200V PNP HIGH VOLTAGE TRANSISTOR IN SOT23

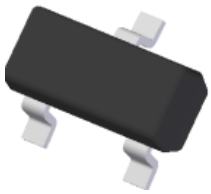
Features

- BV_{CEO} > -200V
- I_C = -0.3A Continuous Collector Current
- I_{CM} = -1A Peak Pulse Current
- 500mW power dissipation
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The FMMT596Q 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/

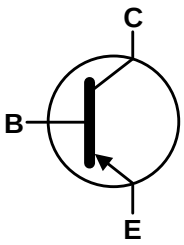
Mechanical Data

- 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)

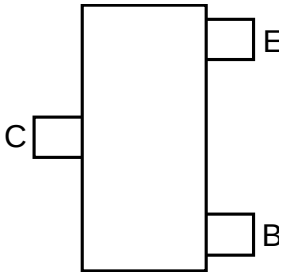
SOT23



Top View



Device Symbol



Top View
Pin-Out

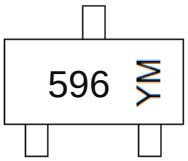
Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT596QTA	Automotive	596	7	8	3,000

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

SOT23



596 = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: I = 2021)
M or $\overline{M}$ = Month (ex: 9 = September)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-220	V
Collector-Emitter Voltage	V_{CEO}	-200	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-0.3	A
Peak Pulse Current	I_{CM}	-1	A
Base Current	I_B	-200	mA

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

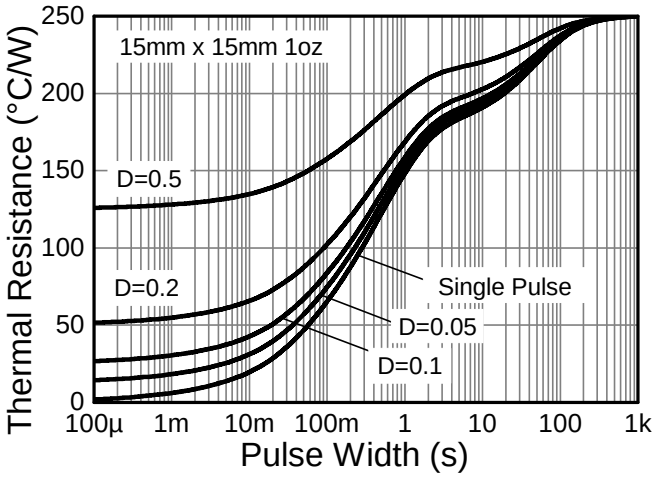
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	500	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	250	°C/W
Thermal Resistance, Junction to Leads (Note 6)	$R_{\theta JL}$	197	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 7)

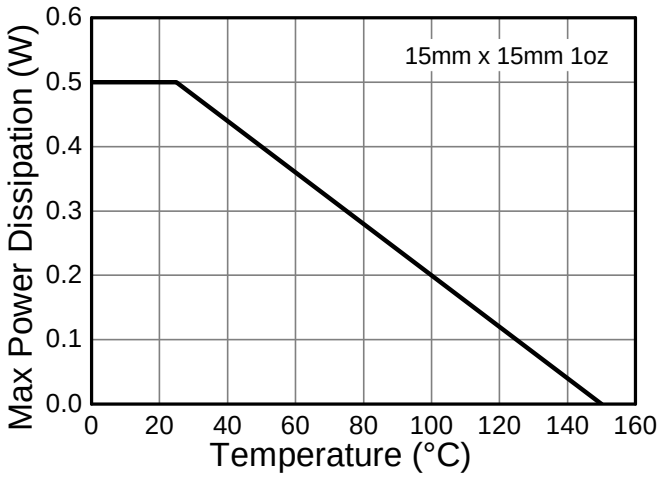
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge - Charged Device Model	ESD CDM	1,000	V	C3

Notes:
5. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Thermal resistance from junction to solder-point (at the end of the collector lead).
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

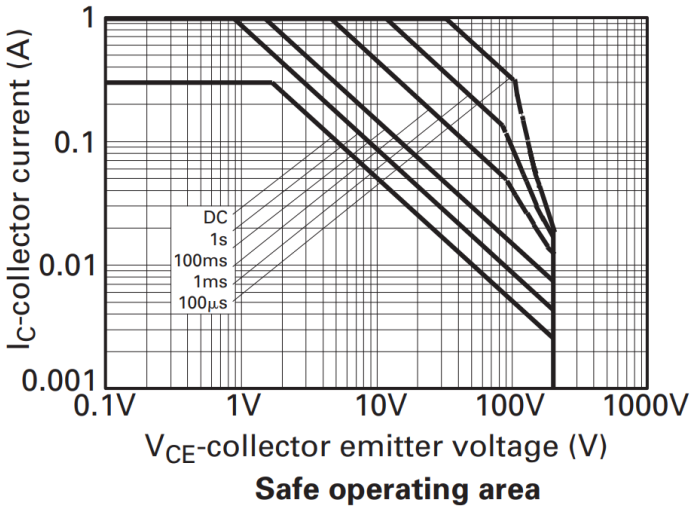
Thermal Characteristics and Derating information



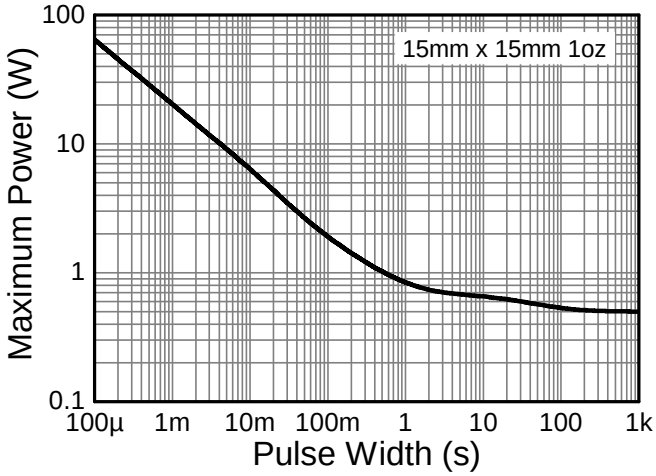
Transient Thermal Impedance



Derating Curve



Safe operating area



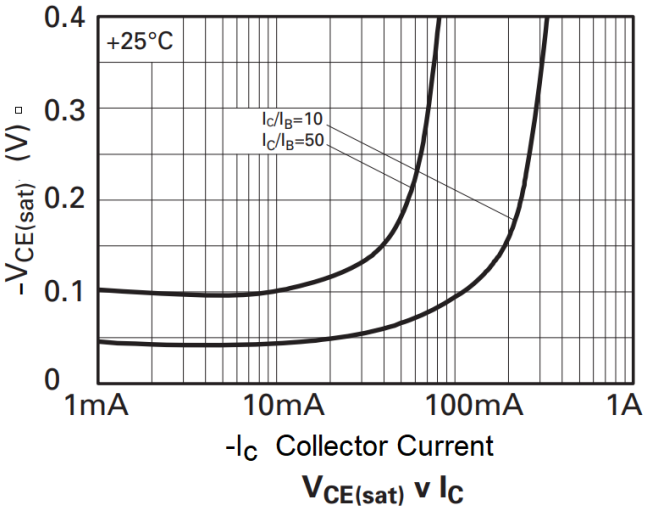
Pulse Power Dissipation

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

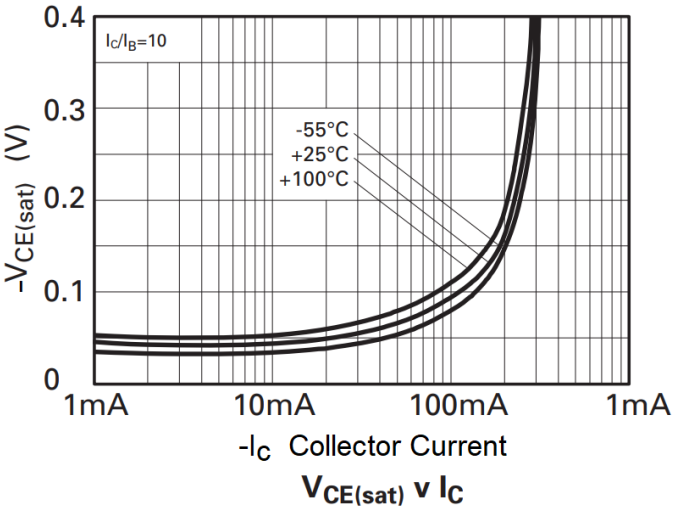
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-220	-	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	-200	-	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-	-	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	V_{CB} = -200V
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	V_{EB} = -5V
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	V_{CES}= -200V
Static Forward Current Transfer Ratio (Note 8)	h_{FE}	100	-	-	-	I_C = -1mA, V_{CE} = -10V
		100	-	-		I_C = -100mA, V_{CE} = -10V
		85	-	300		I_C = -250mA, V_{CE} = -10V
		35	-	-		I_C = -400mA, V_{CE} = -10V
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	-	-	-0.2	V	I_C =- 100mA, I_B = -10mA
		-	-	-0.35	V	I_C = -250mA, I_B = -25mA
Base-Emitter Turn-On Voltage(Note 8)	$V_{BE(on)}$	-	-	-0.9	V	I_C = -250mA, V_{CE} = -10V
Base-Emitter Saturation Voltage(Note 8)	$V_{BE(sat)}$	-	-	-1.0	V	I_C = -250mA, I_B = -25mA
Output Capacitance	C_{obo}	-	-	10	pF	V_{CB} = -10V, f = 1MHz
Transition Frequency	f_T	150	-	-	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Switching Times	t_d	-	22	-	ns	V_{CC} = -80V, I_C = -200mA I_{B1} = -I_{B2} = -20mA
	t_r	-	19	-		
	t_s	-	472	-		
	t_f	-	70	-		
Switching Times	t_d	-	44	-	ns	V_{CC} = -80V, I_C = -100mA I_{B1} = -I_{B2} = -10mA
	t_r	-	31	-		
	t_s	-	665	-		
	t_f	-	76	-		

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

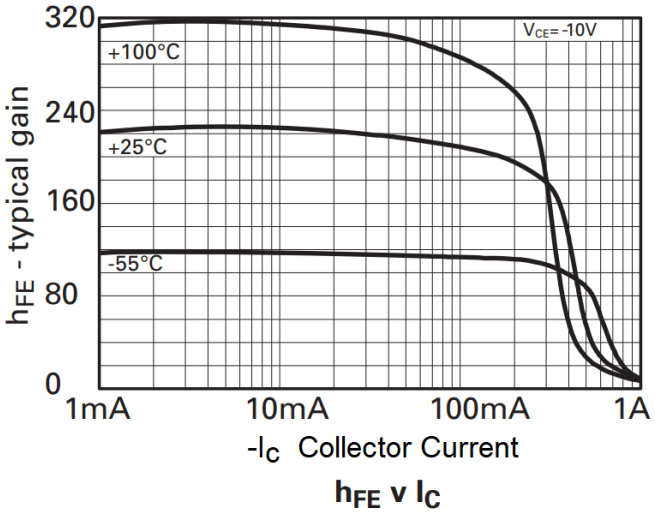
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



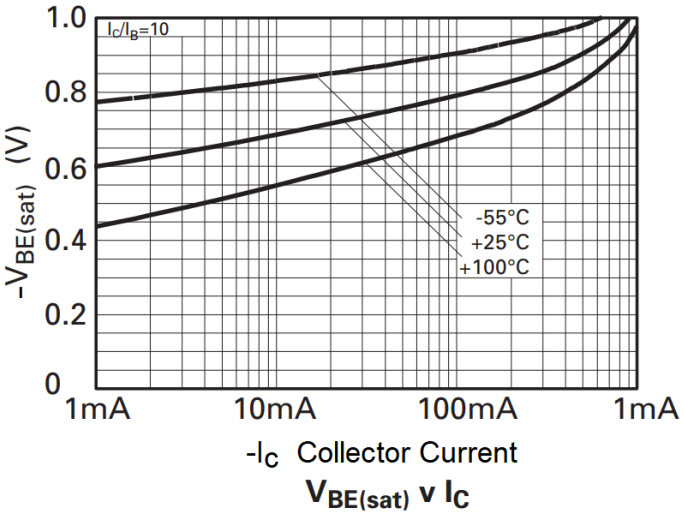
$V_{CE(sat)}$ v I_C



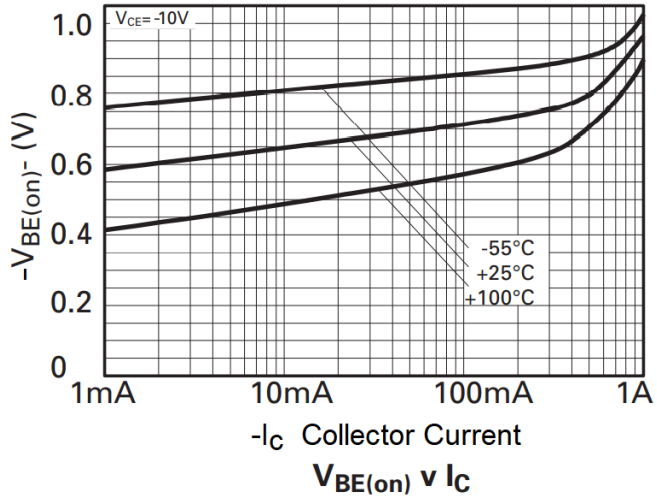
$V_{CE(sat)}$ v I_C



h_{FE} v I_C



$V_{BE(sat)}$ v I_C

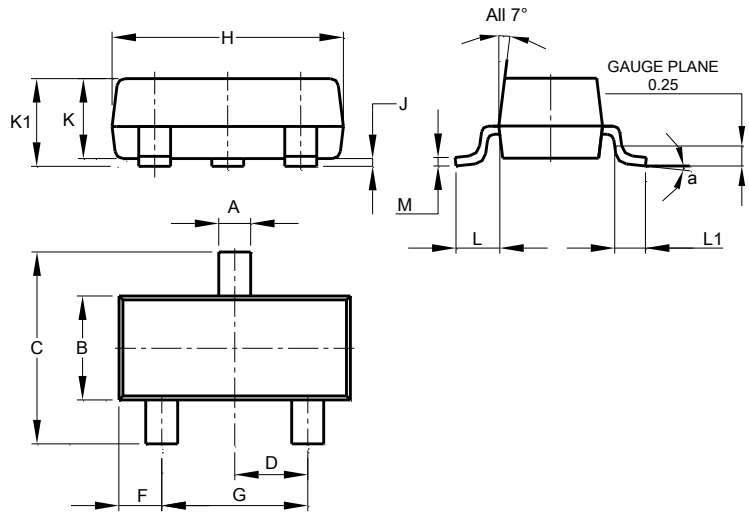


$V_{BE(on)}$ v I_C

Package Outline Dimensions

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

SOT23

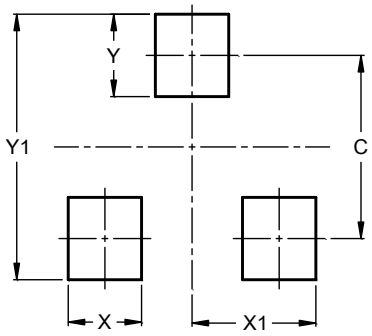


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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