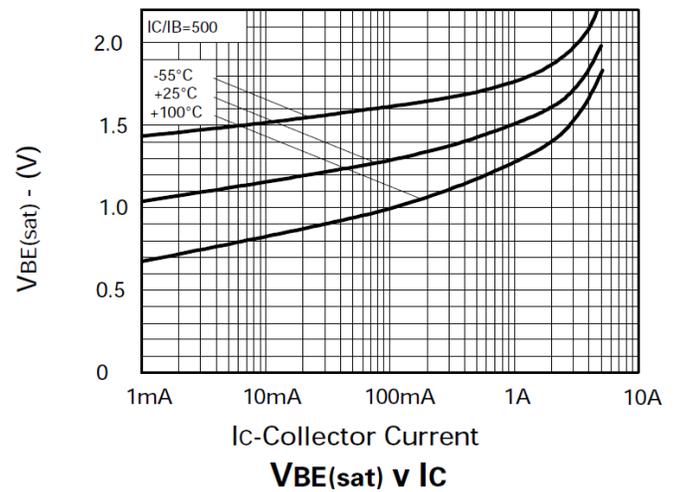
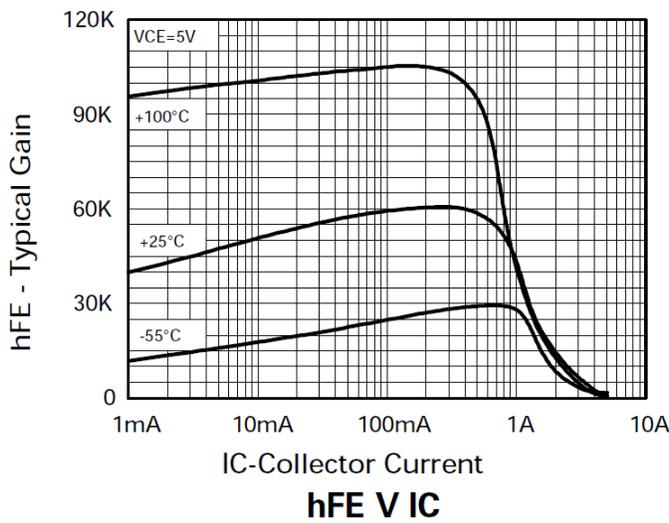
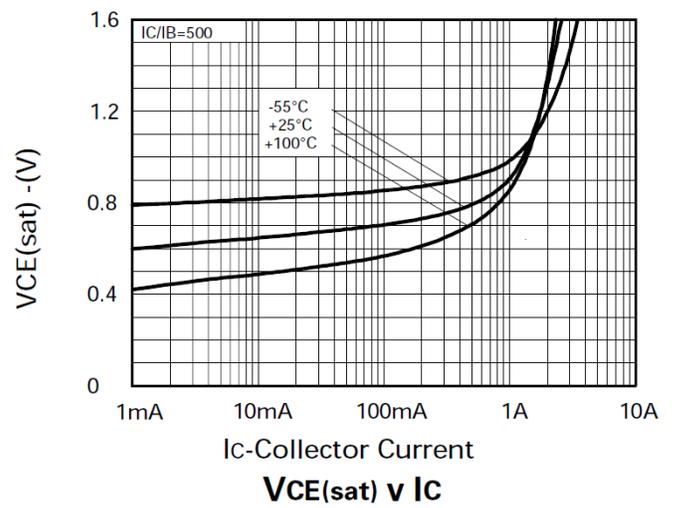
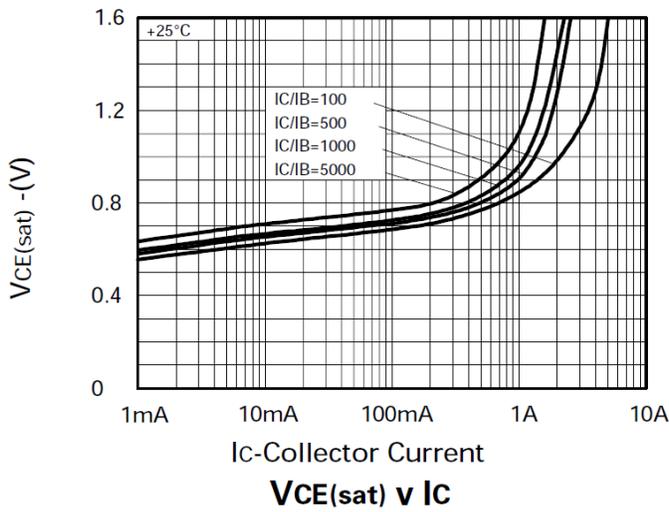
**Pulse Power Dissipation**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	120	170	-	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	100	115	-	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	12	16	-	V	I <sub>E</sub> = 100μA
Collector Cut-off Current	I <sub>CBO</sub>	-	<1	10	nA	V <sub>CB</sub> = 80V
Emitter Cut-off Current	I <sub>EBO</sub>	-	<1	10	nA	V <sub>EB</sub> = 7V
Collector Emitter Cut-off Current	I <sub>CES</sub>	-	<1	100	nA	V <sub>CES</sub> = 80V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	- 20k 15k 5k -	50k 60k 40k 14k 24k 600	- - - - - -	-	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 100mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V I <sub>C</sub> = 2A, V <sub>CE</sub> = 5V I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V I <sub>C</sub> = 5A, V <sub>CE</sub> = 5V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	- - - - -	0.67 0.72 0.75 0.82 0.68 0.85	0.75 0.80 0.85 0.93 -	V	I <sub>C</sub> = 100mA, I <sub>B</sub> = 1mA I <sub>C</sub> = 250mA, I <sub>B</sub> = 1mA I <sub>C</sub> = 500mA, I <sub>B</sub> = 5mA I <sub>C</sub> = 900mA, I <sub>B</sub> = 5mA I <sub>C</sub> = 900mA, I <sub>B</sub> = 5mA, T <sub>J</sub> = +150°C I <sub>C</sub> = 1A, I <sub>B</sub> = 5mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	-	1.5	1.65	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 5mA
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(on)</sub>	-	1.33	1.50	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V
Transition Frequency	f <sub>T</sub>	-	140	-	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V, f = 100MHz
Output Capacitance	C <sub>obo</sub>	-	9	20	pF	V <sub>CB</sub> = 10V, f = 1MHz
Turn-On Time	t <sub>(on)</sub>	-	290	-	ns	V <sub>CC</sub> = 20V, I <sub>C</sub> = 500mA,
Turn-Off Time	t <sub>(off)</sub>	-	2,400	-	ns	I <sub>B1</sub> = -I <sub>B2</sub> = 1mA

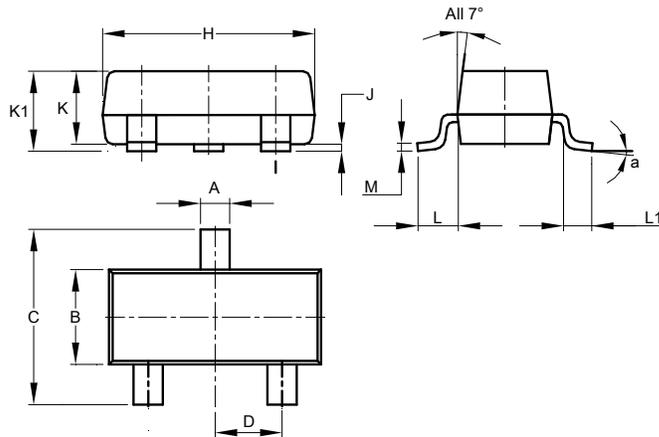
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



## Package Outline Dimensions

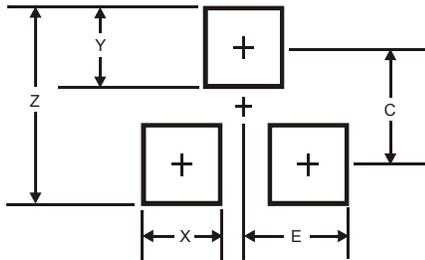
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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	8°		
All Dimensions in mm			

## Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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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