





#### 20V NPN SILICON LOW SATURATION TRANSISTOR IN SOT23

#### **Features**

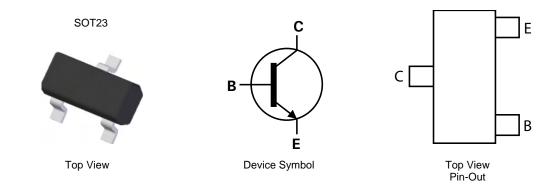
- BV<sub>CEO</sub> > 20V
- I<sub>C</sub> = 2.5A Continuous Collector Current
- $R_{CE(SAT)} = 50 m\Omega$  for a low equivalent On-Resistance
- 625mW Power dissipation
- h<sub>FE</sub> characterised up to 6A for high current gain hold up
- Complementary NPN type: FMMT718
- Totally Lead-Free & Fully RoHS 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
- Weight 0.008 grams (approximate)

#### **Applications**

- DC-DC Modules
- Gate driver
- LED driver



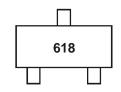
#### Ordering Information (Note 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT618TA	AEC-Q101	618	7	8	3,000
FMMT618QTA	Automotive	618	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.
- 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**



618 = Product Type Marking Code



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	20	V
Collector-Emitter Voltage	V <sub>CEO</sub>	20	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	Ic	2.5	Α
Peak Pulse Current	I <sub>CM</sub>	6	Α
Base Current	I <sub>B</sub>	500	mA

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

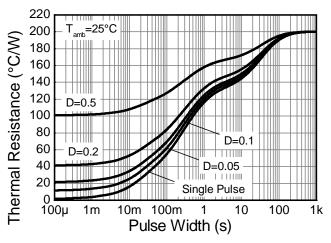
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	625	mW
Power Dissipation (Note 7)	P <sub>D</sub>	806	mW
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	200	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R <sub>θJA</sub>	155	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R <sub>0JL</sub>	194	°C/W
Operating and Storage Temperature Range	T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C

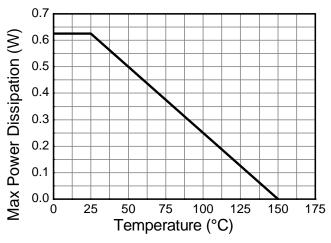
Notes

- 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 ≤ 5 sec.
- 8. Thermal resistance from junction to solder-point (at the end of the collector lead).



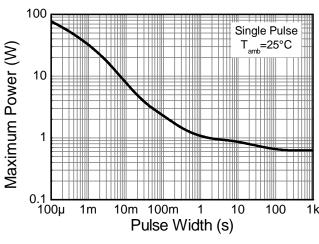
## **Thermal Characteristics and Derating information**

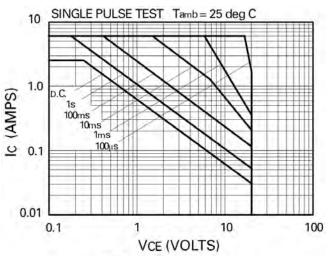




### **Transient Thermal Impedance**







**Pulse Power Dissipation** 

Safe Operating Area





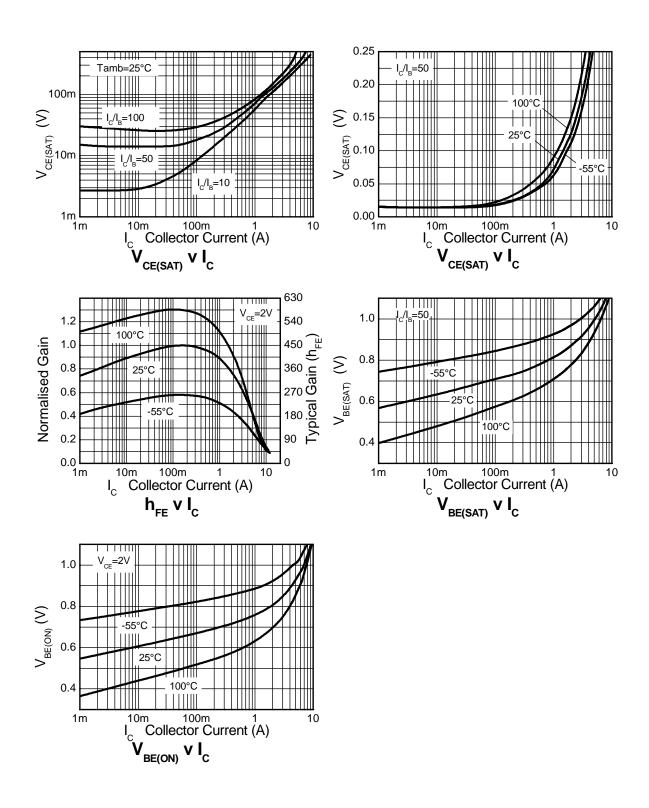
## **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	20	100	-	V	$I_{C} = 100 \mu A$
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	20	27	-	V	$I_C = 10mA$
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.3	-	V	$I_E = 100\mu A$
Collector Cut-off Current	I <sub>CBO</sub>	-	-	100	nA	V <sub>CB</sub> =20V
Emitter Cut-off Current	I <sub>EBO</sub>	-	-	100	nA	$V_{EB} = 4V$
Collector Emitter Cut-off Current	I <sub>CES</sub>	-	-	100	nA	V <sub>CES</sub> =20V
Static Forward Current Transfer Ratio (Note 9)	h <sub>FE</sub>	200 300 200 100	400 450 340 150	- - -	-	$\begin{split} &I_{C} = 10\text{mA}, \ V_{CE} = 2\text{V} \\ &I_{C} = 200\text{mA}, \ V_{CE} = 2\text{V} \\ &I_{C} = 2\text{A}, \ V_{CE} = 2\text{V} \\ &I_{C} = 6\text{A}, \ V_{CE} = 2\text{V} \end{split}$
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>		8 70 130	15 150 200	mV	$I_C$ =0.1A, $I_B$ = 10mA $I_C$ =1A, $I_B$ = 10mA $I_C$ =2.5A, $I_B$ = 50mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	-	0.89	1.0	V	$I_C = 2.5A$ , $I_B = 50mA$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(on)}$	-	0.83	1.0	V	I <sub>C</sub> =2.5A, V <sub>CE</sub> = 2V
Transition Frequency	f⊤	100	140	-	MHz	$I_C = 50$ mA, $V_{CE} = 10$ V, $f=100$ MHz
Collector Output Capacitance	C <sub>obo</sub>	-	23	30	pF	V <sub>CB</sub> = 10V, f=1MHz
Turn-On Time	t <sub>(on)</sub>	-	170	-	ns	$V_{CC} = 10V, I_C = 1A,$
Turn-Off Time	t <sub>(off)</sub>	-	400	-	ns	$I_{B1} = -I_{B2} = 10mA$

Notes: 9. Measured under pulsed conditions. Pulse width  $\leq$  300 $\mu$ s. Duty cycle  $\leq$  2%



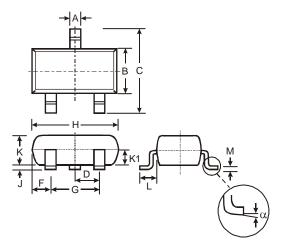
### Typical Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)





## **Package Outline Dimensions**

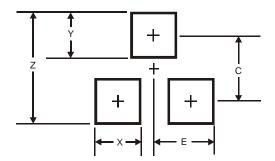
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23					
Dim	Min	Max	Тур		
Α	0.37	0.51	0.40		
В	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		
Ι	2.80	3.00	2.90		
7	0.013	0.10	0.05		
K	0.903	1.10	1.00		
<b>K</b> 1	-	-	0.400		
L	0.45	0.61	0.55		
М	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
Х	0.8
Υ	0.9
С	2.0
E	1.35





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