



**THE DATASHEET OF  
FMMT619QTA**



## Features

- $BV_{CE0} > 50V$
- $I_C = 2A$  Continuous Collector Current
- 625mW Power Dissipation
- Low Saturation Voltage  $V_{CE(sat)} < 200mV @ 1A$
- $R_{CE(sat)} = 68m\Omega$  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)**

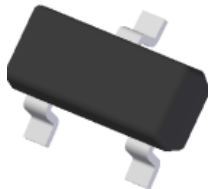
## Mechanical Data

- 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)

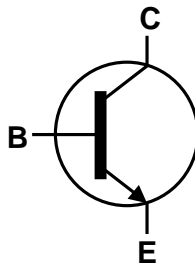
## Applications

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

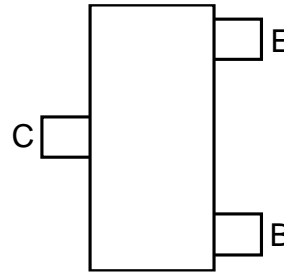
SOT23 (Type DN)



Top View



Device Symbol



Top View  
Pin-Out

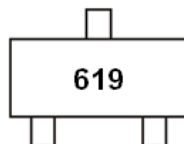
## Ordering Information (Note 4)

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<sub>A</sub> = +25°C, unless otherwise specified.)

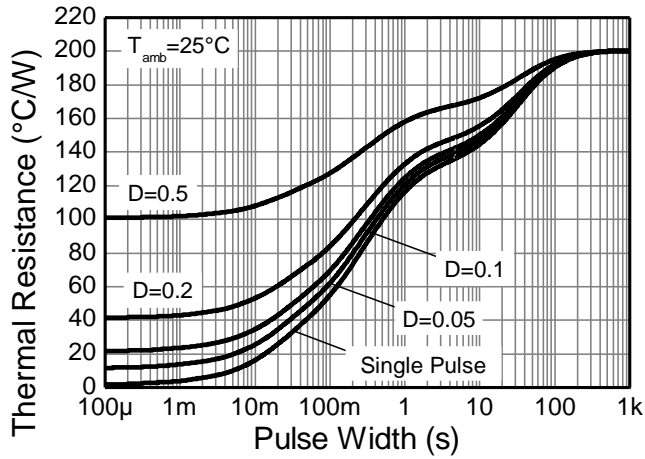
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	50	V
Emitter-Base Voltage	V <sub>EB0</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	2	A
Peak Pulse Current	I <sub>CM</sub>	6	A
Base Current	I <sub>B</sub>	500	mA

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

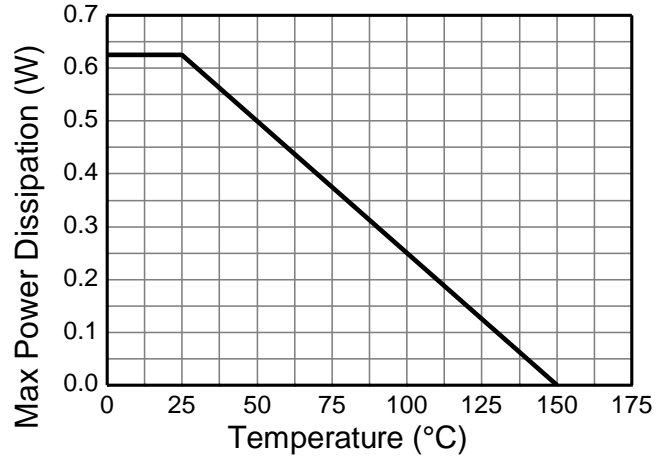
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	625	mW
Power Dissipation (Note 6)	P <sub>D</sub>	806	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	200	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	155	°C/W
Thermal Resistance, 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

- 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).

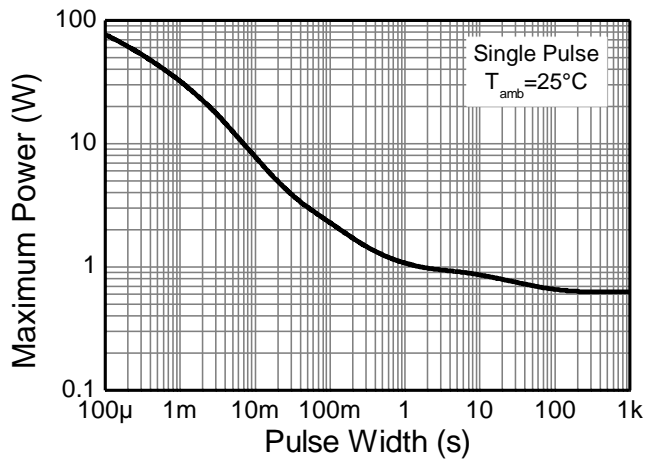
**Thermal Characteristics and Derating Information**



**Figure 1. Transient Thermal Impedance**



**Figure 2. Derating Curve**



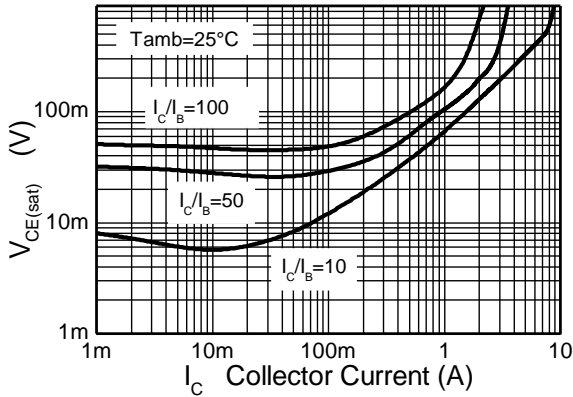
**Figure 3. Pulse Power Dissipation**

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

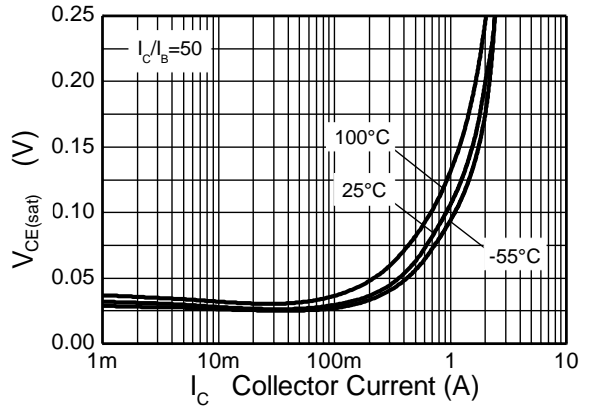
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	50	190	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	50	65	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.3	—	V	I <sub>E</sub> = 100μA
Collector Cut-off Current	I <sub>CBO</sub>	—	—	100	nA	V <sub>CB</sub> = 40V
Emitter Cut-off Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 6V
Collector Emitter Cut-off Current	I <sub>CES</sub>	—	—	100	nA	V <sub>CES</sub> = 40V
<b>ON CHARACTERISTICS (Note 8)</b>						
Static Forward Current Transfer Ratio	h <sub>FE</sub>	200	400	—	—	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
		300	450	—		I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V
		200	400	—		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		100	225	—		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
		—	40	—		I <sub>C</sub> = 6A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	10	20	mV	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 10mA
		—	125	200		I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
		—	150	220		I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	0.87	1.0	V	I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA
Base-Emitter Turn-On Voltage	V <sub>BE(on)</sub>	—	0.82	1.0	V	I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	f <sub>T</sub>	100	165	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V f = 100MHz
Collector Output Capacitance	C <sub>obo</sub>	—	12	20	pF	V <sub>CB</sub> = 10V, f = 1MHz
Turn-On Time	t <sub>on</sub>	—	170	—	ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 1A
Turn-Off Time	t <sub>off</sub>	—	750	—	ns	I <sub>B1</sub> = -I <sub>B2</sub> = 10mA

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

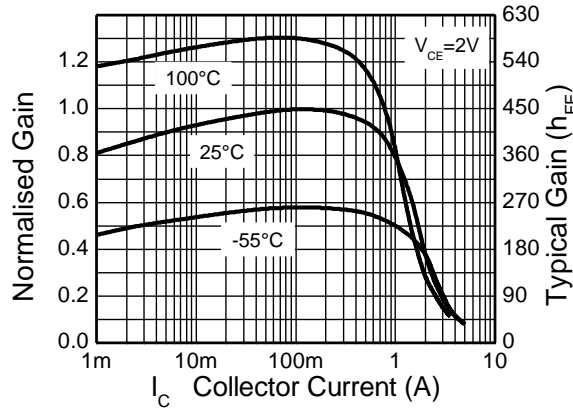
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



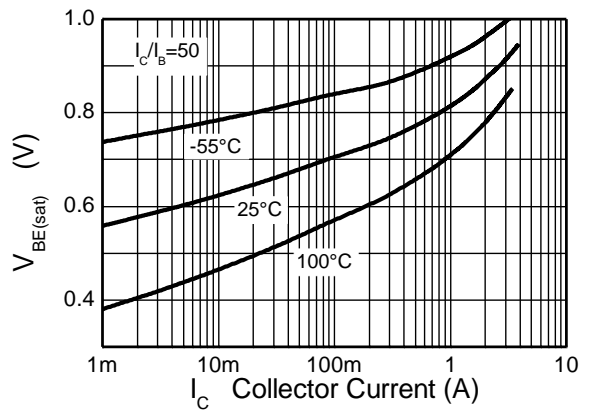
**Figure 4.  $V_{CE(sat)}$  v  $I_C$**



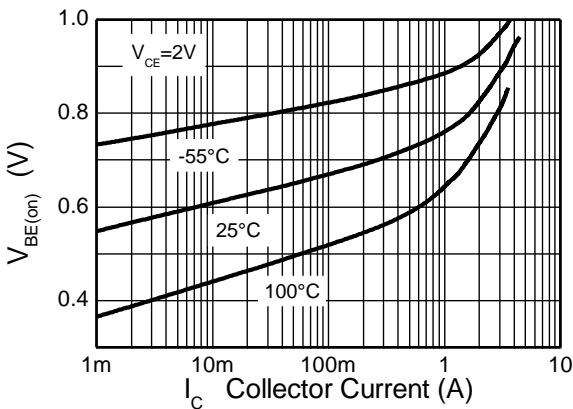
**Figure 5.  $V_{CE(sat)}$  v  $I_C$**



**Figure 6.  $h_{FE}$  v  $I_C$**



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

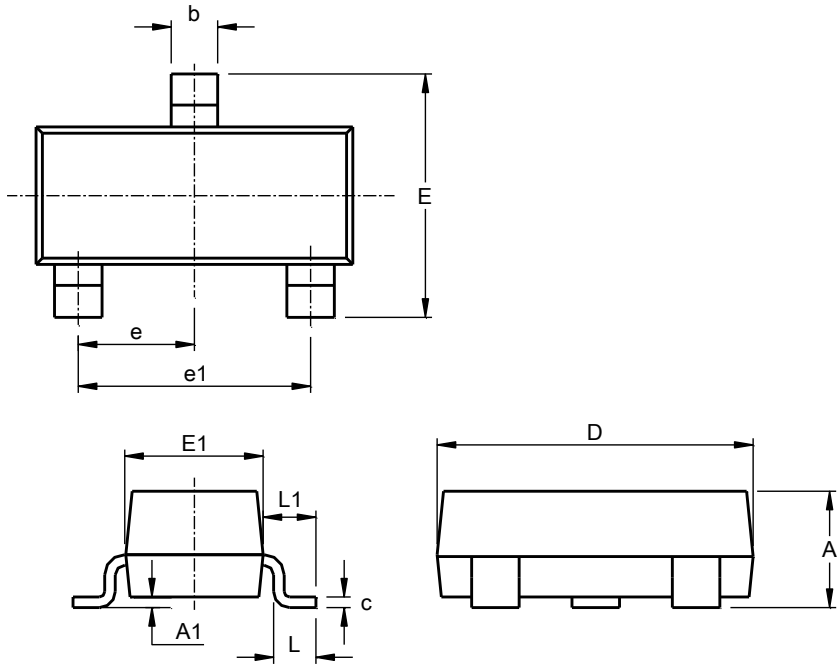


**Figure 8.  $V_{BE(on)}$  v  $I_C$**

**Package Outline Dimensions**

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

**SOT23 (Type DN)**

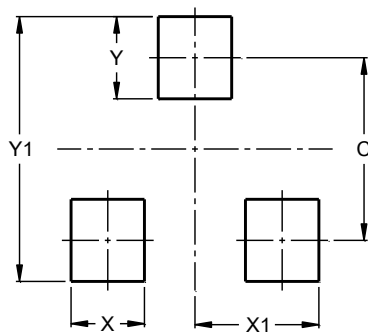


SOT23 Type DN			
Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

**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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