FMMT593

100V PNP HIGH VOLTAGE TRANSISTOR IN SOT23

Features

- BV_{CEO} > -100V
- I_C = -1A high Continuous Collector Current
- I_{CM} = -2A Peak Pulse Current
- Low Saturation Voltage
- Excellent h_{FE} Characteristics up to I_C = -1A
- Complementary NPN Type: FMMT493
- **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

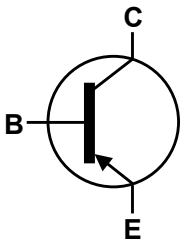
- Case: SOT23
- Case Material: molded plastic, "Green" molding compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight 0.008 grams (approximate)

Applications

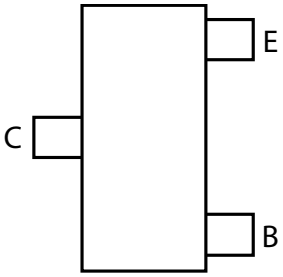
- High-side driver
- Load disconnect switch
- Motor drive

SOT23

Top View



Device Symbol



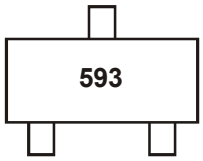
Top View
Pin-Out

Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT593TA	AEC-Q101	593	7	8	3,000
FMMT593QTA	Automotive	593	7	8	3,000
FMMT593TC	AEC-Q101	593	13	8	10,000

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



593 = Product Type Marking Code

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

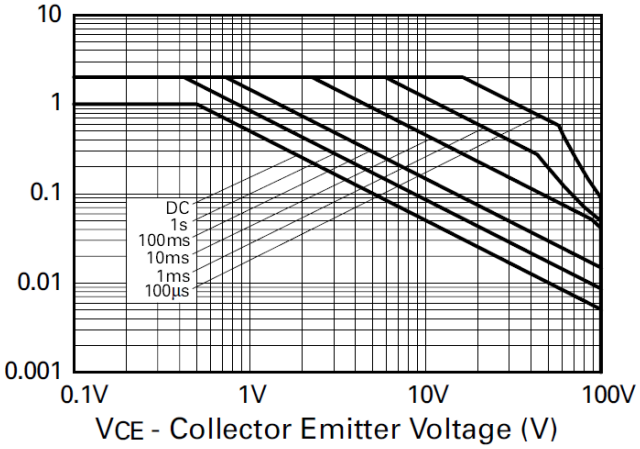
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-120	V
Collector-Emitter Voltage	V_{CEO}	-100	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-1	A
Peak Pulse Current	I_{CM}	-2	A
Continuous Base Current	I_B	-200	mA

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

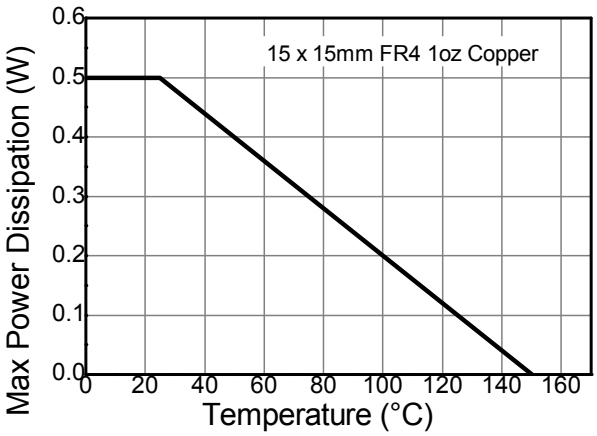
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	500	mW
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	250	°C/W
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	197	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 6. For a device surface mounted on 15mm X 15mm 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. Thermal resistance from junction to solder-point (at the end of the collector lead).

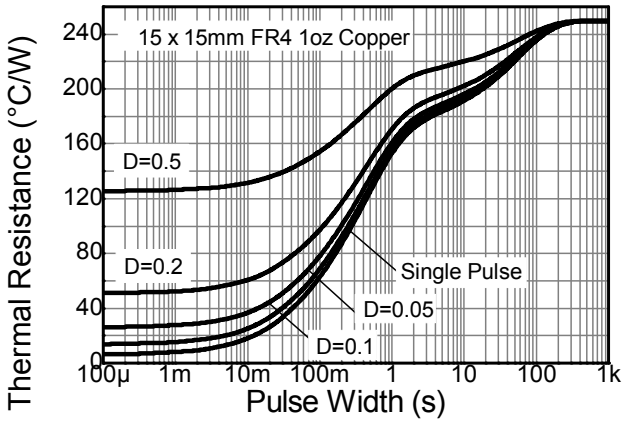
Thermal Characteristics and Derating Information



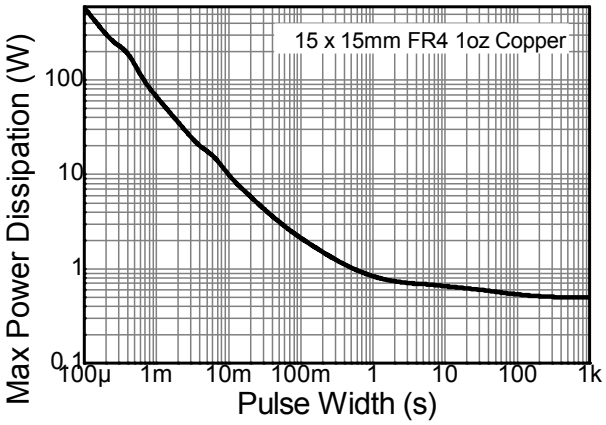
Safe Operating Area



Derating Curve



Transient Thermal Impedance



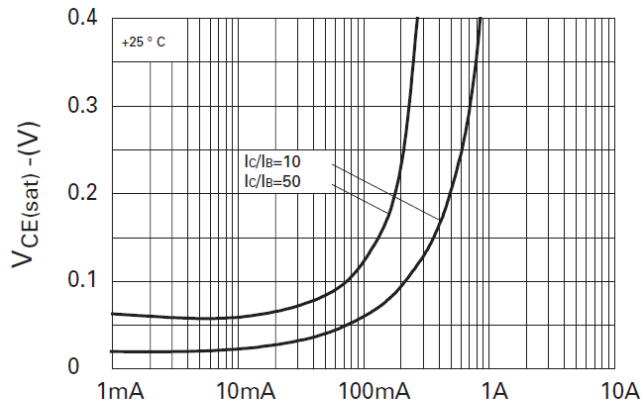
Pulse Power Dissipation

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

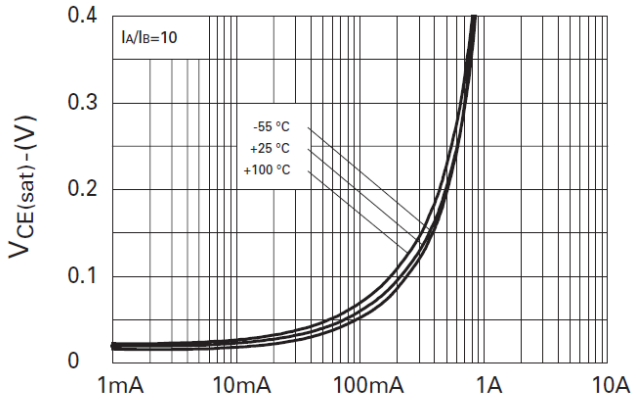
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-120	—	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	-100	—	—	V	I_C = -1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	—	—	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	—	—	-100	nA	V_{CB} = -100V
Emitter Cutoff Current	I_{EBO}	—	—	-100	nA	V_{EB} = -5.6V
Collector-Emitter Cut-Off Current	I_{CES}	—	—	-100	nA	V_{CES} = -100V
Static Forward Current Transfer Ratio (Note 8)	h_{FE}	100 100 100 50	—	— — 300 —	—	I_C = -1mA, V_{CE} = -5V I_C = -250mA, V_{CE} = -5V I_C = -500mA, V_{CE} = -5V I_C = -1A, V_{CE} = -5V
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	—	-200 -300	mV	I_C = - 250mA, I_B = -25mA I_C = - 500mA, I_B = -50mA
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$	—	—	-1.1	V	I_C = -500mA, I_B = -50mA
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(on)}$	—	—	-1.0	V	I_C = -1mA, V_{CE} = -5V
Transition Frequency	f_T	50	—	—	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Output Capacitance	C_{obo}	—	—	5	pF	V_{CB} = -10V, f = 1MHz

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

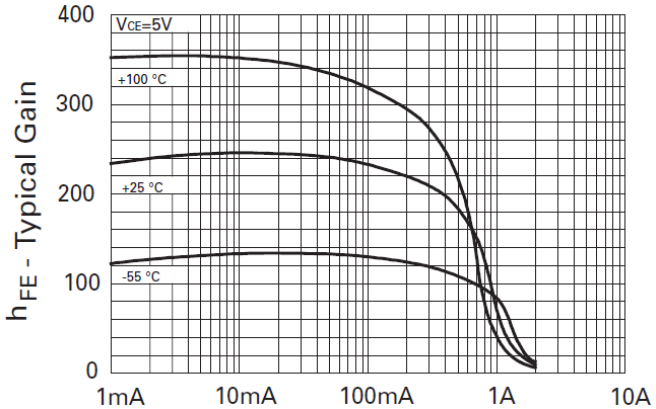
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



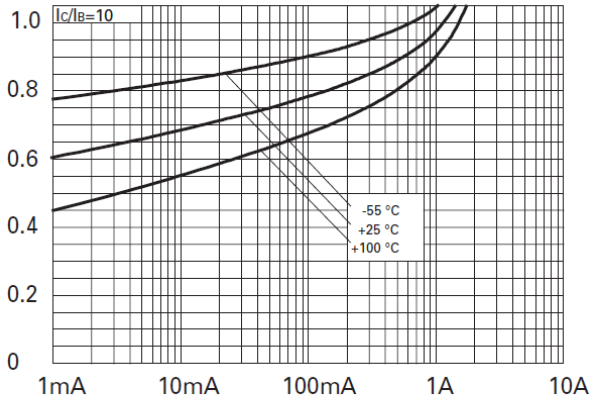
VCE(sat) v IC



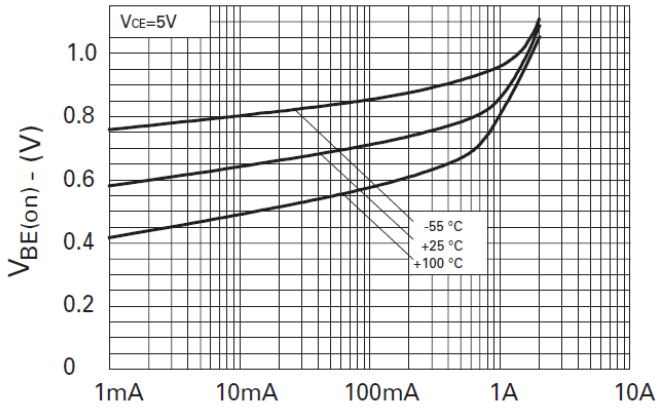
VCE(sat) v IC



hFE V IC



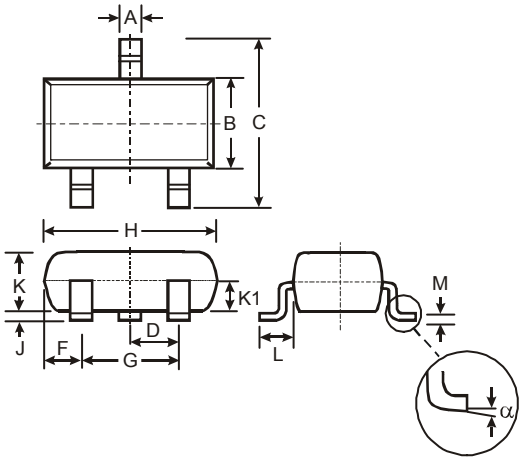
VBE(sat) v IC



VBE(on) v IC

Package Outline Dimensions

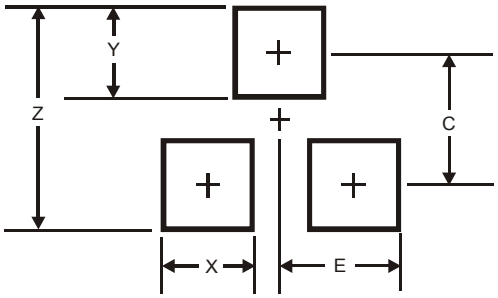
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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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