100V NPN DARLINGTON TRANSISTOR IN SOT23

Description

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

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: FMMT734Q
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMT634Q is suitable for automotive applications requiring specific change control; it is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
- **https://www.diodes.com/quality/product-definitions/**

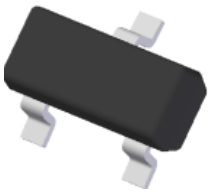
Mechanical Data

- 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 e3
- Weight 0.008 grams (Approximate)

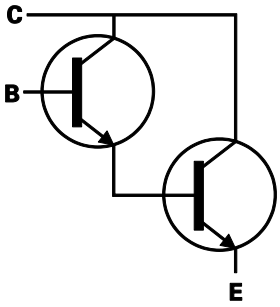
Applications

- Automotive
- Lamp
- Relay
- Solenoid Driving

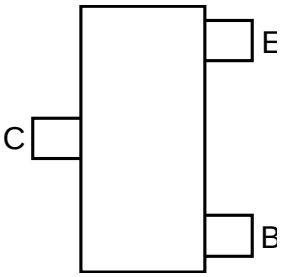
SOT23



Top View



Device Symbol



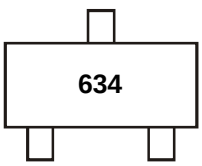
Top View
Pin-Out

Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
FMMT634QTA	Automotive	634	7	8	3,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



634 = 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}	12	V
Continuous Collector Current	I_C	900	mA
Peak Pulse Current	I_{CM}	5	A

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

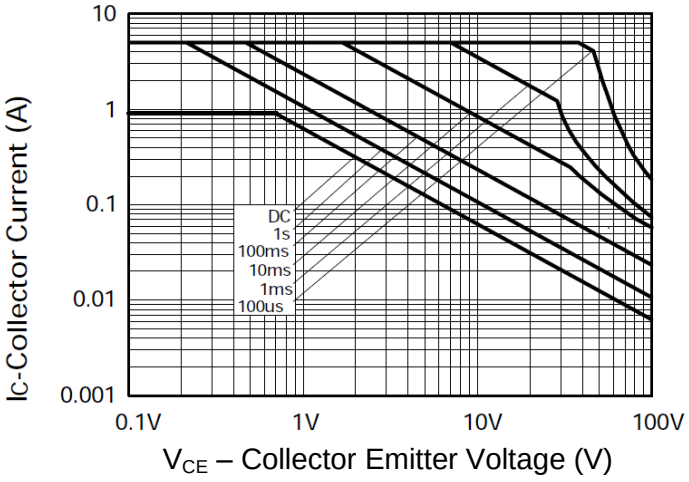
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	625	mW
Power Dissipation (Note 6)	P_D	806	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	155	°C/W
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	194	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

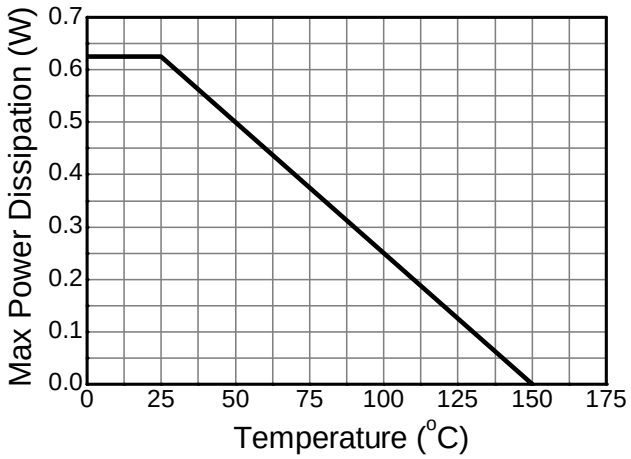
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

Notes:
5. For a device mounted with the exposed collector pad on 25mm × 25mm 1oz copper that is on a single-sided 1.6mm FR-4 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 ≤ 5s.
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.

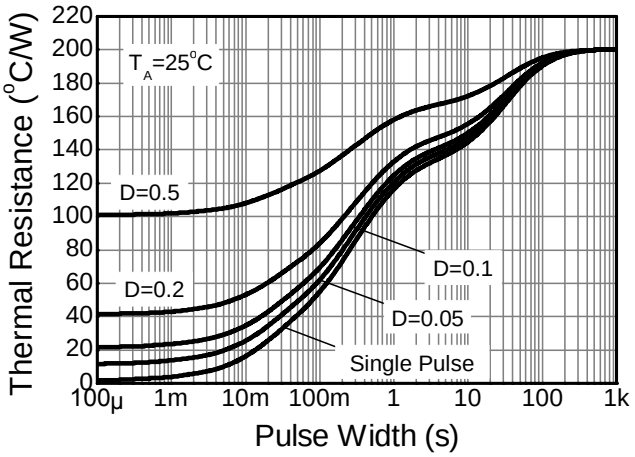
Thermal Characteristics and Derating information



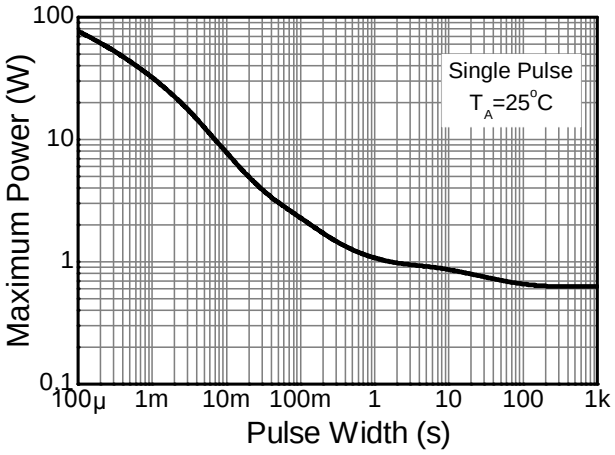
Safe Operating Area



Derating Curve



Transient Thermal Impedance



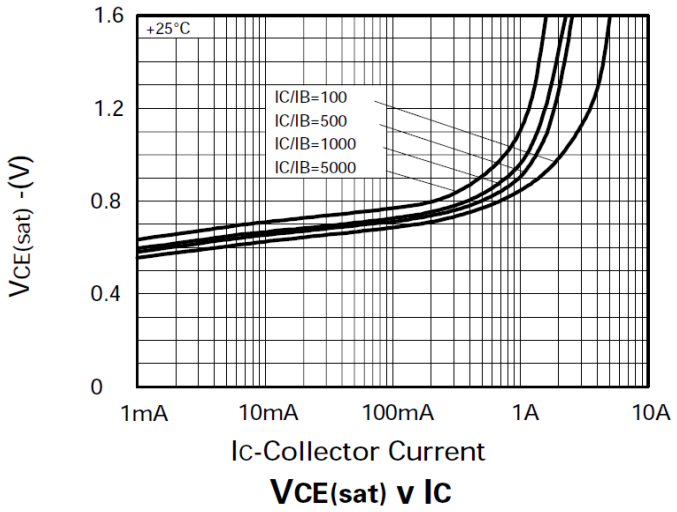
Pulse Power Dissipation

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

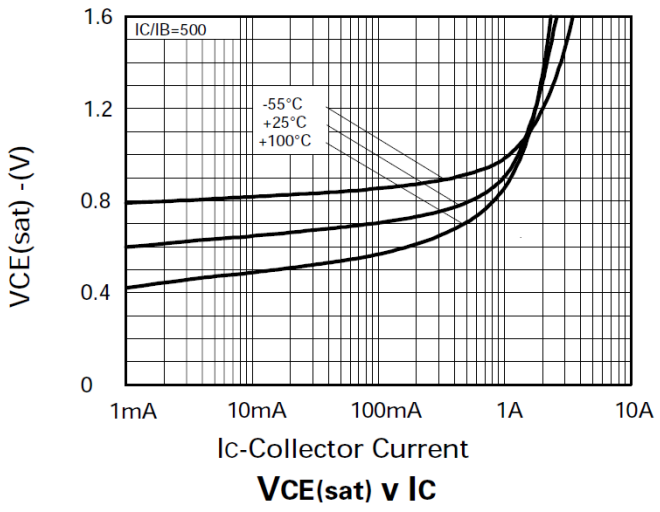
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	120	170	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	100	115	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	12	16	—	V	I_E = 100µA
Collector Cut-Off Current	I_{CBO}	—	<1	10	nA	V_{CB} = 80V
Emitter Cut-Off Current	I_{EBO}	—	<1	10	nA	V_{EB} = 7V
Collector Emitter Cut-Off Current	I_{CES}	—	<1	100	nA	V_{CES} = 80V
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	— 20k 15k 5k — —	50k 60k 40k 14k 24k 600	— — — — — —	—	I_C = 10mA, V_{CE} = 5V I_C = 100mA, V_{CE} = 5V I_C = 1A, V_{CE} = 5V I_C = 2A, V_{CE} = 5V I_C = 1A, V_{CE} = 2V I_C = 5A, V_{CE} = 5V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	— — — — — — —	0.67 0.72 0.78 0.75 0.82 0.68 0.85	0.75 0.80 1 0.85 0.93 — 0.96	V	I_C = 100mA, I_B = 1mA I_C = 250mA, I_B = 1mA I_C = 500mA, I_B = 1mA I_C = 500mA, I_B = 5mA I_C = 900mA, I_B = 5mA I_C = 900mA, I_B = 5mA, T_J = +150°C I_C = 1A, I_B = 5mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	1.5	1.65	V	I_C = 1A, I_B = 5mA
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	1.33	1.50	V	I_C = 1A, V_{CE} = 5V
Transition Frequency	f_T	—	140	—	MHz	I_C = 50mA, V_{CE} = 10V, f = 100MHz
Output Capacitance	C_{obo}	—	9	20	pF	V_{CB} = 10V, f = 1MHz
Turn-On Time	$t_{(on)}$	—	290	—	ns	V_{CC} = 20V, I_C = 500mA, I_{B1} = -I_{B2} = 1mA
Turn-Off Time	$t_{(off)}$	—	2,400	—	ns	

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

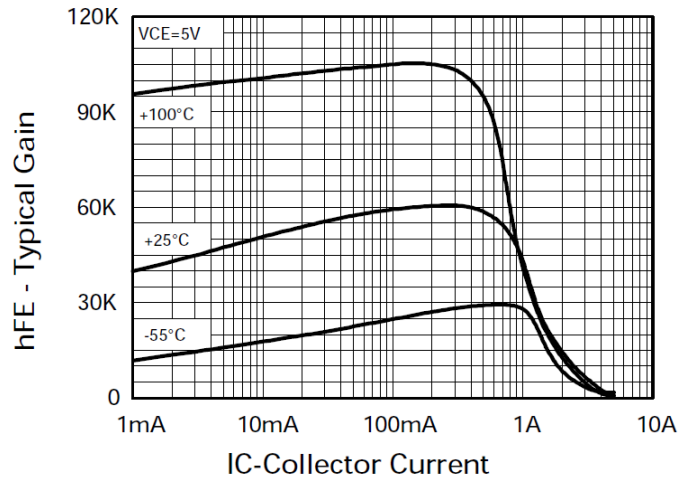
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



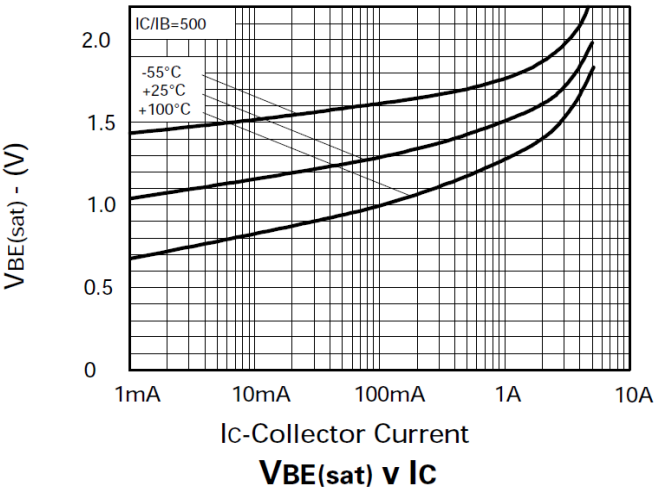
VCE(sat) v IC



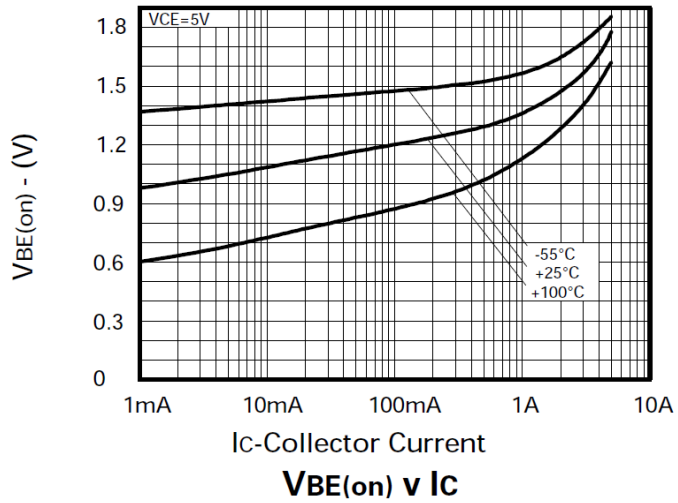
VCE(sat) v IC



hFE V IC



VBE(sat) v IC

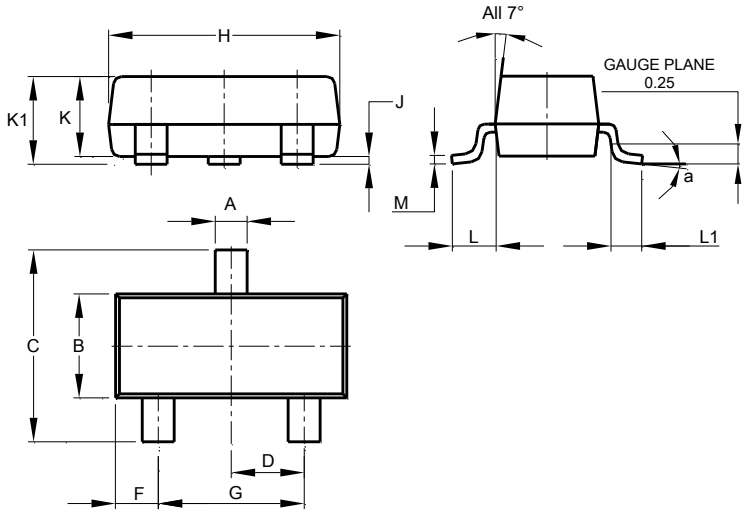


VBE(on) v IC

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23

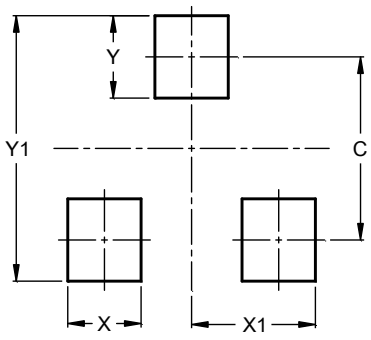


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html 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.

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