




Features

- Compliant with AEC-Q200 Rev-C Stress Test Qualification for Passive Components in Automotive Applications
- Compact design to save board space - 1206 footprint
- Small size results in very fast time to react to fault events
- Symmetrical design
- Low profile
- RoHS compliant* and halogen free**
- Agency recognition: 

MF-NSMF Series - PTC Resettable Fuses

Electrical Characteristic

Model	V max. Volts	I max. Amps	I _{hold}	I _{trip}	Resistance		Max. Time To Trip		Tripped Power Dissipation
			Amperes at 23 °C		Ohms at 23 °C		Amperes at 23 °C	Seconds at 23 °C	Watts at 23 °C
			Hold	Trip	R _{Min.}	R _{1Max.}			Typ.
MF-NSMF012	30.0	10	0.12	0.29	1.35	8.50	1.0	0.20	0.4
MF-NSMF016	30.0	10	0.16	0.75	0.70	6.00	1.0	0.30	0.6
MF-NSMF020	24.0	10	0.20	0.46	0.60	2.60	1.0	0.60	0.6
MF-NSMF020X	30.0	60	0.20	0.40	0.60	3.30	1.0	0.60	0.6
MF-NSMF025X	16.0	20	0.25	0.50	0.45	2.30	8.0	0.08	0.6
MF-NSMF035	6.0	100	0.35	0.75	0.30	1.20	8.0	0.10	0.6
MF-NSMF035X	16.0	20	0.35	0.75	0.30	1.40	3.5	0.14	0.6
MF-NSMF050	13.2	100	0.50	1.00	0.15	0.70	8.0	0.10	0.4
MF-NSMF075	6.0	100	0.75	1.50	0.10	0.40	8.0	0.10	0.4
MF-NSMF110	6.0	100	1.10	2.20	0.06	0.20	8.0	0.10	0.6
MF-NSMF150	6.0	100	1.50	3.00	0.03	0.13	8.0	0.30	0.6
MF-NSMF200	6.0	100	2.00	4.00	0.02	0.085	8.0	1.00	0.7

Environmental Characteristics

Operating Temperature.....	-40 °C to +85 °C
Passive Aging.....	+85 °C, 1000 hours..... ±5 % typical resistance change
Humidity Aging.....	+85 °C, 85 % R.H. 1000 hours ±5 % typical resistance change
Thermal Shock.....	+85 °C to -40 °C, 20 times..... ±10 % typical resistance change
Solvent Resistance.....	MIL-STD-202, Method 215 No change
Vibration.....	MIL-STD-883C, Method 2007.1,..... No change Condition A
Moisture Sensitivity Level.....	1
ESD Classification (HBM).....	6

Test Procedures And Requirements For Model MF-NSMF Series

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech.	Verify dimensions and materials	Per MF physical description
Resistance.....	In still air @ 23 °C.....	$R_{min} \leq R \leq R_{1max}$
Time to Trip.....	At specified current, V _{max} , 23 °C.....	$T \leq \text{max. time to trip (seconds)}$
Hold Current.....	30 min. at I _{hold}	No trip
Trip Cycle Life.....	V _{max} , I _{max} , 100 cycles.....	No arcing or burning
Trip Endurance.....	V _{max} , 48 hours.....	No arcing or burning
Solderability.....	ANSI/J-STD-002.....	95 % min. coverage
UL File Number.....	E174545 http://www.ul.com/ Follow link to Online Certificates Directory, then enter UL File No. E174545, or click here	
TÜV Certificate Number.....	R 02057213 http://www.tuvdotcom.com/ Follow link to "other certificates", enter File No. 2057213 or click here	

* RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

**Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

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Applications

- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection
- PC motherboards - Plug and Play protection
- Mobile phones - Battery and port protection
- PDAs / digital cameras
- Game console port protection
- Automotive electronic control modules

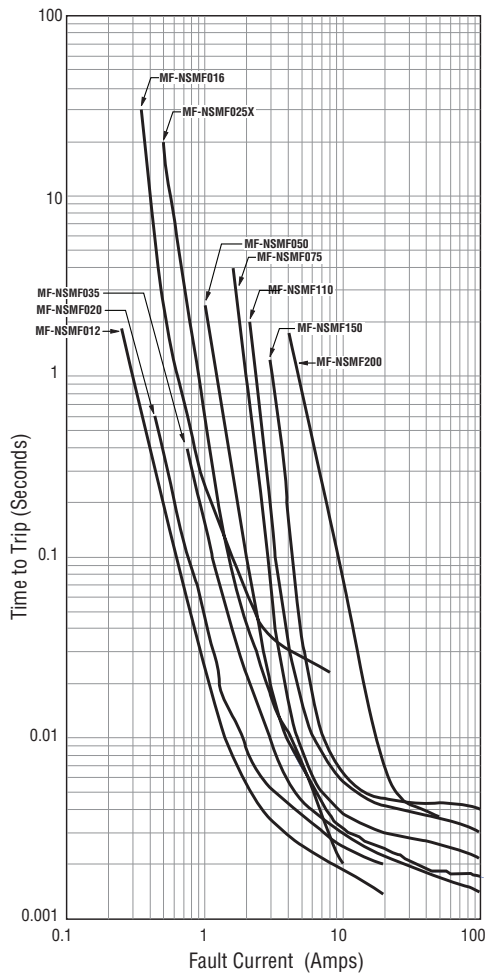
MF-NSMF Series - PTC Resettable Fuses

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Thermal Derating Chart - I_{hold} (Amps)

Model	Ambient Operating Temperature								
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C
MF-NSMF012	0.19	0.17	0.15	0.12	0.11	0.10	0.09	0.08	0.07
MF-NSMF016	0.21	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.09
MF-NSMF020	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.11
MF-NSMF020X	0.30	0.27	0.24	0.20	0.18	0.16	0.14	0.12	0.10
MF-NSMF025X	0.37	0.33	0.29	0.25	0.22	0.20	0.17	0.15	0.12
MF-NSMF035	0.51	0.46	0.40	0.35	0.30	0.27	0.24	0.22	0.18
MF-NSMF035X	0.58	0.51	0.44	0.35	0.31	0.28	0.24	0.21	0.16
MF-NSMF050	0.76	0.68	0.59	0.50	0.44	0.40	0.35	0.32	0.26
MF-NSMF075	1.11	1.00	0.85	0.75	0.67	0.61	0.52	0.50	0.42
MF-NSMF110	1.64	1.46	1.30	1.10	0.92	0.83	0.80	0.65	0.52
MF-NSMF150	2.20	1.99	1.77	1.50	1.34	1.23	1.10	1.01	0.84
MF-NSMF200	2.88	2.61	2.28	2.00	1.80	1.66	1.51	1.39	1.19

Typical Time to Trip at 23 °C



The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

How to Order

MF - NSMF 020 X - 2

Multifuse® Product Designator _____

Series _____
 NSMF = 1206 Surface Mount Component

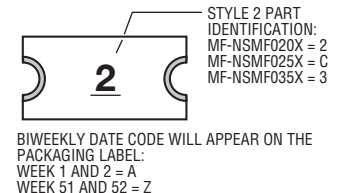
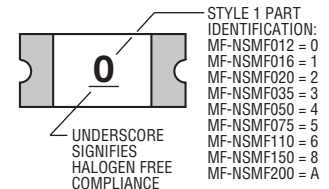
Hold Current, I_{hold} _____
 012-200 (0.12 Amps - 2.00 Amps)

Options _____
 _____ = Standard
 X = Multifuse® freeExpansion Design™

Packaging _____
 Packaged per EIA 481-1
 -2 = Tape and Reel

Typical Part Marking

Represents total content. Layout may vary.



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MF-NSMF Series - PTC Resettable Fuses

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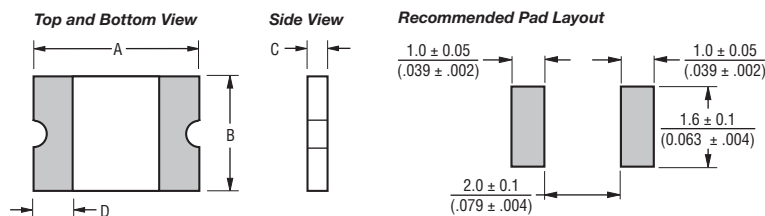
Product Dimensions

Model	A		B		C		D	Style
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
MF-NSMF012	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.70}{(0.028)}$	$\frac{1.10}{(0.043)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF016	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF020	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF020X	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.40}{(0.016)}$	$\frac{0.85}{(0.033)}$	$\frac{0.25}{(0.010)}$	2
MF-NSMF025X	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.25}{(0.010)}$	2
MF-NSMF035	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF035X	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.40}{(0.016)}$	$\frac{0.85}{(0.033)}$	$\frac{0.25}{(0.010)}$	2
MF-NSMF050	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.48}{(0.019)}$	$\frac{0.85}{(0.033)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF075	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.40}{(0.016)}$	$\frac{0.70}{(0.028)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF110	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.40}{(0.016)}$	$\frac{0.70}{(0.028)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF150	$\frac{3.00}{(0.118)}$	$\frac{3.40}{(0.134)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.40}{(0.016)}$	$\frac{0.70}{(0.028)}$	$\frac{0.25}{(0.010)}$	1
MF-NSMF200	$\frac{3.00}{(0.118)}$	$\frac{3.50}{(0.138)}$	$\frac{1.40}{(0.055)}$	$\frac{1.80}{(0.071)}$	$\frac{0.70}{(0.028)}$	$\frac{1.60}{(0.063)}$	$\frac{0.25}{(0.010)}$	1

Packaging: 3000 pcs. per reel.

DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Style 1



Terminal material:

Electroless Ni under immersion Au

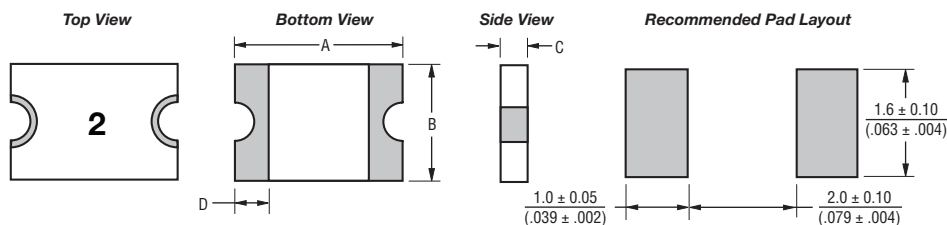
Termination pad solderability:

Standard Au finish;
Meets ANSI/J-STD-002 Category 2.

Recommended Storage:

40 °C max./70 % RH max.

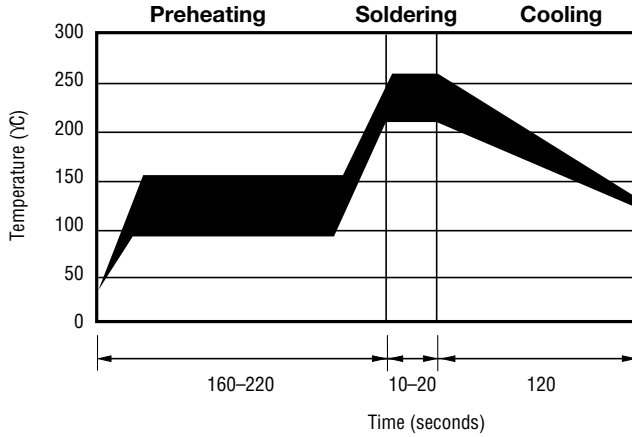
Style 2



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Solder Reflow Recommendations



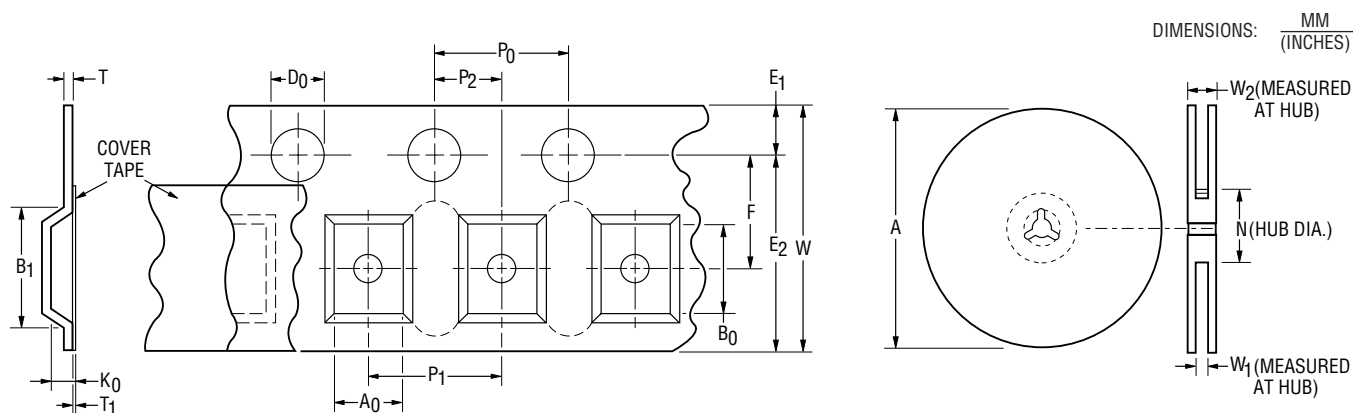
Notes:

- MF-NSMF models cannot be wave soldered. Please contact Bourns for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit, especially during hand soldering. Please refer to the Multifuse® Polymer PTC Soldering Recommendation guidelines.

MF-NSMF Series Tape and Reel Specifications

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Tape Dimensions	MF-NSMF012 & MF-NSMF200 per EIA 481-1	MF-NSMF016 ~ MF-NSMF050 per EIA 481-1	MF-NSMF075 ~ MF-NSMF150 per EIA 481-1	MF-NSMF020X, MF-NSMF025X & MF-NSMF035X per EIA 481-1
W	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)
P ₀	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)
P ₁	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)
P ₂	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)
A ₀	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)
B ₀	3.50 ± 0.10 (0.138 ± 0.004)	3.45 ± 0.10 (0.136 ± 0.004)	3.45 ± 0.10 (0.136 ± 0.004)	3.55 ± 0.10 (0.140 ± 0.004)
B ₁ max.	4.35 (0.171)	4.35 (0.171)	4.35 (0.171)	4.35 (0.171)
D ₀	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)
F	3.5 ± 0.05 (0.138 ± 0.002)	3.5 ± 0.05 (0.138 ± 0.002)	3.5 ± 0.05 (0.138 ± 0.002)	3.5 ± 0.05 (0.138 ± 0.002)
E ₁	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)
E ₂ min.	6.25 (0.246)	6.25 (0.246)	6.25 (0.246)	6.25 (0.246)
T max.	0.6 (0.024)	0.6 (0.024)	0.6 (0.024)	0.6 (0.024)
T ₁ max.	0.1 (0.004)	0.1 (0.004)	0.1 (0.004)	0.1 (0.004)
K ₀	1.35 ± 0.10 (0.053 ± 0.004)	1.04 ± 0.10 (0.041 ± 0.004)	0.85 ± 0.10 (0.033 ± 0.004)	0.80 ± 0.10 (0.032 ± 0.004)
Leader min.	390 (15.35)	390 (15.35)	390 (15.35)	390 (15.35)
Trailer min.	160 (6.30)	160 (6.30)	160 (6.30)	160 (6.30)
Reel Dimensions				
A max.	185 (7.28)	185 (7.28)	185 (7.28)	185 (7.28)
N min.	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)
W ₁	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0.0)	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0.0)	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0.0)	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0.0)
W ₂ max.	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)



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Features

- Lead free device
- RoHS compliant*
- Protects four lines
- ESD and EFT protection
- Low capacitance: <5 pF

Applications

- Portable electronics
- Cellular phones
- Video/graphics cards
- USB 2.0 interface
- Sensor interface

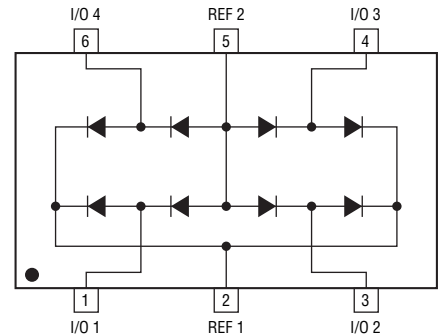
CDSOT23-SR208 — Steering Diode Array

General Information

The markets of portable communications, computing and video equipment are challenging the semiconductor industry to develop increasingly smaller electronic components.

Bourns offers Transient Voltage Suppressor Array diodes for EFT and ESD protection applications, in compact chip package SOT23-6 size format. Bourns® Chip Diodes conform to JEDEC standards, are easy to handle on standard pick and place equipment and their flat configuration minimizes roll away.

The Bourns® device will meet IEC 61000-4-2 (ESD) and IEC 61000-4-4 (EFT) requirements.



Electrical Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Min.	Nom.	Max.	Unit
Repetitive Peak Forward Current (t _p = 5 μs, F = 50 KHz)	I _{FRM}			700	mA
Continuous Power Dissipation	P _{PC}			500	mW
Forward Voltage @ 50 mA	V _F			1.2	V
Repetitive Peak Reverse Voltage @ 10 μA	V _R RM			20	V
Reverse Leakage Current @ V _{RRM} 5 V	I _R			1	μA
Capacitance ¹	C _{j(SD)}			5	pF
Forward Surge Rating (1/20 s @ 25 °C, I _F = 10 mA)	V _F			1.5	V

Note:

1. Apply a 5 V bias between pin 2 (REF 1) to pin 5 (REF 2). Measure C_j between any I/O pins to pin 5 (REF 2) and divide by two.

Thermal Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Min.	Nom.	Max.	Unit
Operating Temperature	T _J	-55	+25	+150	°C
Storage Temperature	T _{STG}	-55	+25	+150	°C

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011. Specifications are subject to change without notice.

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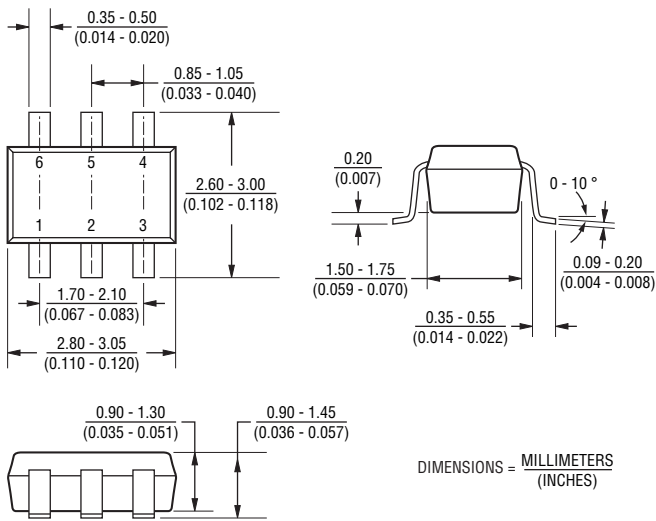
CDSOT23-SR208 — Steering Diode Array

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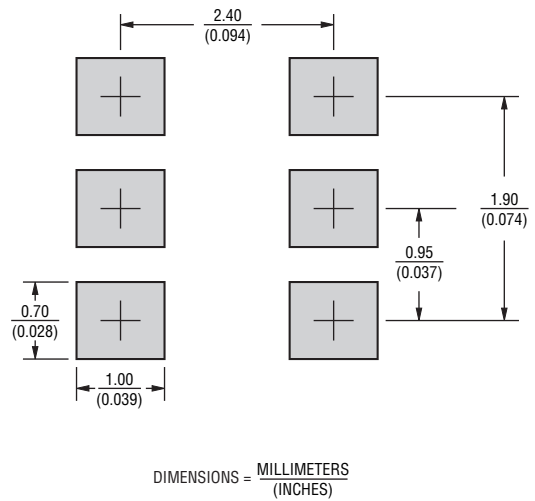
Mechanical Characteristics

This is a molded JEDEC SOT23-6 package with lead free 100 % Tin (Sn) on the lead frame. It weighs approximately 15 mg and has a flammability rating of UL 94V-0.

Product Dimensions



Recommended Footprint



How to Order

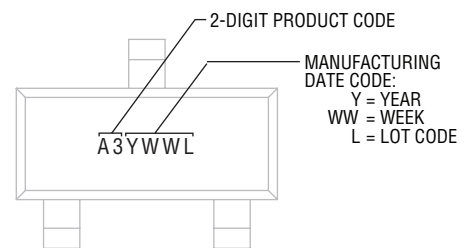
CD SOT23 - SR 208

Common Code _____
 CD = Chip Diode
 Package _____
 SOT23 = SOT23-6 Package
 Model _____
 SR = Steering Diode
 Model Number _____
 208

Environmental Specifications

Moisture Sensitivity Level1
 ESD Classification (HBM).....2

Typical Part Marking



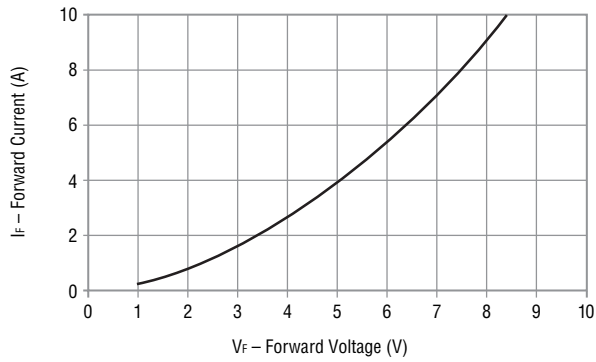
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CDSOT23-SR208 — Steering Diode Array

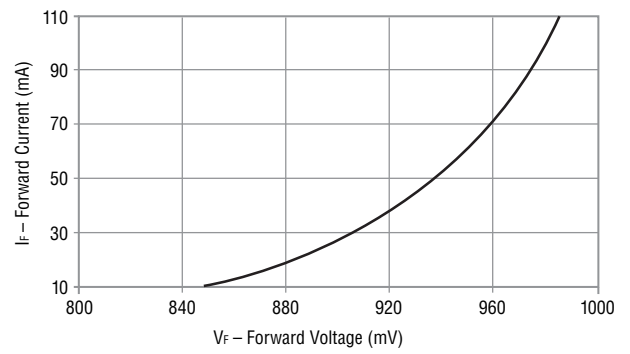
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Performance Graphs

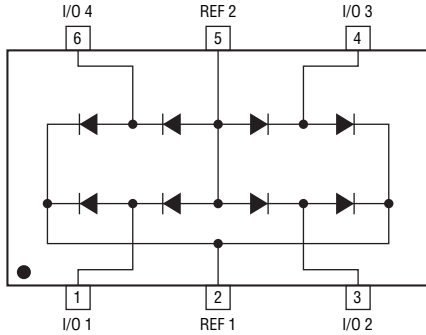
Peak Forward Current vs. Forward Voltage



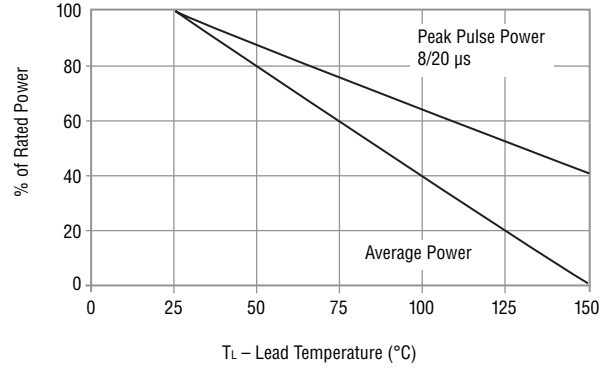
Low Forward Current vs. Forward Voltage



Block Diagram



Power Derating Curve



Specifications are subject to change without notice.

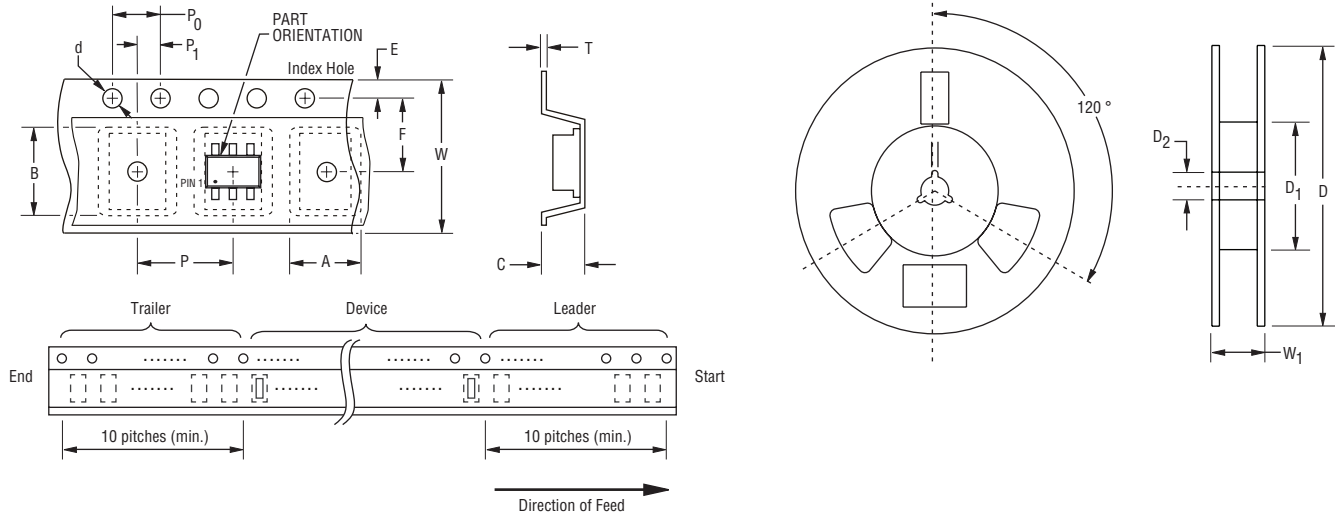
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CDSOT23-SR208 — Steering Diode Array

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Packaging Information

The product is packaged in tape and reel format per EIA-481 standard.



Item	Symbol	SOT23-6
Carrier Width	A	$\frac{3.90 \pm 0.10}{(0.154 \pm 0.004)}$
Carrier Length	B	$\frac{3.90 \pm 0.10}{(0.154 \pm 0.004)}$
Carrier Depth	C	$\frac{0.90 \pm 0.10}{(0.035 \pm 0.004)}$
Sprocket Hole	d	$\frac{1.55 \pm 0.05}{(0.061 \pm 0.002)}$
Reel Outside Diameter	D	$\frac{178}{(7.008)}$
Reel Inner Diameter	D ₁	$\frac{50.0}{(1.969)}$ MIN.
Feed Hole Diameter	D ₂	$\frac{13.0 \pm 0.20}{(0.512 \pm 0.008)}$
Sprocket Hole Position	E	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$
Punch Hole Position	F	$\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$
Punch Hole Pitch	P	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Sprocket Hole Pitch	P ₀	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$
Embossment Center	P ₁	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$
Overall Tape Thickness	T	$\frac{0.20 \pm 0.10}{(0.008 \pm 0.004)}$
Tape Width	W	$\frac{8.00 \pm 0.20}{(0.315 \pm 0.008)}$
Reel Width	W ₁	$\frac{14.4}{(0.567)}$ MAX.
Quantity per Reel	--	3000

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REV. 01/18

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