50V NPN SILICON LOW SATURATION TRANSISTOR IN SOT23

Features

- BV_{CEO} > 50V
- I_C = 2A Continuous Collector Current
- 625mW Power Dissipation
- Low Saturation Voltage $V_{CE(sat)}$ < 200mV @ 1A
- $R_{CE(sat)}$ = 68mΩ for a Low Equivalent On-Resistance
- h_{FE} Characterised up to 6A for High Current Gain Hold-up
- Complementary PNP Type: DIODES™ FMMT720
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (FMMT619Q)**

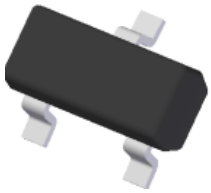
Mechanical Data

- Package: SOT23
- Package 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)

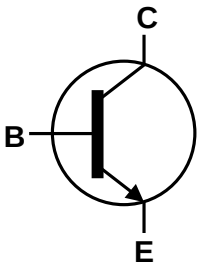
Applications

- MOSFET gate driving
- DC-DC / DC-AC converters
- Regulators
- LED drivers
- Motor controls

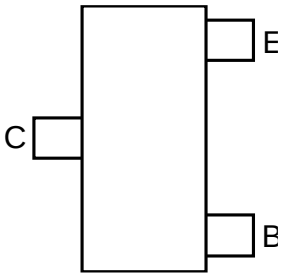
SOT23 (Type DN)



Top View



Device Symbol



Top View
Pin-Out

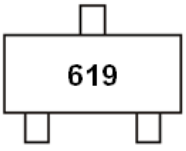
Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
FMMT619TA	SOT23 (Type DN)	619	7	8	3,000	Reel
FMMT619TC	SOT23 (Type DN)	619	13	8	10,000	Reel

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 (Type DN)



619 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	2	A
Peak Pulse Current	I_{CM}	6	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
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

Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
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).

Thermal Characteristics and Derating Information

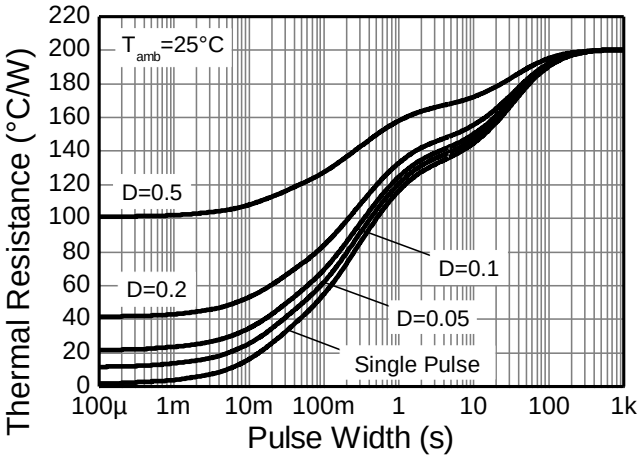


Figure 1. Transient Thermal Impedance

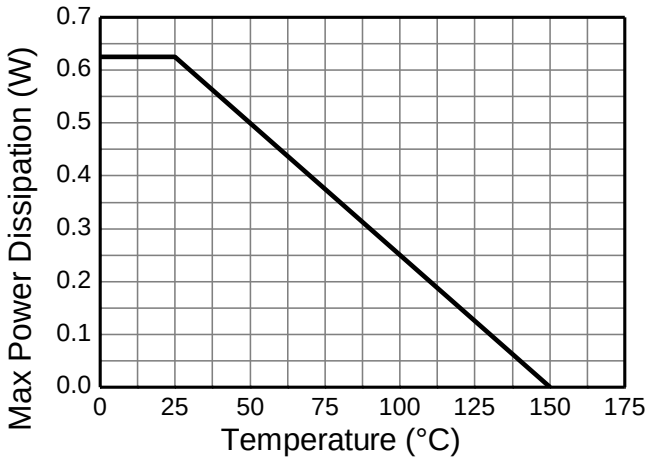


Figure 2. Derating Curve

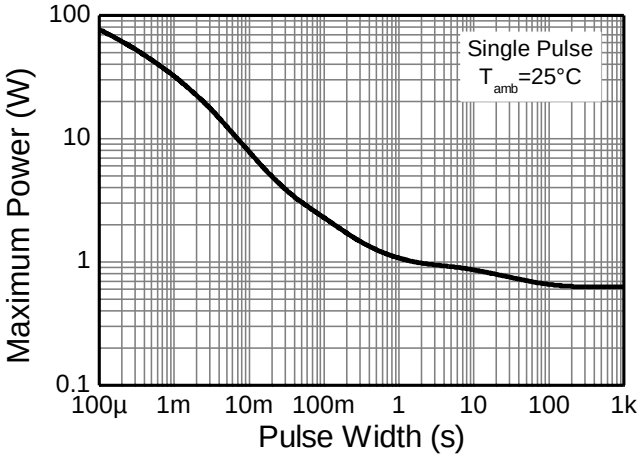


Figure 3. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	50	190	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	50	65	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	I_E = 100µA
Collector Cut-off Current	I_{CBO}	—	—	100	nA	V_{CB} = 40V
Emitter Cut-off Current	I_{EBO}	—	—	100	nA	V_{EB} = 6V
Collector Emitter Cut-off Current	I_{CES}	—	—	100	nA	V_{CES} = 40V
ON CHARACTERISTICS (Note 8)						
Static Forward Current Transfer Ratio	h_{FE}	200 300 200 100 —	400 450 400 225 40	— — — — —	—	I_C = 10mA, V_{CE} = 2V I_C = 200mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 6A, V_{CE} = 2V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	— — —	10 125 150	20 200 220	mV	I_C = 0.1A, I_B = 10mA I_C = 1A, I_B = 10mA I_C = 2A, I_B = 50mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	0.87	1.0	V	I_C = 2A, I_B = 50mA
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	—	0.82	1.0	V	I_C = 2A, V_{CE} = 2V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	100	165	—	MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Collector Output Capacitance	C_{obo}	—	12	20	pF	V_{CB} = 10V, f = 1MHz
Turn-On Time	t_{on}	—	170	—	ns	V_{CC} = 10V, I_C = 1A I_{B1} = -I_{B2} = 10mA
Turn-Off Time	t_{off}	—	750	—	ns	

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

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

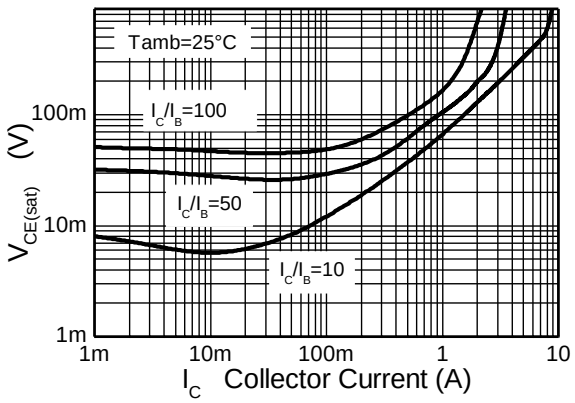


Figure 4. $V_{CE(sat)}$ v I_C

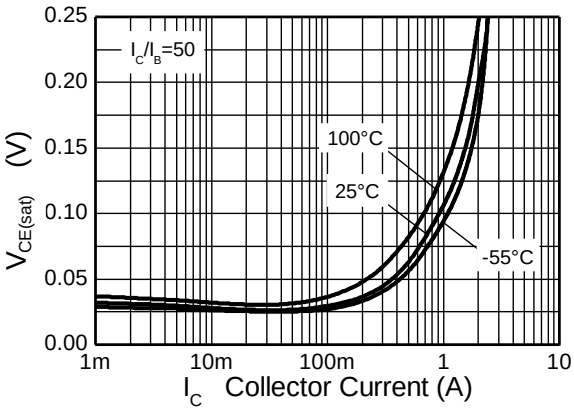


Figure 5. $V_{CE(sat)}$ v I_C

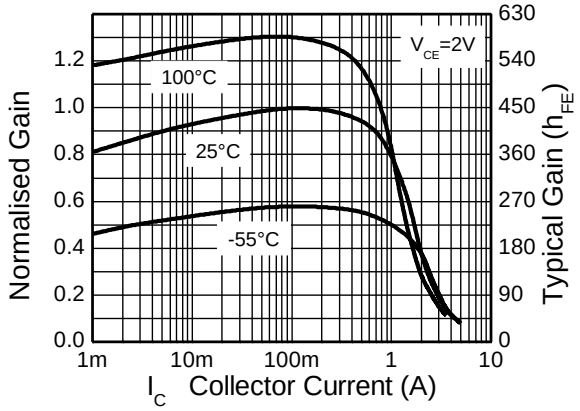


Figure 6. h_{FE} v I_C

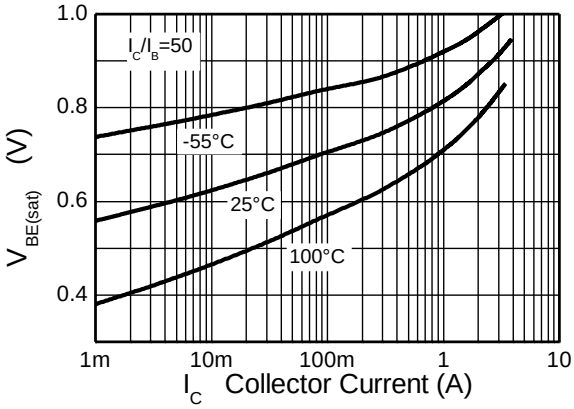


Figure 7. $V_{BE(sat)}$ v I_C

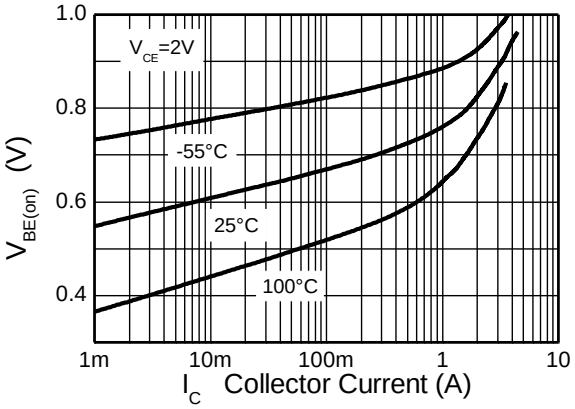
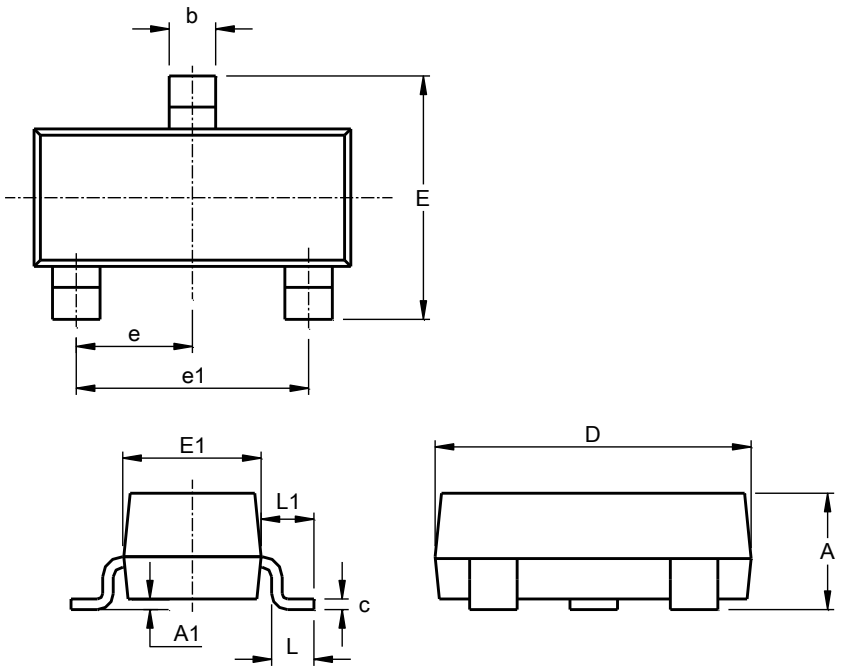


Figure 8. $V_{BE(on)}$ v I_C

Package Outline Dimensions

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

SOT23 (Type DN)

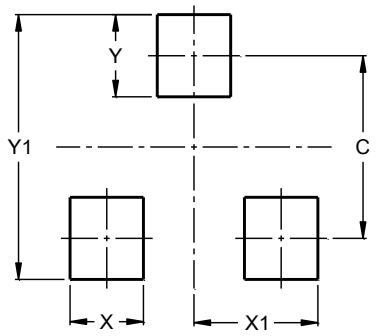


SOT23 Type DN			
Dim	**Min**	**Max**	**Typ**
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

Suggested Pad Layout

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

SOT23 (Type DN)



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

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