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Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

Feature

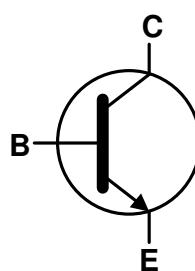
- $BV_{CEO} > 60V$
- $I_C = 1A$ Continuous Collector Current
- $I_{CM} = 2A$ Peak Pulse Current
- $R_{CE(SAT)} = 195m\Omega$ for a Low Equivalent On-Resistance
- 500mW Power Dissipation
- h_{FE} Characterized up to 2A for High Current Gain Hold Up
- Complementary PNP Type: FMMT591Q
- **Totally Lead-Free & 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

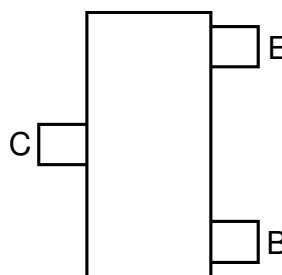
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208^③
- Weight 0.008 grams (Approximate)



Top View



Device Symbol


 Top View
 Pin-Out

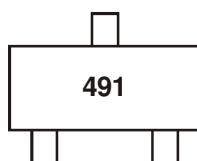
Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
FMMT491QTA	Automotive	491	7	8	3,000
FMMT491QTC	Automotive	491	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/quality/lead_free.html 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. Refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



491 = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	1	A
Peak Pulse Current	I_{CM}	2	A
Base Current	I_B	200	mA

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, 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

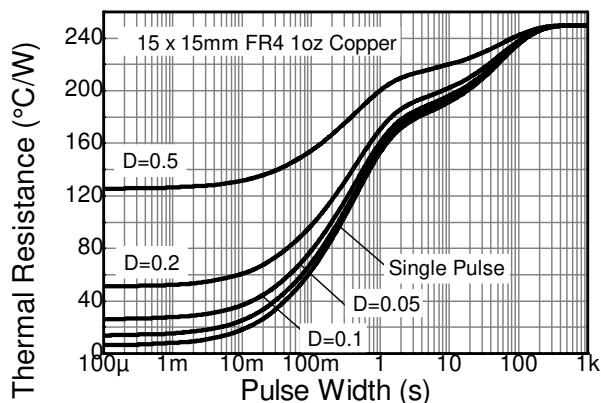
ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

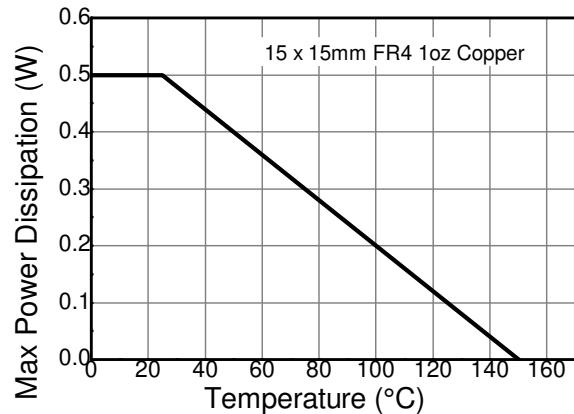
Notes:

- 6. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
- 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
- 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

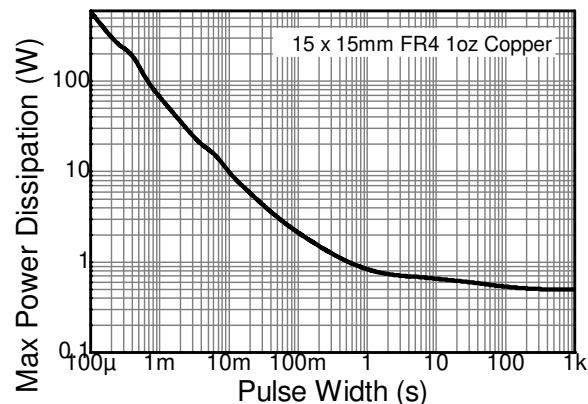
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



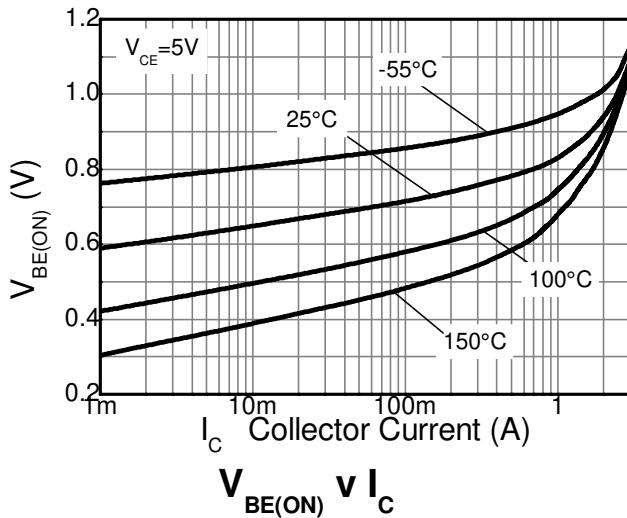
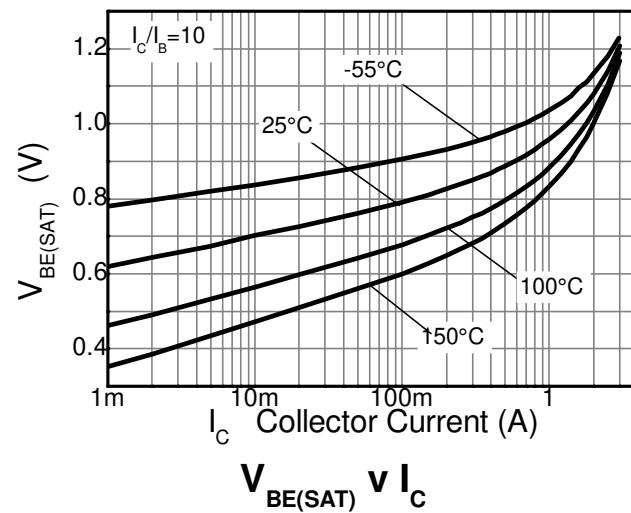
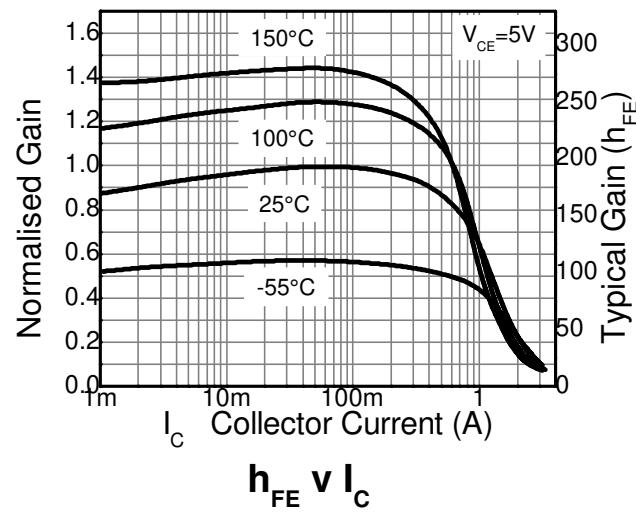
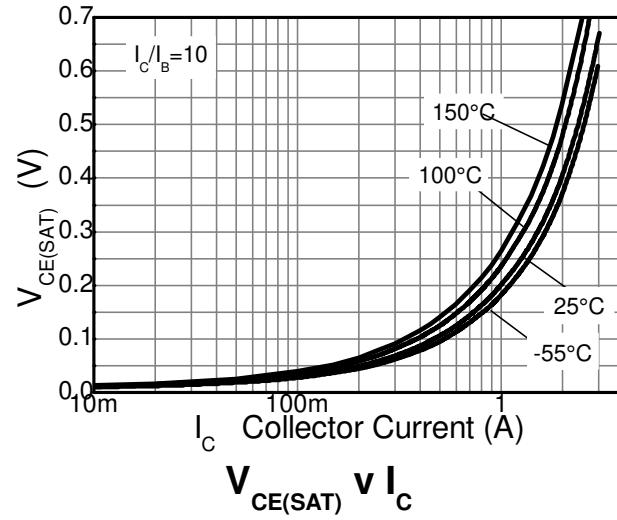
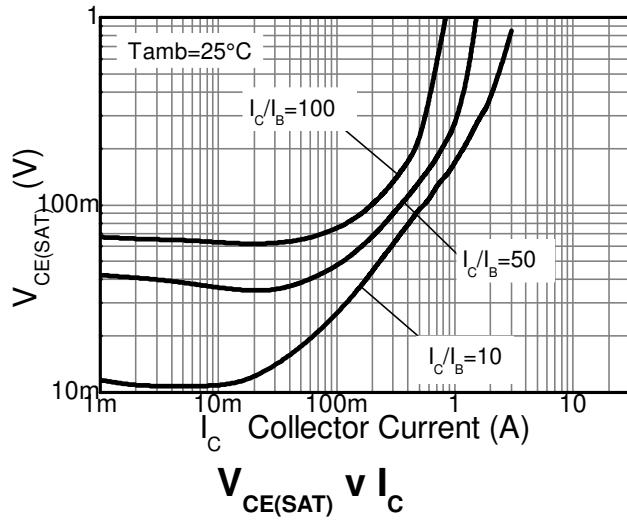
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	—	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	<1	100	nA	$V_{\text{CB}} = 60\text{V}$
Emitter Cutoff Current	I_{EBO}	—	<1	100	nA	$V_{\text{EB}} = 5.6\text{V}$
Collector Emitter Cutoff Current	I_{CES}	—	<1	100	nA	$V_{\text{CE}} = 60\text{V}, V_{\text{CES}} = 60\text{V}$
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	100	140	—	—	$I_C = 1\text{mA}, V_{\text{CE}} = 5\text{V}$
		100	150	300		$I_C = 500\text{mA}, V_{\text{CE}} = 5\text{V}$
		80	120	—		$I_C = 1\text{A}, V_{\text{CE}} = 5\text{V}$
		30	40	—		$I_C = 2\text{A}, V_{\text{CE}} = 5\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{\text{CE}(\text{SAT})}$	—	100	150	mV	$I_C = 500\text{mA}, I_B = 50\text{mA}$
		—	160	250		$I_C = 1\text{A}, I_B = 100\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{\text{BE}(\text{ON})}$	—	830	1,000	mV	$I_C = 1\text{A}, V_{\text{CE}} = 5\text{V}$
Base-Emitter Saturation Voltage (Note 9)	$V_{\text{BE}(\text{SAT})}$	—	965	1,100	mV	$I_C = 1\text{A}, I_B = 100\text{mA}$
Output Capacitance	C_{COBO}	—	—	10	pF	$V_{\text{CB}} = 10\text{V}, f = 1\text{MHz}$
Transition Frequency	f_T	150	—	—	MHz	$V_{\text{CE}} = 10\text{V}, I_C = 50\text{mA}, f = 100\text{MHz}$

Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

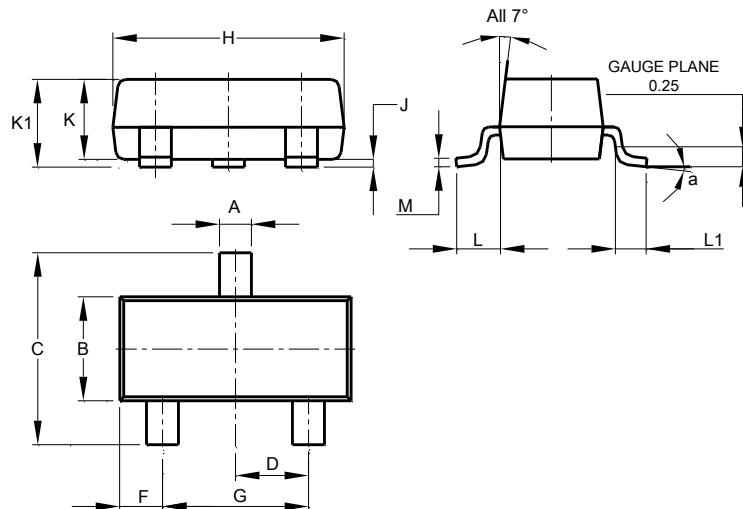
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT23



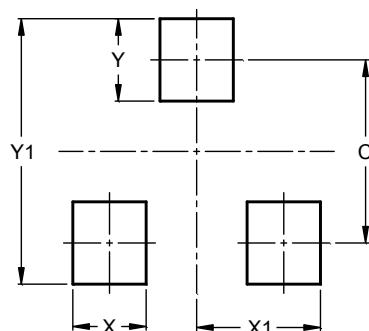
SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	—

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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