150V NPN SILICON LOW SATURATION TRANSISTOR IN SOT23

Description

This bipolar junction transistor (BJT) is designed to meet the stringent requirements of automotive applications.

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)

Features

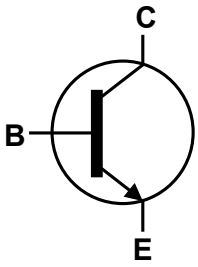
- BV_{CEO} > 150V
- Maximum Continuous Collector Current I_C = 1A
- 625mW Power Dissipation
- h_{FE} Characterized up to 3.0A
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMT625Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Applications

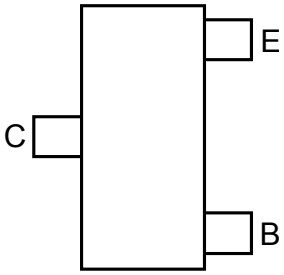
- DC-DC Modules
- Power Management Functions
- Motor Control and Drive Functions

SOT23

Top View



Device Symbol



Top View
Pin-Out

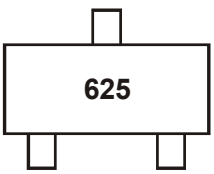
Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
FMMT625QTA	Automotive	625	7	8	3000 Units

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

SOT23



625 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	150	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	1	A
Peak Pulse Current	I_{CM}	3	A
Base Current	I_B	500	mA

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

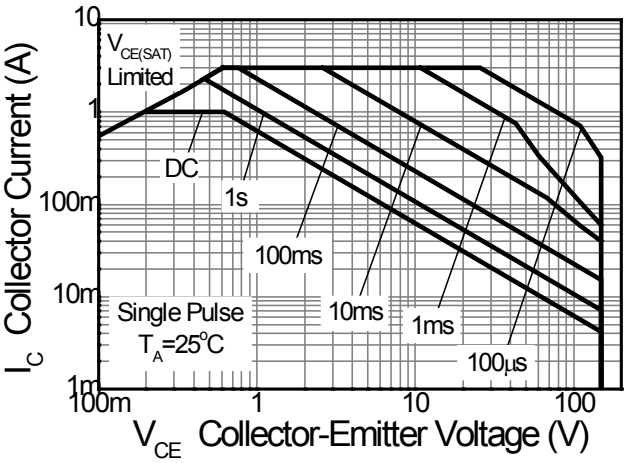
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	625	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Leads (Note 6)	$R_{\theta JL}$	194	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 7)

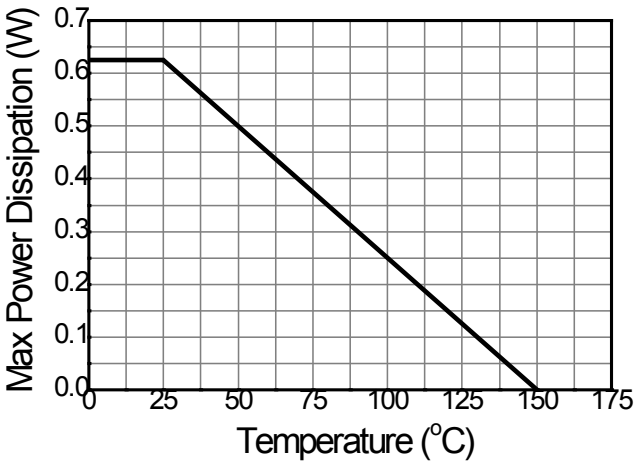
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	≥ 8000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

Notes: 5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1 oz copper, in still air conditions.
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.

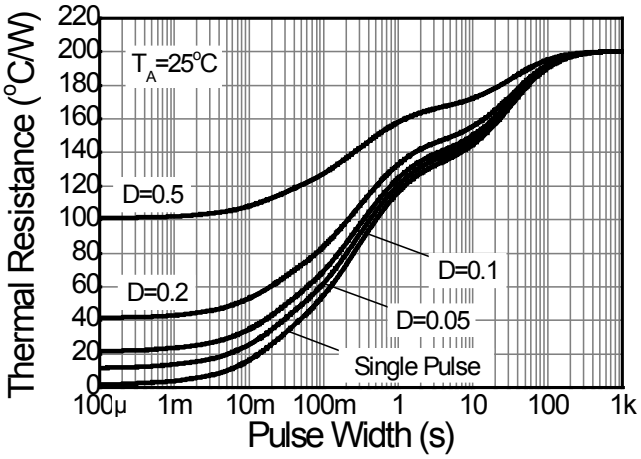
Thermal Characteristics and Derating information



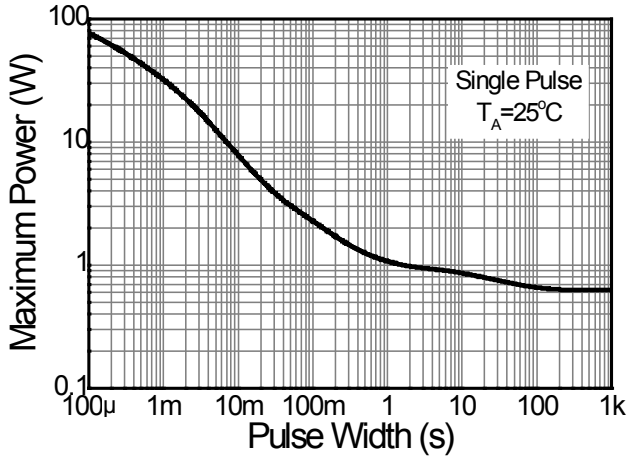
Safe Operating Area



Derating Curve



Transient Thermal Impedance



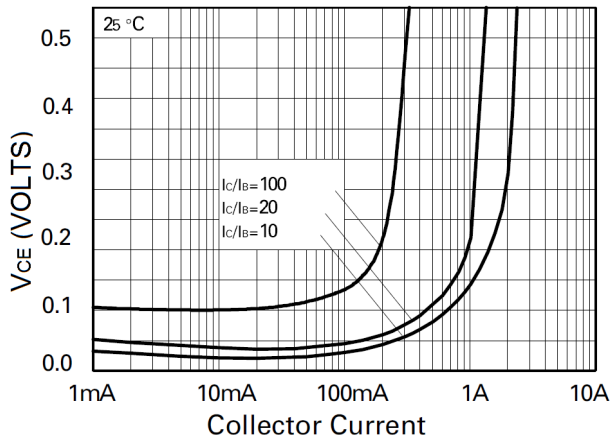
Pulse Power Dissipation

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

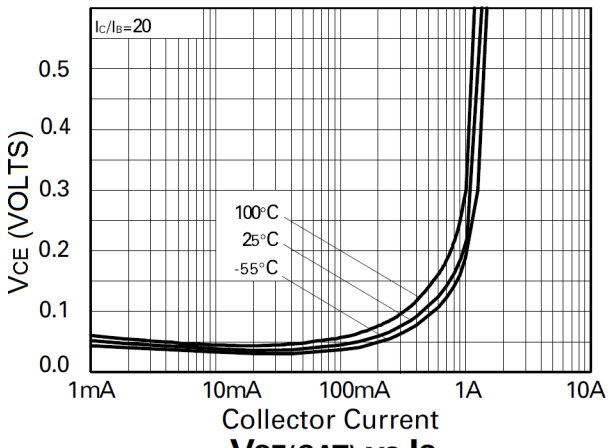
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	300	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	150	175	—	V	I_C = 1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	8.3	—	V	I_E = 100µA
Collector Cut-off Current	I_{CBO}	—	—	100	nA	V_{CB} = 130V
Emitter Cut-off Current	I_{EBO}	—	—	100	nA	V_{EB} = 5V
Collector Emitter Cut-off Current	I_{CES}	—	—	100	nA	V_{CES} = 130V
Static Forward Current Transfer Ratio (Note 8)	h_{FE}	200 300 30 —	400 450 45 15	— — — —	—	I_C = 10mA, V_{CE} = 10V I_C = 200mA, V_{CE} = 10V I_C = 1A, V_{CE} = 10V I_C = 3A, V_{CE} = 10V
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	— — —	26 110 180	50 200 300	mV	I_C = 0.1A, I_B = 10mA I_C = 0.1A, I_B = 1mA I_C = 1A, I_B = 50mA
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$	—	0.85	1.0	V	I_C = 1A, I_B = 50mA
Base-Emitter Turn-on Voltage (Note 8)	$V_{BE(on)}$	—	0.74	1.0	V	I_C = 1A, V_{CE} = 10V
Transition Frequency	f_t	100	135	—	MHz	I_C = 50mA, V_{CE} = 10V, f = 100MHz
Collector Output Capacitance	C_{obo}	—	6	10	pF	V_{CB} = 10V, f = 1MHz
Turn-On Time	t_{on}	—	160	—	ns	V_{CC} = 50V, I_C = 500mA,
Turn-Off Time	t_{off}	—	1500	—	ns	I_{B1} = -I_{B2} = 50mA

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

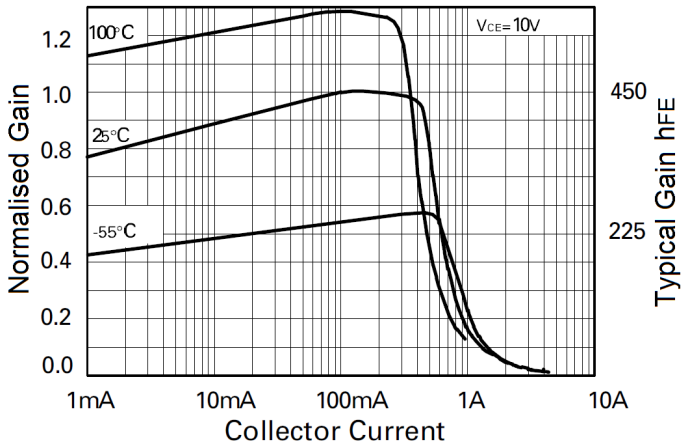
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



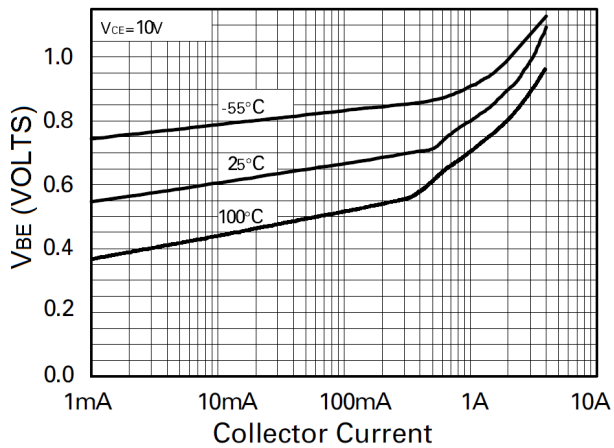
VCE(SAT) vs IC



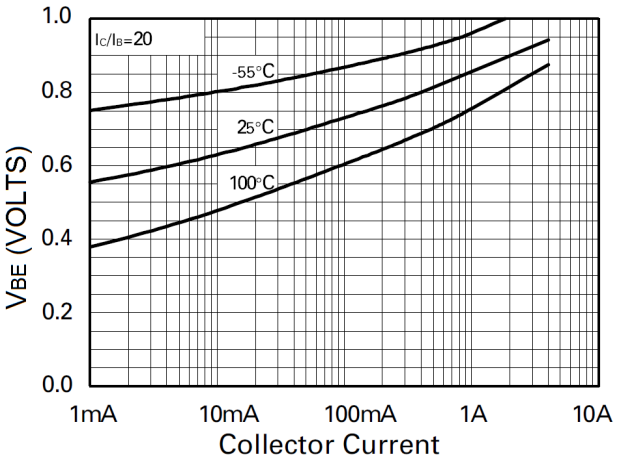
VCE(SAT) vs IC



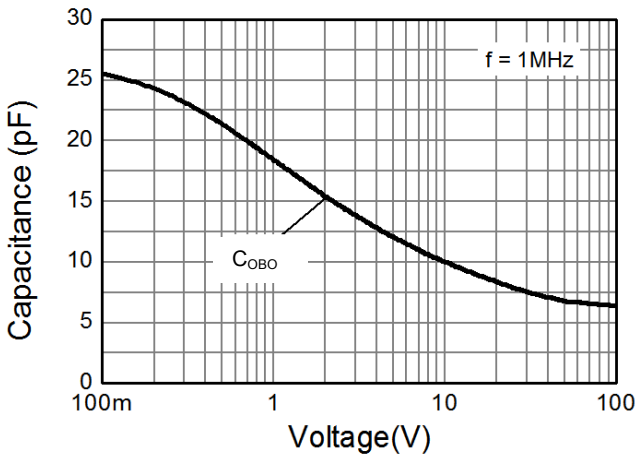
hFE vs IC



VBE(ON) vs IC



VBE(SAT) vs IC



Capacitance v Voltage

Package Outline Dimensions

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

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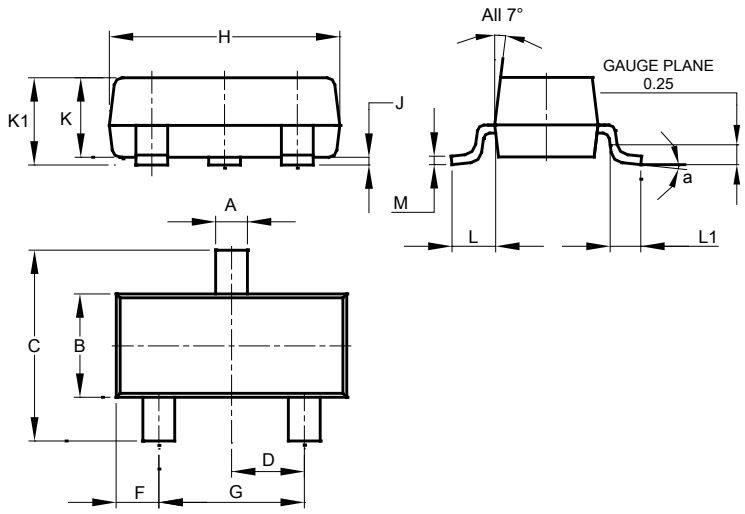

SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

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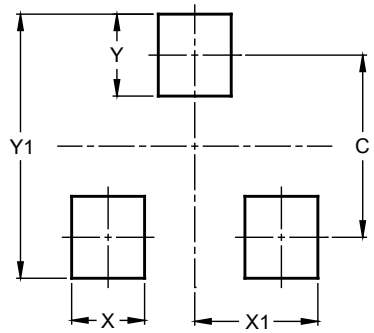

Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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