

## MC Series - DO-214



### Agency Approvals

Agency	Agency File Number
	E133083

### Pinout Designation

NOT APPLICABLE

### Schematic Symbol



### Description

The MC Series DO-214 are low capacitance SIDACtor® components designed to protect broadband equipment such as VOIP, DSL modems and DSLAMs from damaging overvoltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards while limiting the impact to broadband signals.

### Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Does not degrade surge capability after multiple surge events within limit.
- 40% lower capacitance than our Baseband Protectors, for applications that demand greater signal integrity
- RoHS Compliant and Halogen-Free
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)
- Fails short circuit when surged in excess of ratings

### Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21/45 Enhanced Level\*
- ITU K.20/21/45 Basic Level
- GR 1089 Inter-building\*
- GR 1089 Intra-building
- IEC 61000-4-5 2nd edition
- YD/T 1082
- YD/T 993
- YD/T 950

\*A-rated parts require series resistance

### Electrical Characteristics

Part Number	Marking	$V_{DRM}$ @ $I_{DRM}=5\mu A$	$V_S$ @ 100V/ $\mu s$	$I_H$	$I_S$	$I_T$	$V_T$ @ $I_T=2.2$ Amps	Capacitance @ 1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P0080SAMCLRP	P-8AM	6	25	50	800	2.2	4	10	35
P0220SAMCLRP	P02AM	15	32	50	800	2.2	4	10	35
P0300SAMCLRP	P03AM	25	40	50	800	2.2	4	10	35
P0080SCMCLRP	P-8CM	6	25	50	800	2.2	4	25	60
P0220SCMCLRP	P02CM	15	32	50	800	2.2	4	25	60
P0300SCMCLRP	P03CM	25	40	50	800	2.2	4	15	40
P0640SCMCLRP	P06CM	58	77	150	800	2.2	4	50	80
P0720SCMCLRP	P07CM	65	88	150	800	2.2	4	50	75
P0900SCMCLRP	P09CM	75	98	150	800	2.2	4	40	70
P1100SCMCLRP	P11CM	90	130	150	800	2.2	4	40	70
P1300SCMCLRP	P13CM	120	160	150	800	2.2	4	35	60
P1500SCMCLRP	P15CM	140	180	150	800	2.2	4	30	55
P1800SCMCLRP	P18CM	170	220	150	800	2.2	4	30	50
P2100SCMCLRP	P21CM	180	240	150	800	2.2	4	30	50
P2300SCMCLRP	P23CM	190	260	150	800	2.2	4	30	50
P2600SCMCLRP	P26CM	220	300	150	800	2.2	4	30	45
P3100SCMCLRP	P31CM	275	350	150	800	2.2	4	30	45
P3500SCMCLRP	P35CM	320	400	150	800	2.2	4	25	50
P4500SCMCLRP	P45CM	400	530	50	800	2.2	4	25	45

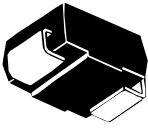
Notes:  
 - Absolute maximum ratings measured at  $T_A = 25^\circ C$  (unless otherwise noted).  
 - Components are bi-directional.

**Surge Ratings**

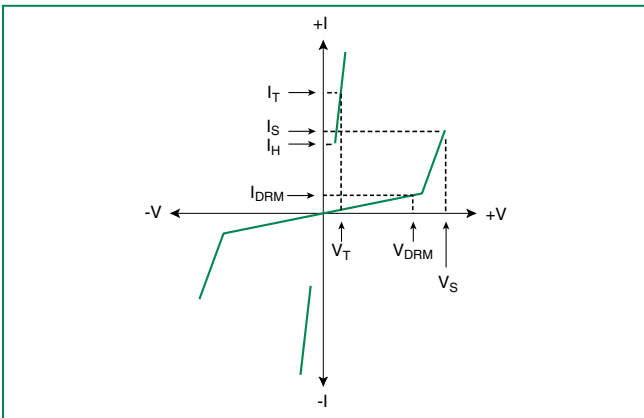
Series	$I_{PP}$										$I_{TSM}$ 50/60 Hz	di/dt
	0.2/310 <sup>1</sup>	2/10 <sup>1</sup>	8/20 <sup>1</sup>	10/160 <sup>1</sup>	10/560 <sup>1</sup>	5/320 <sup>1</sup>	10/360 <sup>1</sup>	10/1000 <sup>1</sup>	5/310 <sup>1</sup>	10/700 <sup>1</sup>		
	0.5/700 <sup>2</sup>	2/10 <sup>2</sup>	1.2/50 <sup>2</sup>	10/160 <sup>2</sup>	10/560 <sup>2</sup>	9/720 <sup>2</sup>	10/360 <sup>2</sup>	10/1000 <sup>2</sup>	10/700 <sup>2</sup>			
	A min	A min	A min	A min	A min	A min	A min	A min	A min	A min	A/μs max	
A	20	150	150	90	50	75	75	45	75	25	500	
C	50	500	400	200	150	200	175	100	200 <sup>3</sup>	35	500	

Notes:  
 1 Current waveform in μs  
 2 Voltage waveform in μs  
 3 For surge rating of P4500SCMCLRP 10/700μs min=150A  
 - Peak pulse current rating ( $I_{PP}$ ) is repetitive and guaranteed for the life of the product that remains in thermal equilibrium.  
 -  $I_{PP}$  ratings applicable over temperature range of -40°C to +85°C  
 - The component must initially be in thermal equilibrium with -40°C ≤  $T_J$  ≤ +150°C

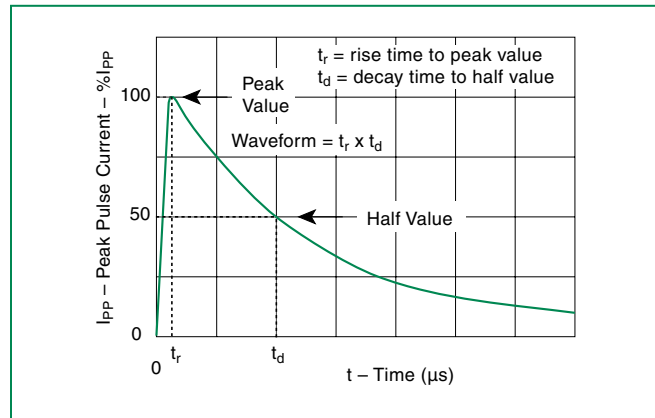
**Thermal Considerations**

Package	Symbol	Parameter	Value	Unit
DO-214AA 	$T_J$	Operating Junction Temperature Range	-40 to +150	°C
	$T_S$	Storage Temperature Range	-65 to +150	°C
	$R_{θJA}$	Thermal Resistance: Junction to Ambient	90	°C/W

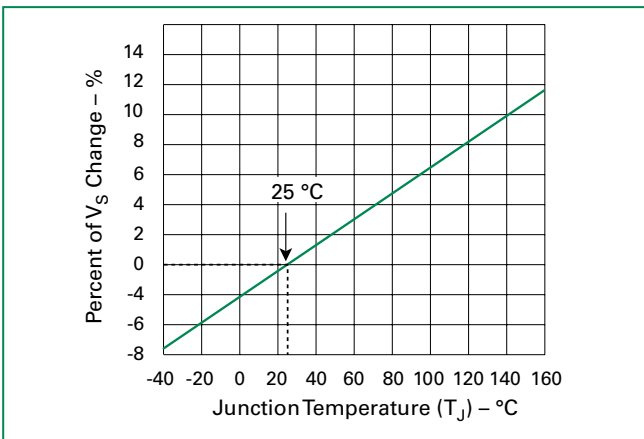
**V-I Characteristics**



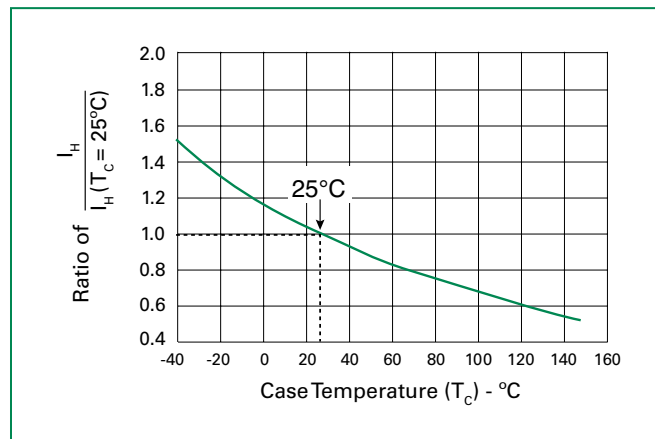
**$t_r \times t_d$  Pulse Waveform**



**Normalized  $V_S$  Change vs. Junction Temperature**

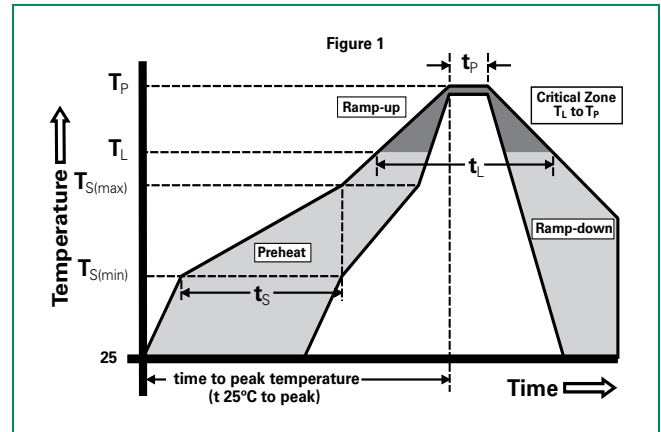


**Normalized DC Holding Current vs. Case Temperature**



### Soldering Parameters

Reflow Condition	Pb-Free assembly (see Fig. 1)	
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max ( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)	3°C/sec. Max.	
$T_{s(max)}$ to $T_L$ - Ramp-up Rate	3°C/sec. Max.	
Reflow	-Temperature ( $T_L$ ) (Liquidus)	+217°C
	-Temperature ( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )	+260(+0/-5)°C	
Time within 5°C of actual PeakTemp ( $t_p$ )	30 secs. Max.	
Ramp-down Rate	6°C/sec. Max.	
Time 25°C to Peak Temp ( $T_p$ )	8 min. Max.	
Do not exceed	+260°C	



### Physical Specifications

Lead Material	Copper Alloy
Terminal Finish	100% Matte-Tin Plated
Body Material	UL Recognized epoxy meeting flammability classification V-0

### Environmental Specifications

High Temp Voltage Blocking	80% Rated $V_{DRM}$ ( $V_{AC Peak}$ ) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
Temp Cycling	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
Biased Temp & Humidity	52 $V_{DC}$ (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101
High Temp Storage	+150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101
Low Temp Storage	-65°C, 1008 hrs.
Thermal Shock	0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106
Autoclave (Pressure Cooker Test)	+121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102
Resistance to Solder Heat	+260°C, 30 secs. MIL-STD-750 (Method 2031)
Moisture Sensitivity Level	85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1

### Additional Information



Datasheet

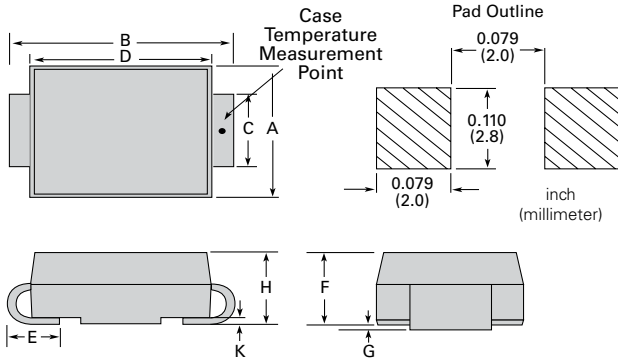


Resources



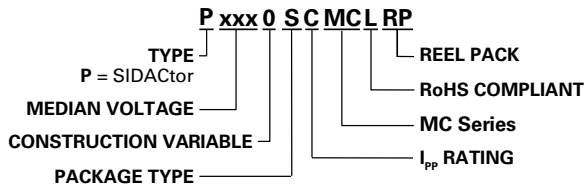
Samples

**Dimensions – DO-214AA**

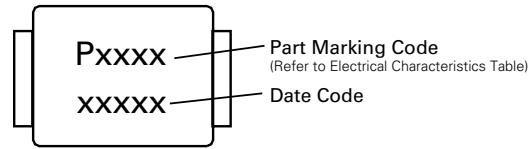


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.130	0.156	3.30	3.95
B	0.201	0.220	5.10	5.60
C	0.077	0.087	1.95	2.20
D	0.159	0.181	4.05	4.60
E	0.030	0.063	0.75	1.60
F	0.075	0.096	1.90	2.45
G	0.002	0.008	0.05	0.20
H	0.077	0.104	1.95	2.65
K	0.006	0.016	0.15	0.41

**Part Numbering**



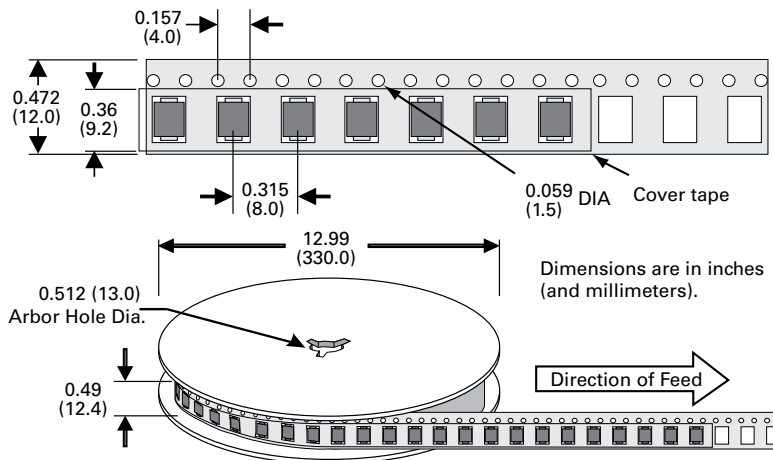
**Part Marking**



**Packing Options**

Package Type	Description	Quantity	Added Suffix	Industry Standard
S	DO-214AA Tape & Reel Pack	2500	N/A	EIA-481-D

**Tape and Reel Specification – DO-214AA**



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