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: FMMT493Q
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMT593Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

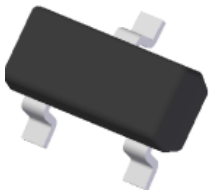
Mechanical Data

- 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)

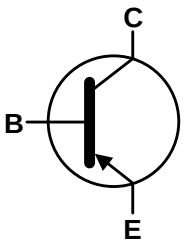
Applications

- High-Side Drivers
- Load Disconnect Switches
- Motor Drives

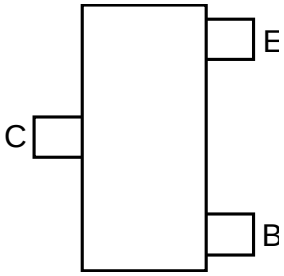
SOT23



Top View



Device Symbol



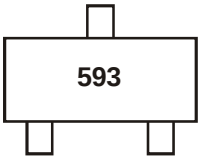
Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FMMT593QTA	Automotive	593	7	8	3000
FMMT593QTC	Automotive	593	13	8	10,000

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



593 = Product Type Marking Code

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

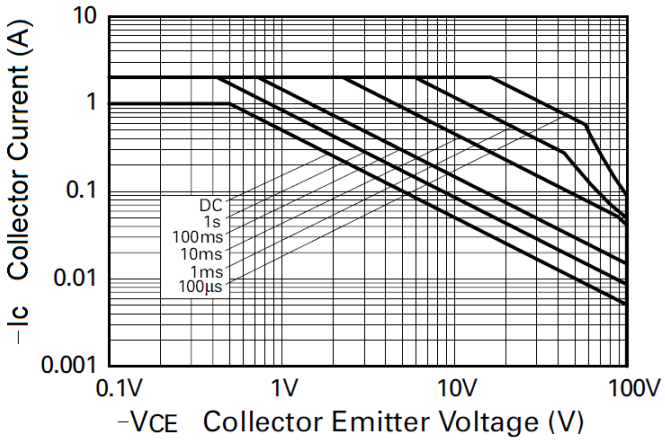
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-120	V
Collector-Emitter Voltage	V_{CEO}	-100	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-1	A
Peak Pulse Current	I_{CM}	-2	A
Continuous Base Current	I_B	-200	mA

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

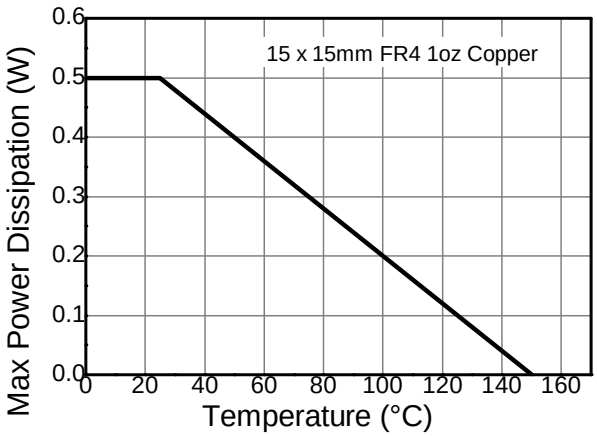
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	500	mW
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\Theta JA}$	250	°C/W
Thermal Resistance, Junction to Lead	(Note 6)	$R_{\Theta JL}$	197	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. For a device surface mounted on 15mm × 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.
6. Thermal resistance from junction to solder-point (at the end of the collector lead).

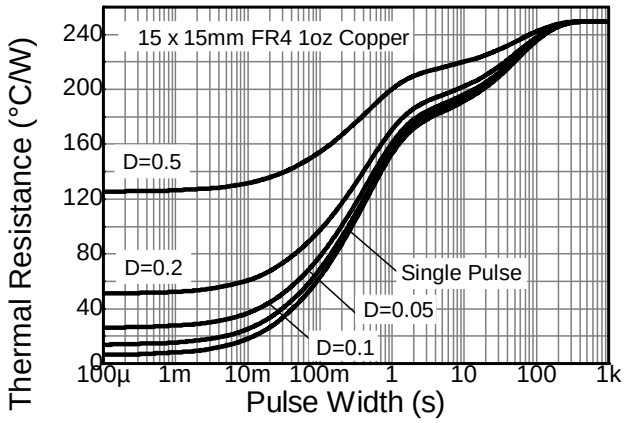
Thermal Characteristics and Derating Information



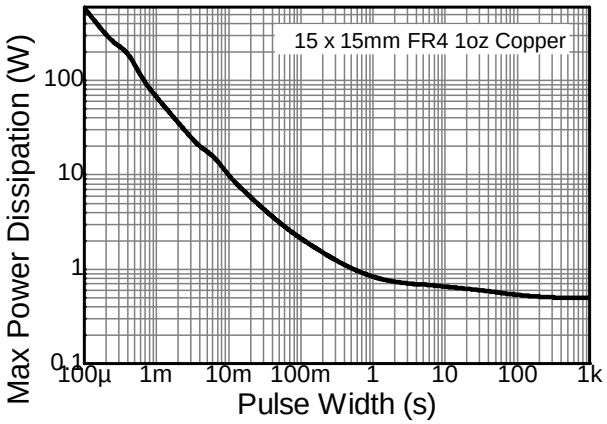
Safe Operating Area



Derating Curve



Transient Thermal Impedance



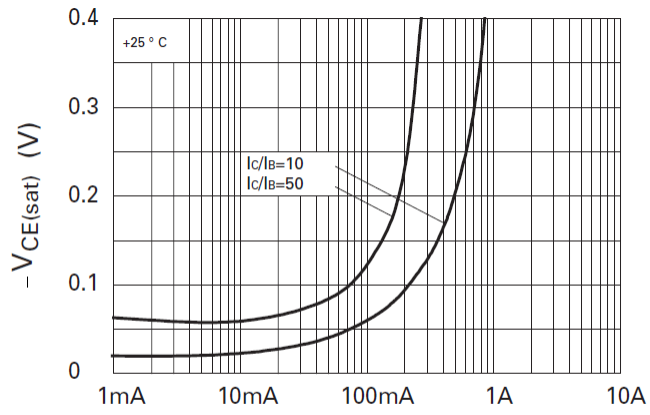
Pulse Power Dissipation

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

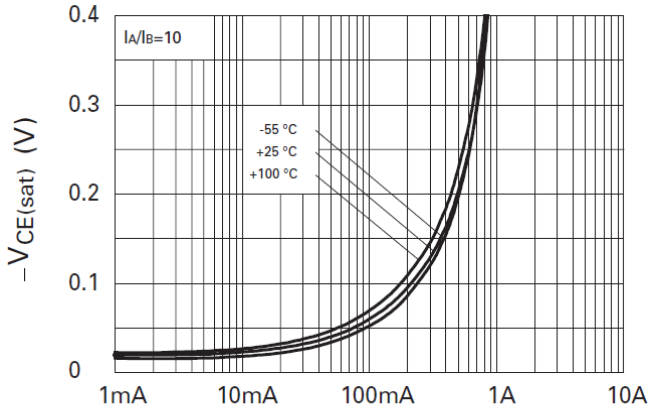
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-120	—	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-100	—	—	V	I_C = -1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	—	—	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	—	—	-100	nA	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 7)	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 7)	$V_{CE(sat)}$	—	—	-200 -300	mV	I_C = - 250mA, I_B = -25mA I_C = - 500mA, I_B = -50mA
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(sat)}$	—	—	-1.1	V	I_C = -500mA, I_B = -50mA
Base-Emitter Turn-On Voltage (Note 7)	$V_{BE(on)}$	—	—	-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}	—	—	10	pF	V_{CB} = -20V, f = 1MHz

Notes: 7. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

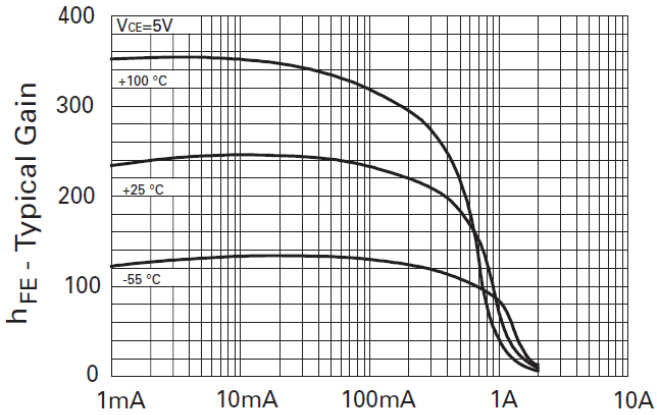
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



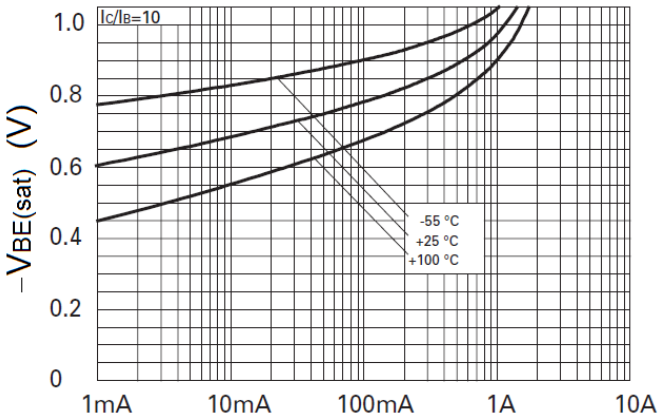
VCE(sat) v IC



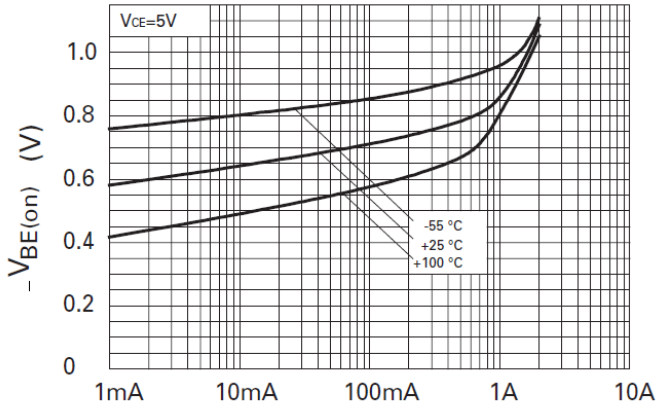
VCE(sat) v IC



hFE V IC



VBE(sat) v IC

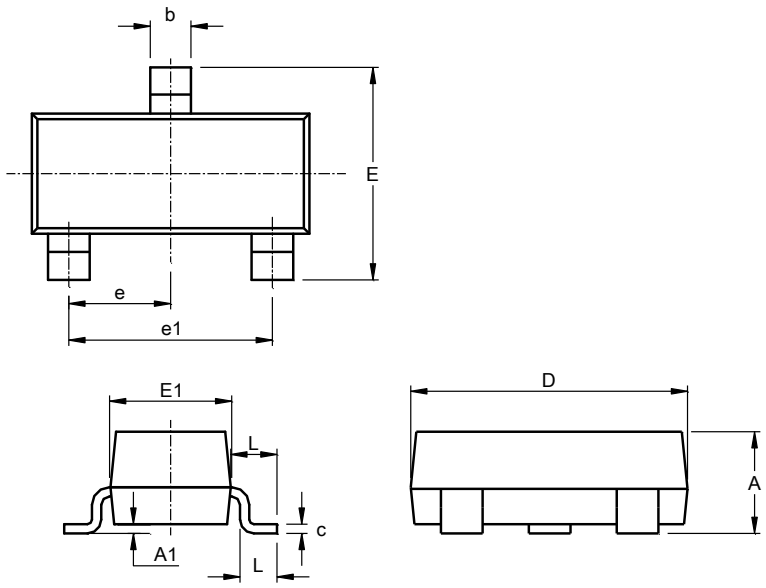


VBE(on) v IC

Package Outline Dimensions

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

SOT23 (Type DN)

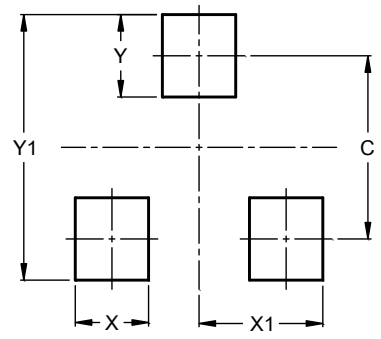


SOT23 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

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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