

40V NPN SILICON PLANAR MEDIUM POWER TRANSISTOR IN SOT23

Feature

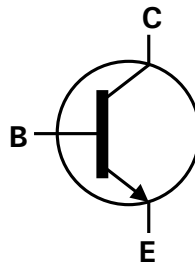
- $BV_{CEO} > 40V$
- $I_C = 1A$ Continuous Collector Current
- $I_{CM} = 2A$ Peak Pulse Current
- $R_{CE(sat)} = 195m\Omega$ for a low equivalent On-Resistance
- 500mW Power Dissipation
- h_{FE} characterised up to 2A for high current gain hold up
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

Mechanical Data

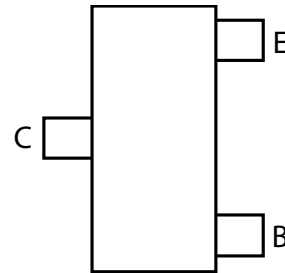
- Case: SOT23
- Case Material: molded plastic, "Green" molding compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight 0.008 grams (approximate)



Top View



Device Symbol



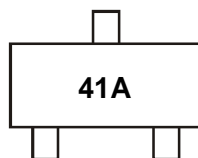
Top View
Pin-Out

Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT491ATA	AEC-Q101	41A	7	8	3,000
FMMT491ATC	AEC-Q101	41A	13	8	10,000
FMMT491AQTA	Automotive	41A	7	8	3,000
FMMT491AQTC	Automotive	41A	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



41A = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	40	V
Collector-Emitter Voltage	V _{CEO}	40	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°C, unless otherwise specified.)

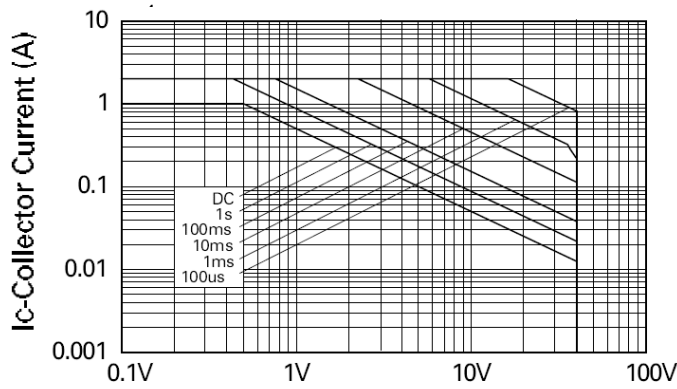
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	500	mW
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	250	°C/W
Thermal Resistance, Junction to Lead (Note 7)	R _{θJL}	197	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

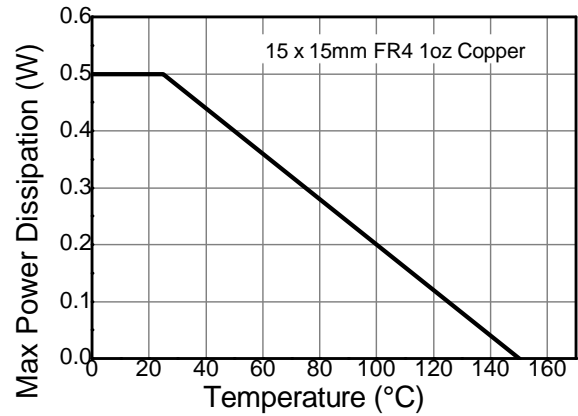
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	≥ 8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

- 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).
 - 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

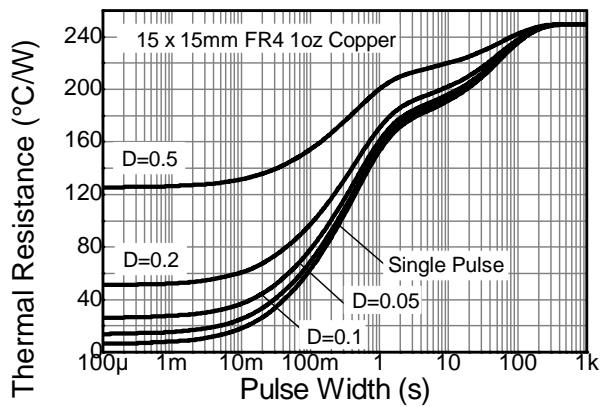
Thermal Characteristics and Derating Information



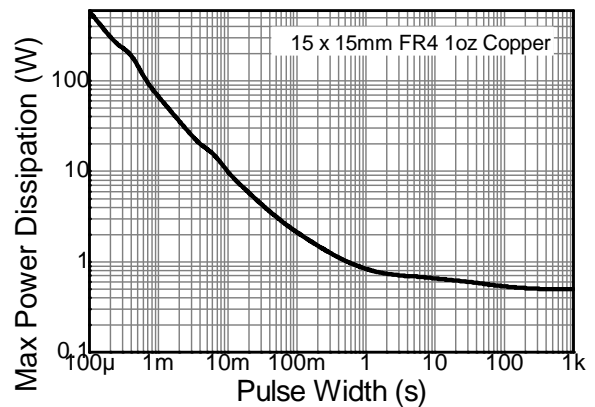
VCE - Collector Emitter Voltage (V)
Safe Operating Area



Derating Curve



Transient Thermal Impedance



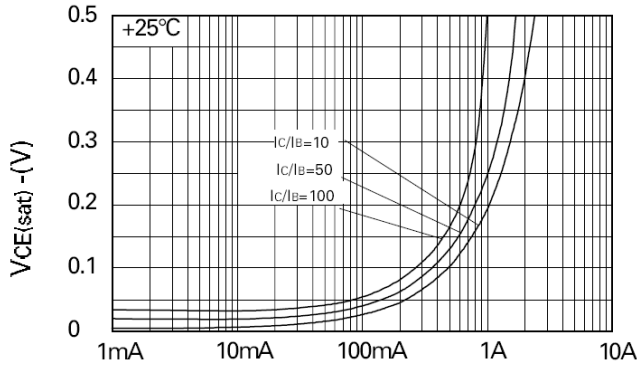
Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	40	—	—	V	$I_C = 100\mu A$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	40	—	—	V	$I_C = 10mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	—	—	V	$I_E = 100\mu A$
Collector Cutoff Current	I_{CBO}	—	—	100	nA	$V_{CB} = 30V, V_{CES} = 30V$
Emitter Cutoff Current	I_{EBO}	—	—	100	nA	$V_{EB} = 5V$
Collector Emitter Cutoff Current	I_{CES}	—	—	100	nA	$V_{CE} = 30V, V_{CES} = 30V$
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	300	—	—	—	$I_C = 1mA, V_{CE} = 5V$
		300	—	900		$I_C = 500mA, V_{CE} = 5V$
		200	—	—		$I_C = 1A, V_{CE} = 5V$
		35	—	—		$I_C = 2A, V_{CE} = 5V$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	—	0.3	V	$I_C = 500mA, I_B = 50mA$
		—	—	0.5		$I_C = 1A, I_B = 100mA$
Base-Emitter Turn-On Voltage(Note 9)	$V_{BE(on)}$	—	—	1.0	V	$I_C = 1A, V_{CE} = 5V$
Base-Emitter Saturation Voltage(Note 9)	$V_{BE(sat)}$	—	—	1.1	V	$I_C = 1A, I_B = 100mA$
Output Capacitance	C_{obo}	—	—	10	pF	$V_{CB} = 10V, f = 1MHz$
Transition Frequency	f_T	150	—	—	MHz	$V_{CE} = 10V, I_C = 50mA, f = 100MHz$

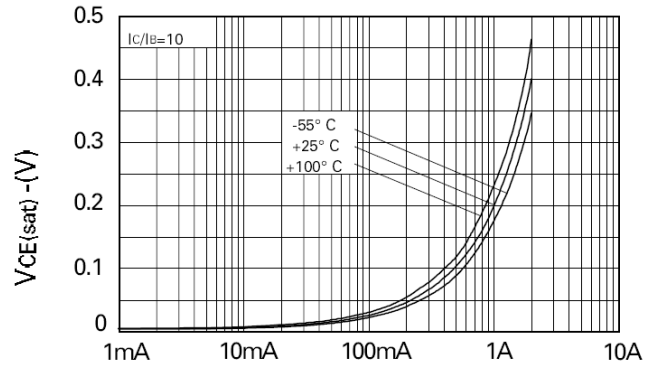
Notes: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu s$. Duty cycle $\leq 2\%$.

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



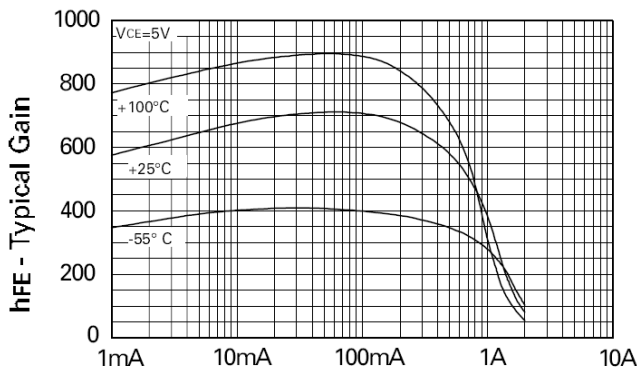
IC-Collector Current

$V_{CE(sat)} \text{ v } I_C$



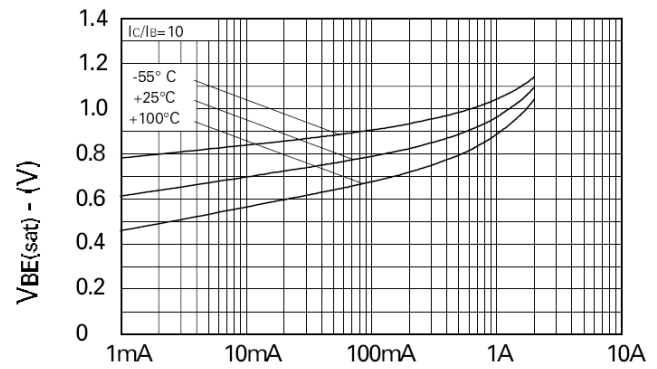
IC-Collector Current

$V_{CE(sat)} \text{ v } I_C$



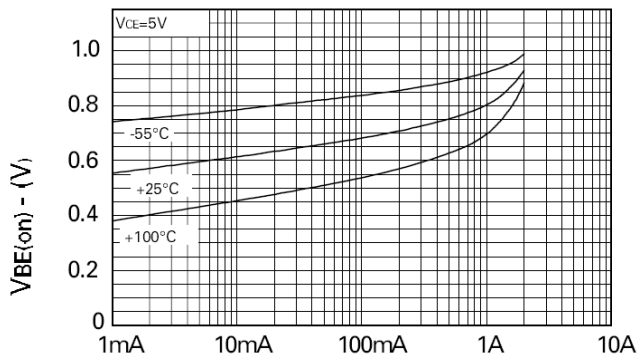
IC-Collector Current

$h_{FE} \text{ v } I_C$



IC-Collector Current

$V_{BE(sat)} \text{ v } I_C$

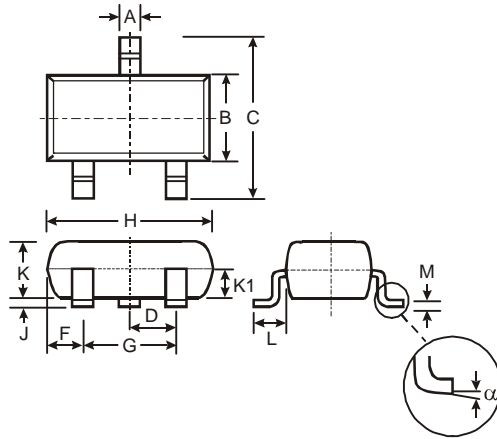


IC-Collector Current

$V_{BE(on)} \text{ v } I_C$

Package Outline Dimensions

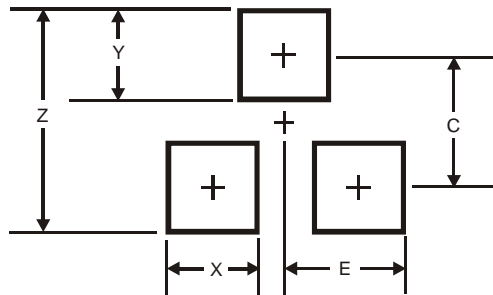
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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