



**THE DATASHEET OF  
FMMT619TC**



**50V NPN SILICON LOW SATURATION TRANSISTOR IN SOT23**

**Features**

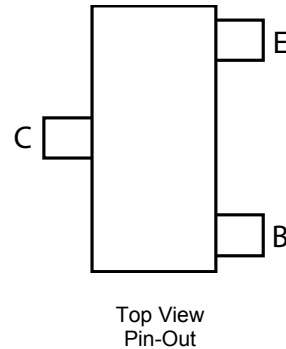
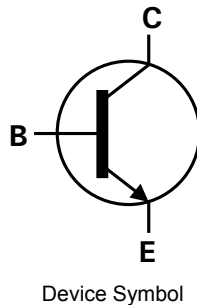
- $BV_{CEO} > 50V$
- $I_C = 2A$  Continuous Collector Current
- 625mW power dissipation
- Low Saturation Voltage  $V_{CE(sat)} < 200mV @ 1A$
- $R_{CE(sat)} = 68m\Omega$  for a low equivalent on-resistance
- $h_{FE}$  characterised up to 6A for high current gain hold-up
- Complementary PNP type: FMMT720
- **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**
- **PPAP capable (Note 4)**

**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**

- MOSFET Gate Driving
- DC-DC / DC-AC Converters
- Regulator
- LED driver
- Motor Control

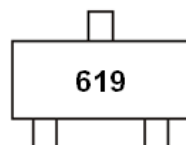


**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT619TA	AEC-Q101	619	7	8	3,000
FMMT619QTA	Automotive	619	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> 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
  5. For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**



619 = Product Type Marking Code

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

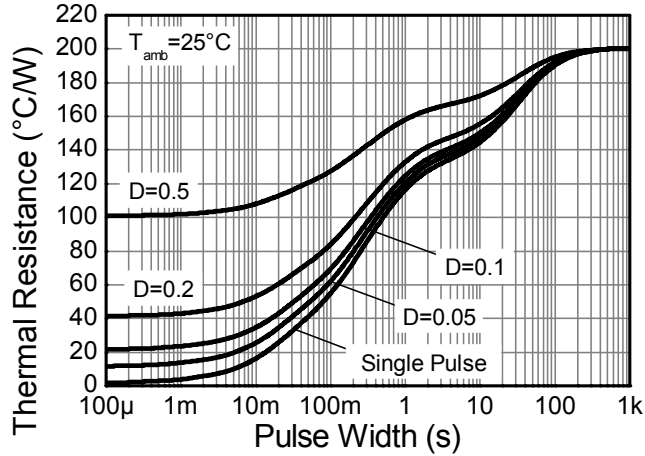
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	50	V
Collector-Emitter Voltage	$V_{CEO}$	50	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	2	A
Peak Pulse Current	$I_{CM}$	6	A
Base Current	$I_B$	500	mA

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

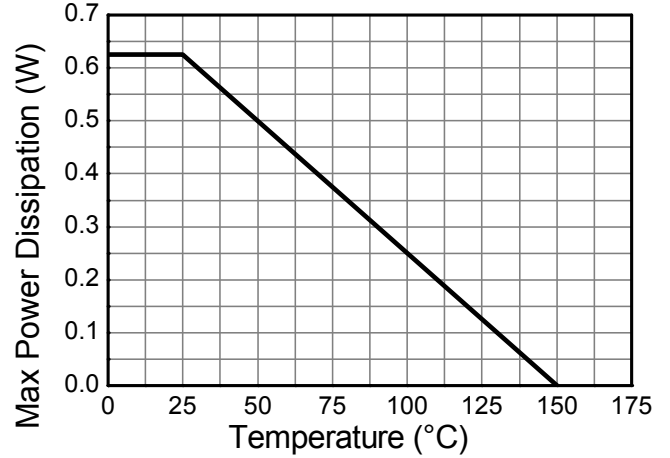
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	$P_D$	625	mW
Power Dissipation (Note 7)	$P_D$	806	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	155	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	194	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
- 6. For a device surface mounted on 25mm X 25mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - 7. Same as note 6, except the device is measured at  $t \leq 5$  sec.
  - 8. Thermal resistance from junction to solder-point (at the end of the collector lead).

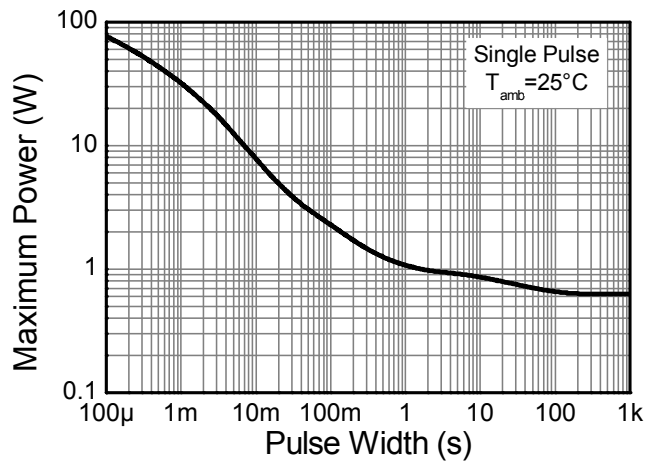
**Thermal Characteristics and Derating information**



**Transient Thermal Impedance**



**Derating Curve**



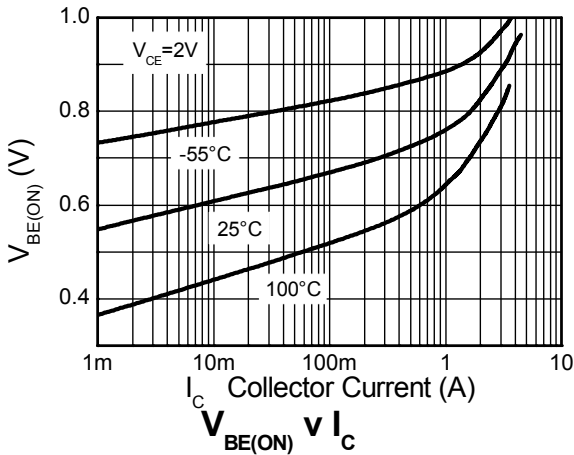
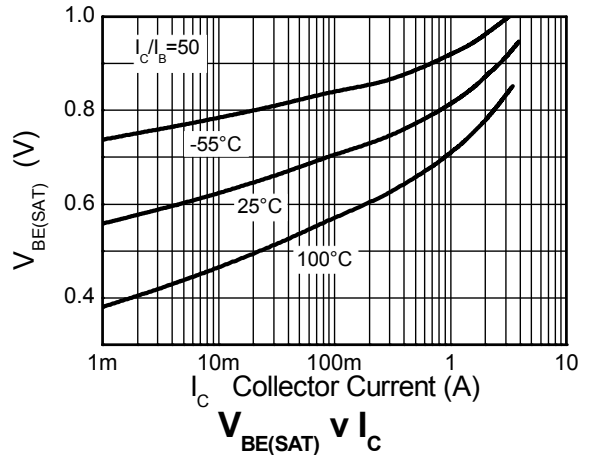
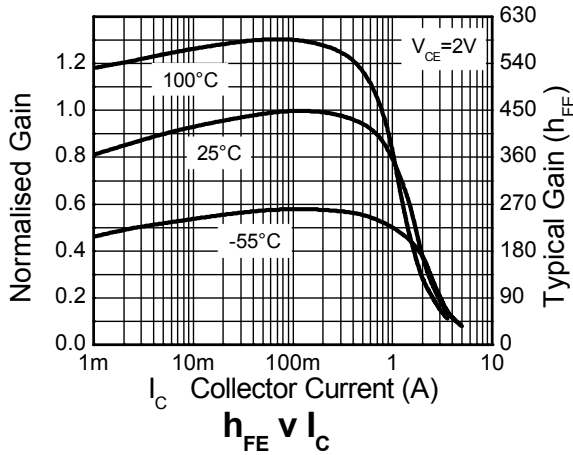
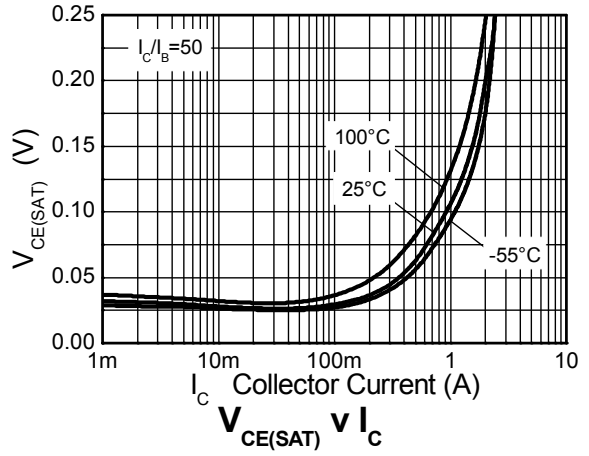
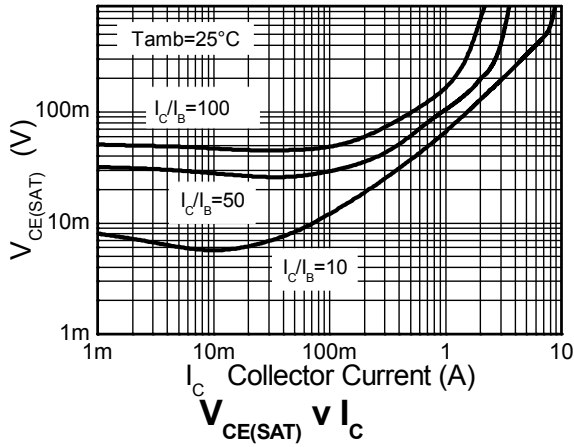
**Pulse Power Dissipation**

**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 9)	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 9)</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 Saturation 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

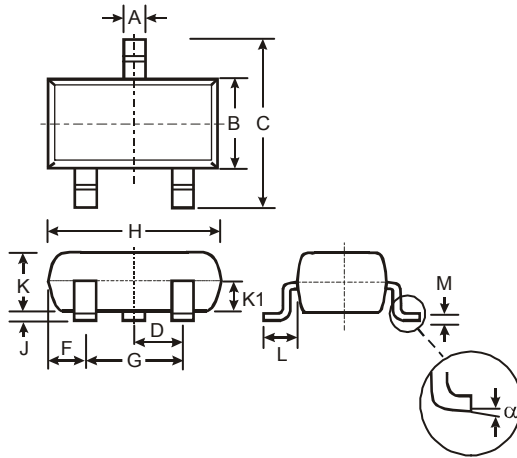
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

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



### Package Outline Dimensions

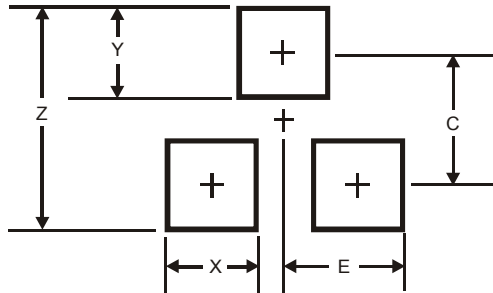
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	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

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