

Pxxx2ACMC Series

Two-Chip MicroCapacitance SIDACtor® - Modified TO-220



Description

This Pxxx2ACMC Series offered in a modified TO-220 package are low capacitance SIDACtor components designed to protect various types of Broadband equipment from damaging overvoltage transients.

The series provides a robust peak surge current capability that enables equipment to comply with various 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.
- Fails short circuit when surged in excess of ratings
- Robust Modified TO-220 Package
- Custom lead forms available
- 40% lower capacitance than our Baseband Protectors, for applications that demand greater signal integrity
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)
- Halogen-free and RoHS compliant
- Recognized to UL 497B as an Isolated Loop Circuit Protector

Additional Information



Resources



Accessories



Samples

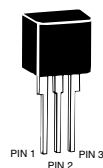
Agency Approvals

Agency	Agency File Number
	E133083

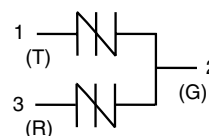
Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level
- ITU K.20/21 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

Pinout Designation



Schematic Symbol



Electrical Characteristics

Part Number	Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ $100V/\mu s$	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
		V min	V max	V min	V max	mA min	mA max	A max	V min	
		Pins 1-2, 3-2		Pins 1-3		Pins 1-2, 3-2				
P0602ACMCLxx	P0602ACMC	25	40	50	80	50	800	2.2	4	See Capacitance Values Table
P1402ACMCLxx	P1402ACMC	58	77	116	154	150	800	2.2	4	
P1602ACMCLxx	P1602ACMC	65	95	130	190	150	800	2.2	4	
P2202ACMCLxx	P2202ACMC	90	130	180	260	150	800	2.2	4	
P2702ACMCLxx	P2702ACMC	120	160	240	320	150	800	2.2	4	
P3002ACMCLxx	P3002ACMC	140	180	280	360	150	800	2.2	4	
P3602ACMCLxx	P3602ACMC	170	220	340	440	150	800	2.2	4	
P4202ACMCLxx	P4202ACMC	190	250	380	500	150	800	2.2	4	

Table continues on next page.

Pxxx2ACMC Series

Two-Chip MicroCapacitance SIDACtor® - Modified TO-220

Electrical Characteristics (continued)

Part Number	Marking	V_{DRM} @ $I_{DRM}=5\mu A$	V_S @ $100V/\mu s$	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
		V min	V max	V min	V max	mA min	mA max	A max	V min	
		Pins 1-2, 3-2		Pins 1-3		Pins 1-2, 3-2				
P4802ACMCLxx	P4802ACMC	220	300	440	600	150	800	2.2	4	See Capacitance Values Table
P6002ACMCLxx	P6002ACMC	275	350	550	700	150	800	2.2	4	

Notes:

- Absolute maximum ratings measured at $T_A=25^\circ C$ (unless otherwise noted).
- Components are bi-directional (unless otherwise noted).
- **XX** Part Number Suffix: **RP** (Reel Pack), Blank (Bulk Pack), or **60** (Type 60 lead form, Bulk Pack. Special order item -- contact factory.)

Capacitance Values

Part Number	pF Pin 1-2 / 3-2 Tip-Ground, Ring-Ground		pF Pin 1-3 Tip-Ring	
	MIN	MAX	MIN	MAX
P0602ACMCLxx	25	45	10	25
P1402ACMCLxx	40	60	20	35
P1602ACMCLxx	35	55	20	35
P2202ACMCLxx	45	70	25	40
P2702ACMCLxx	40	60	20	35
P3002ACMCLxx	35	55	20	35
P3602ACMCLxx	35	50	15	30
P4202ACMCLxx	30	50	15	30
P4802ACMCLxx	30	45	15	30
P6002ACMCLxx	30	45	15	25

Note: Off-state capacitance (C_o) is measured at 1 MHz with a 2 V bias.

Surge Ratings

Series	I_{PP}									I_{TSM} 50/60 Hz	di/dt
	0.2/310 ¹ 0.5/700 ²	2/10 ¹ 2/10 ²	8/20 ¹ 1.2/50 ²	10/160 ¹ 10/160 ²	10/560 ¹ 10/560 ²	5/320 ¹ 9/720 ²	10/360 ¹ 10/360 ²	10/1000 ¹ 10/1000 ²	5/310 ¹ 10/700 ²		
	A min	A min	A min	A min	A min	A min	A min	A min	A min	A min	A/μs Max
C	50	500	400	200	150	200	175	100	200	30	500

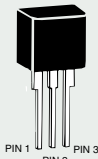
Notes:

- 1 Current waveform in μs
- 2 Voltage waveform in μs
- Peak pulse current rating (I_{PP}) is repetitive and guaranteed for the life of the product.
- I_{PP} ratings applicable over temperature range of $-40^\circ C$ to $+85^\circ C$
- The component must initially be in thermal equilibrium with $-40^\circ C \leq T_J \leq +150^\circ C$

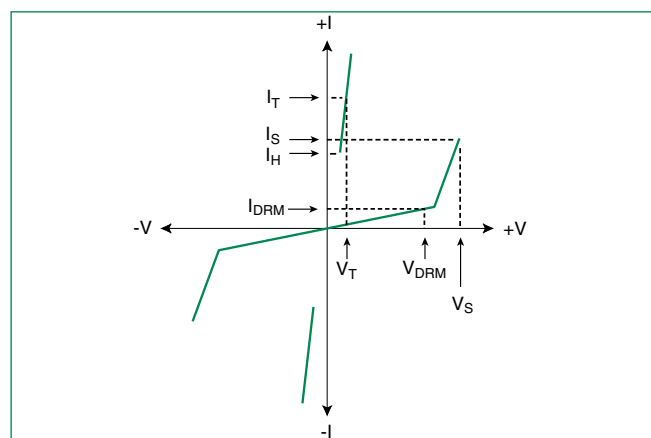
Pxxx2ACMC Series

Two-Chip MicroCapacitance SIDACtor® - Modified TO-220

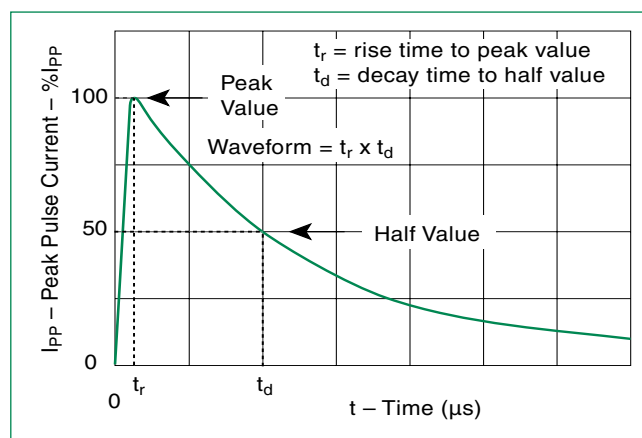
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
Modified TO-220 	T_J	Operating Junction Temperature Range	-40 to +150	°C
	T_S	Storage Temperature Range	-65 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	50	°C/W

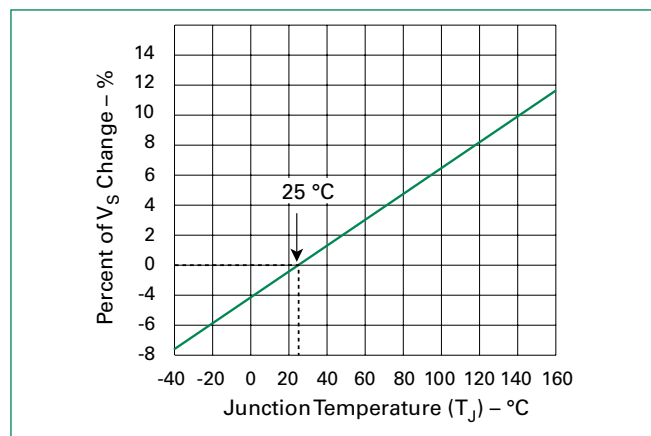
V-I Characteristics



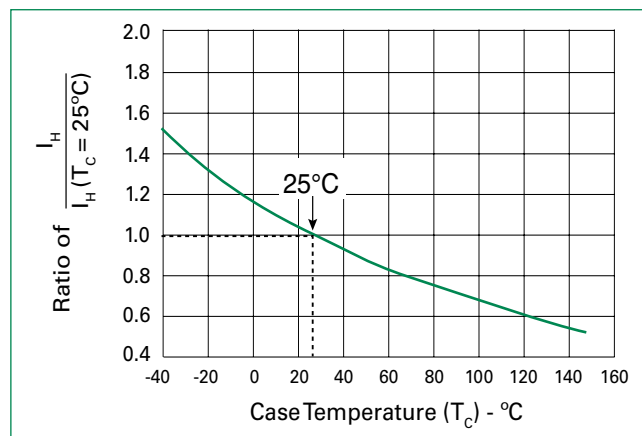
tr x td Pulse Waveform



Normalized V_S Change vs. Junction Temperature



Normalized DC Holding Current vs. Case Temperature

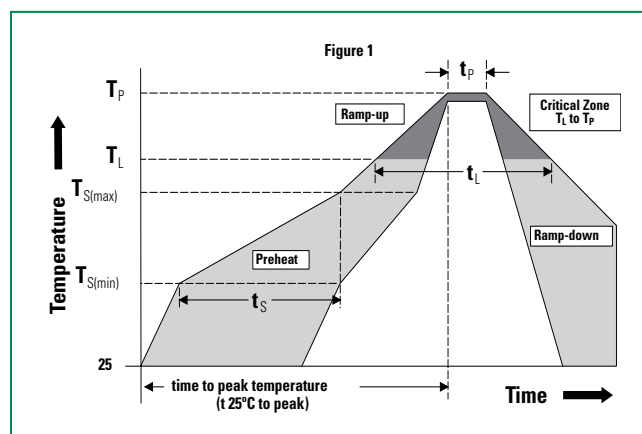


Pxxx2ACMC Series

Two-Chip MicroCapacitance SIDACtor® - Modified TO-220

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 Peak Temp (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 compound meeting flammability rating V-0

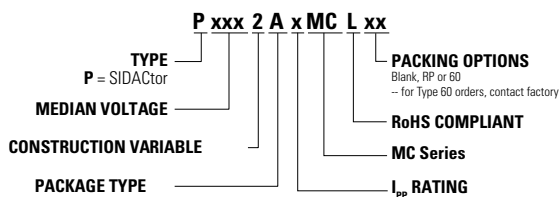
Environmental Specifications

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-A-104
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
Unbiased Highly Accelerated Stress Test	+130°C, 85%RH, 2atm, 96 hrs. JESD22-A-118
Resistance to Solder Heat	+260°C, 30 secs. MIL-STD-750 (Method 2031)

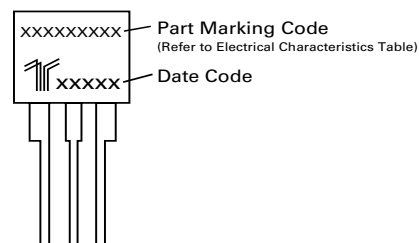
Pxxx2ACMC Series

Two-Chip MicroCapacitance SIDACtor® - Modified TO-220

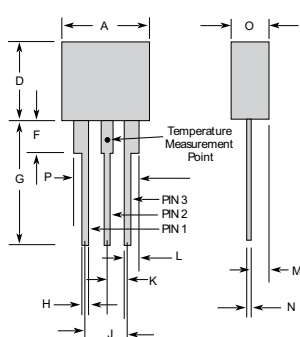
Part Numbering



Part Marking



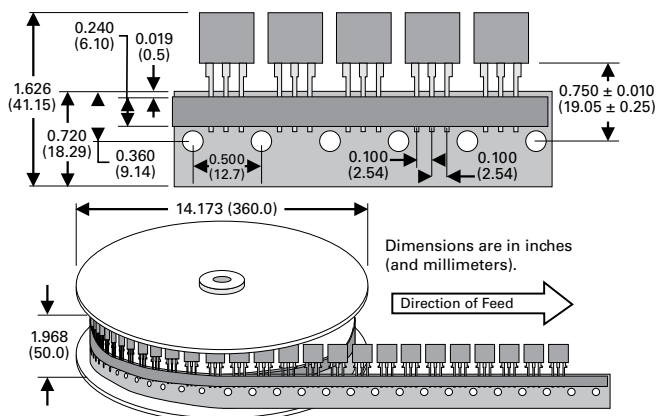
Dimensions - Modified TO-220



The modified TO-220 package is designed to meet mechanical standards as set forth in JEDEC publication number 95.

	Inches		Millimeters	
	Min	Max	Min	Max
A	0.400	0.410	10.16	10.42
D	0.360	0.375	9.14	9.53
F	0.110	0.130	2.80	3.30
G	0.540	0.575	13.71	14.61
H	0.025	0.035	0.63	0.89
J	0.195	0.205	4.95	5.21
K	0.095	0.105	2.41	2.67
L	0.060	0.075	1.52	1.90
M	0.070	0.085	1.78	2.16
N	0.018	0.024	0.46	0.61
O	0.178	0.188	4.52	4.78
P	0.290	0.310	7.37	7.87

Tape and Reel Specification — Modified TO-220



Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
A	Modified TO-220, Tape and Reel Pack	700	RP	EIA-468-B
	Modified TO-220, Bulk Pack	500	N/A	N/A
	Modified TO-220, Type 60 Lead Form Bulk Pack	500	60 (special order item, contact factory for details)	N/A

Disclaimer Notice - Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse. "Littelfuse" includes Littelfuse, Inc., and all of its affiliate entities. <http://www.littelfuse.com/disclaimer-electronics>.