



PRODUCT CHANGE NOTIFICATION

PCN-000925

Date: 31AUG2023

Change Details

Part Number(s) Affected:

SMF05.TCT

Customer Part Number(s) Affected: ☒ N/A

Description, Purpose, and Effect of Change:

Semtech is updating the Product Datasheet for SMF05.TCT.

In Summary:

From							To						
DIMENSIONS							DIMENSIONS						
DIM	INCHES			MILLIMETERS			DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	-	-	.043	-	-	1.10	A	-	-	.043	-	-	1.10
A1	.000	-	.004	0.00	-	0.10	A1	.000	-	.004	0.00	-	0.10
A2	.028	.035	.039	0.70	0.90	1.00	A2	.028	.035	.039	0.70	0.90	1.00
b	.006	-	.012	0.15	-	0.30	b	.004	-	.012	0.10	-	0.30
c	.003	-	.009	0.08	-	0.22	c	.003	-	.009	0.08	-	0.22
D	.075	.079	.083	1.90	2.00	2.10	D	.071	.079	.087	1.80	2.00	2.20
E1	.045	.049	.053	1.15	1.25	1.35	E1	.045	.049	.053	1.15	1.25	1.35
E	.083 BSC			2.10 BSC			E	.083 BSC			2.10 BSC		
e	.026 BSC			0.65 BSC			e	.026 BSC			0.65 BSC		
e1	.051			1.30 BSC			e1	.051			1.30 BSC		
L	.010	.014	.018	0.26	0.36	0.46	L	.010	.014	.018	0.26	0.36	0.46
L1	(.017)			(0.42)			L1	(.017)			(0.42)		
N	5			5			N	5			5		
θ1	0°	-	8°	0°	-	8°	θ1	0°	-	8°	0°	-	8°
aaa	.004			0.10			aaa	.004			0.10		
bbb	.004			0.10			bbb	.004			0.10		
ccc	.012			0.30			ccc	.012			0.30		

Updated Semtech Logo for DS.

Change Classification

☒ Major ☐ Minor

**Impact to Form, Fit,
Function**

☒ Yes ☐ No

Impact to Data Sheet

☒ Yes ☐ No

New Revision or Date

Datasheet Rev 7.1

Impact to Performance, Characteristics or Reliability:

There is NO impact to performance, electrical characteristics or reliability resulting from this change.




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Date: 31AUG2023

Implementation Date	20JUL2023	Work Week	Not Applicable
Last Time Ship (LTS) Of unchanged product	Not Applicable	Affecting Lot No. / Serial No. (SN)	Not Applicable
Sample Availability	Not Applicable	Qualification Report Availability	Not Applicable
Supporting Documents for Change Validation/Attachments: <ul style="list-style-type: none">SMF05 and SMF12 Datasheet Rev 7.1.4			

Quality Assurance		
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Semtech Contact Info:	QA representative: Les Fang Yuen Quality Assurance lfangyuen@semtech.com +1 (949) 269-4443	Digital signature 
FOR FURTHER INFORMATION & WORLDWIDE SALES COVERAGE: http://www.semtech.com/contact/index.html#support		

Description

The SMF series TVS arrays are designed to protect sensitive electronics from damage or latch-up due to ESD and other voltage-induced transient events. They are designed for use in applications where board space is at a premium. Each device will protect up to four lines. They are unidirectional devices and may be used on lines where the signal polarities are above ground.

TVS diodes are solid-state devices designed specifically for transient suppression. They feature large cross-sectional area junctions for conducting high transient currents. They offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

The SMF series devices may be used to meet the immunity requirements of IEC 6100-4-2, level 4. The small SC70 package makes them ideal for use in portable electronics such as cell phones, PDA's, notebook computers, and digital cameras.

Features

- Transient protection for data lines to:
 - IEC 61000-4-2 (ESD) $\pm 8\text{kV}$ (air), $\pm 15\text{kV}$ (contact)
 - IEC 61000-4-4 (EFT) 40A (5/50ns)
- Small package for use in portable electronics
- Protects four I/O lines
- Working voltage: 5V and 12V
- Low leakage current
- Low operating and clamping voltages
- Solid-state silicon-avalanche technology

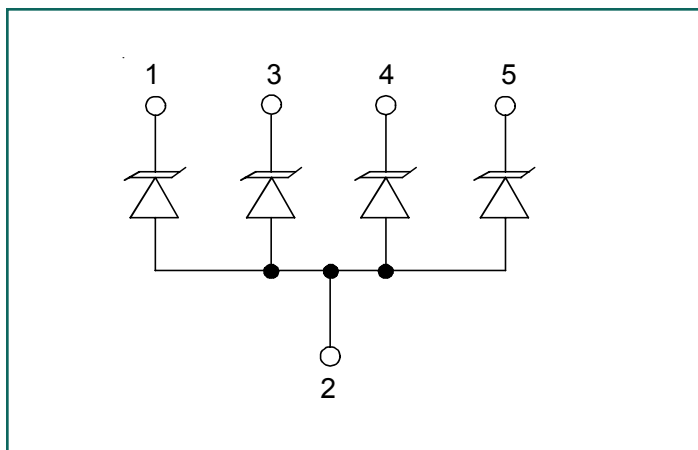
Mechanical Characteristics

- EIAJ SC70-5L package
- Molding compound flammability rating: UL 94V-0
- Marking: Marking Code
- Packaging: Tape and Reel

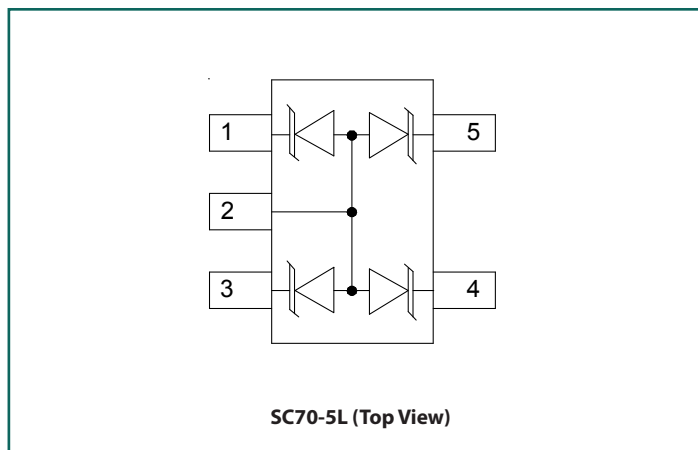
Applications

- Cellular Handsets and Accessories
- Cordless Phones
- Personal Digital Assistants (PDA's)
- Notebook & Handhelds
- Portable Instrumentation
- Digital Cameras
- Peripherals
- MP3 Players

Circuit Diagram



Schematic & Pin Configuration



Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P _{PK}	200	Watts
Peak Forward Voltage (I _F = 1A, tp = 8/20μs)	V _{FP}	1.5	V
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V _{ESD}	±20 ±15	kV
Lead Soldering Temperature	T _L	260 (10 seconds)	°C
Operating Temperature	T _J	-55 to +125	°C
Storage Temperature	T _{STG}	-55 to +150	°C

Electrical Characteristics (T=25°C unless otherwise specified)

SMF05

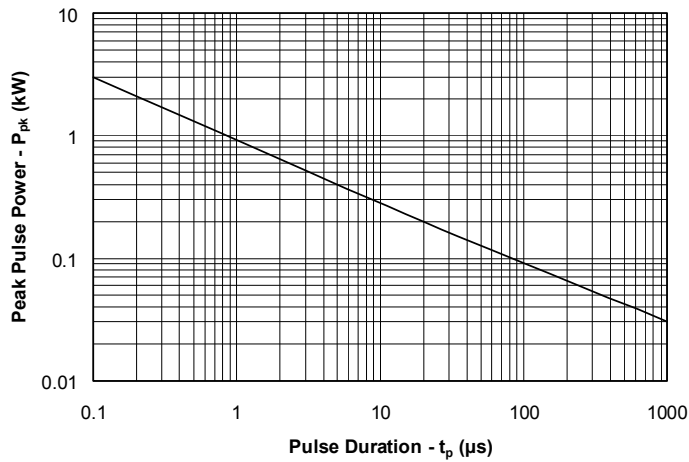
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				5	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA,	6			V
Reverse Leakage Current	I _R	V _{RWM} = 5V, T=25 °C			10	μA
Clamping Voltage	V _C	I _{pp} = 1A, tp = 8/20μs			9.5	V
Clamping Voltage	V _C	I _{pp} = 12A, tp = 8/20μs			12.5	
Peak Pulse Current	I _{pp}	tp = 8/20μs			12	A
Junction Capacitance	C _J	Between I/O pins and Ground V _R = 0V, f = 1MHz		150	175	pF

SMF12

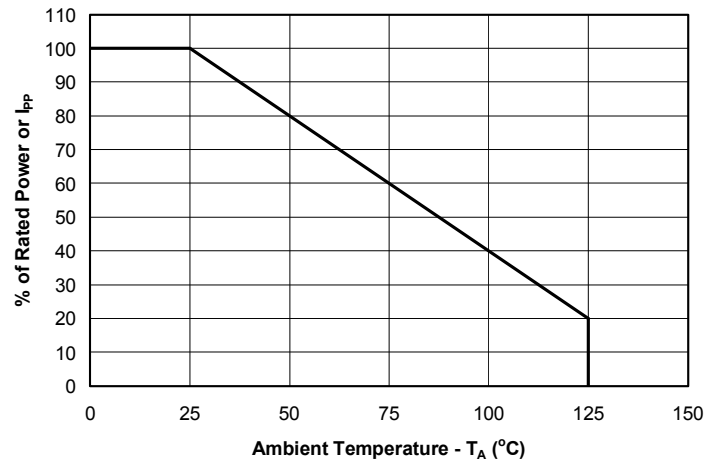
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				12	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA,	13.3			V
Reverse Leakage Current	I _R	V _{RWM} = 12V, T=25 °C			1	μA
Clamping Voltage	V _C	I _{pp} = 1A, tp = 8/20μs			19	V
Clamping Voltage	V _C	I _{pp} = 8A, tp = 8/20μs			25	
Peak Pulse Current	I _{pp}	tp = 8/20μs			8	A
Junction Capacitance	C _J	Between I/O pins and Ground V _R = 0V, f = 1MHz		60	75	pF

Typical Characteristics

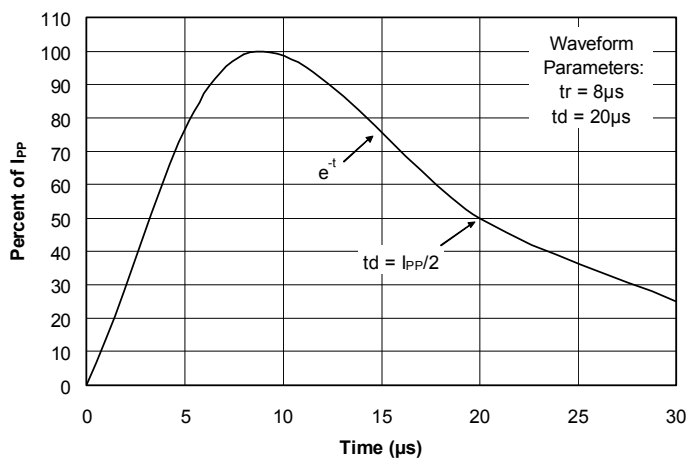
Non-Repetitive Peak Pulse Power vs Pulse Time



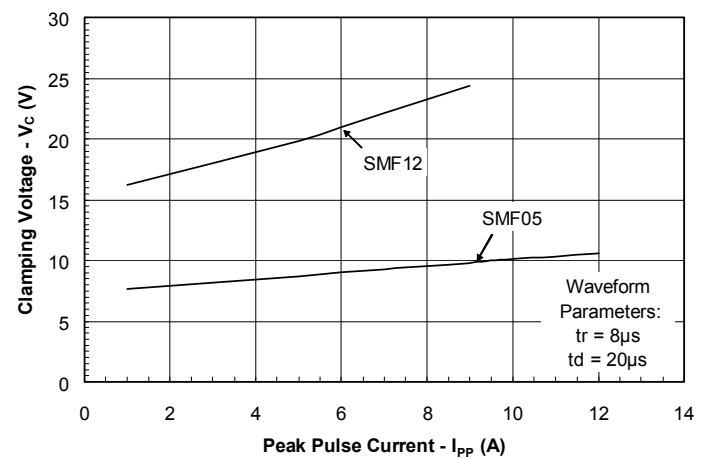
Power Derating Curve



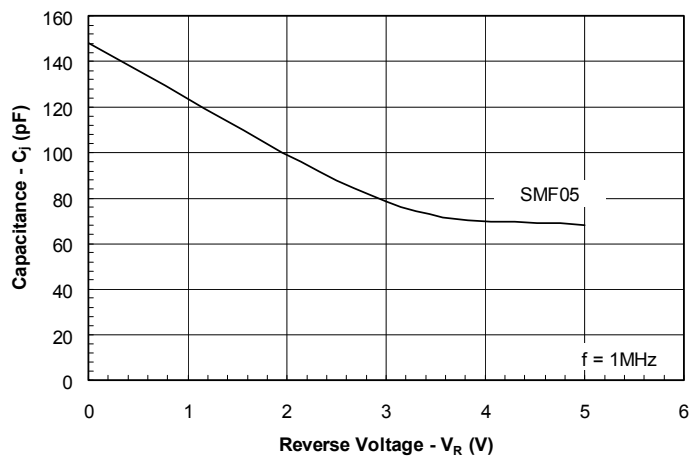
Pulse Waveform



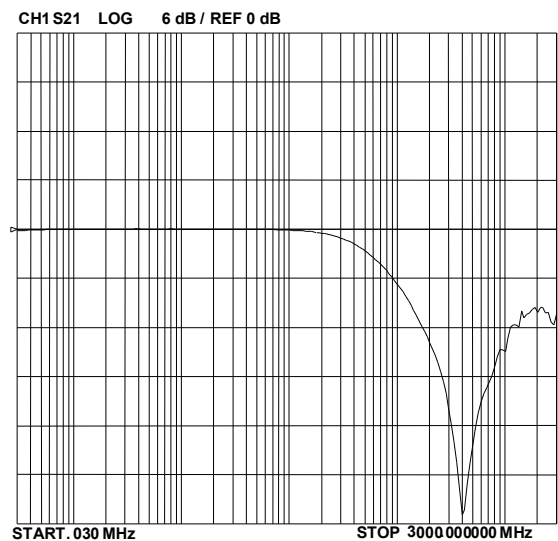
Clamping Voltage vs Peak Pulse Current



Capacitance vs Reverse Voltage

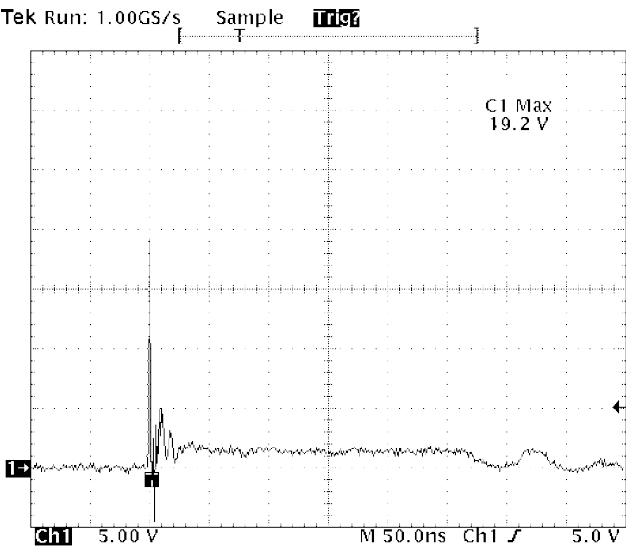


SMF05 Insertion Loss S21

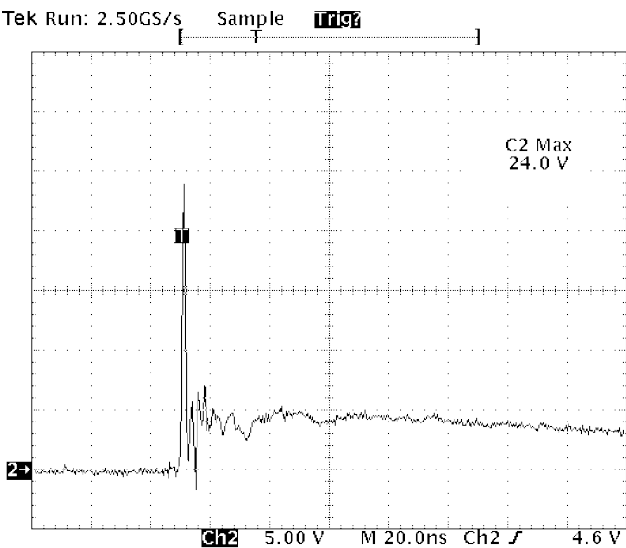


Typical Characteristics

SMF05 ESD Clamping
(8kV Contact per IEC 61000-4-2)



SMF12 ESD Clamping
(8kV Contact per IEC 61000-4-2)



Applications Information

Device Connection for Protection of Four Data Lines

The SMFxx is designed to protect up to four unidirectional data lines. The device is connected as follows:

1. Unidirectional protection of four I/O lines is achieved by connecting pins 1, 3, 4, and 5 to the data lines. Pin 2 is connected to ground. The ground connection should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.

Circuit Board Layout Recommendations for Suppression of ESD

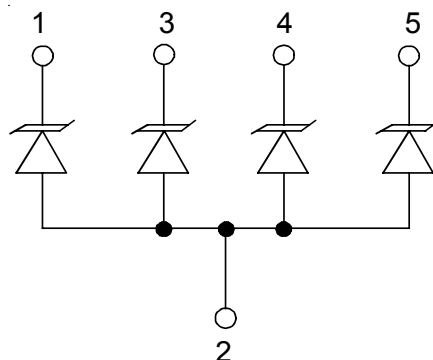
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- Place the SMFxx near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the SMFxx and the protected line.
- Minimize all conductive loops including power and ground loops.
- The ESD transient return path to ground should be kept as short as possible.
- Never run critical signals near board edges.
- Use ground planes whenever possible.

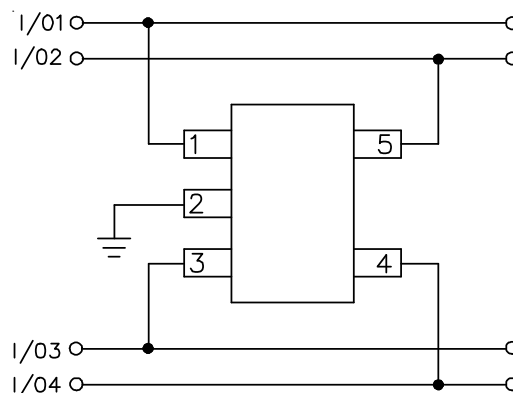
Matte Tin Lead Finish

Matte tin has become the industry standard lead-free replacement for SnPb lead finishes. A matte tin finish is composed of 100% tin solder with large grains. Since the solder volume on the leads is small compared to the solder paste volume that is placed on the land pattern of the PCB, the reflow profile will be determined by the requirements of the solder paste. Therefore, these devices are compatible with both lead-free and SnPb assembly techniques. In addition, unlike other lead-free compositions, matte tin does not have any added allows that can cause degradation of the solder joint.

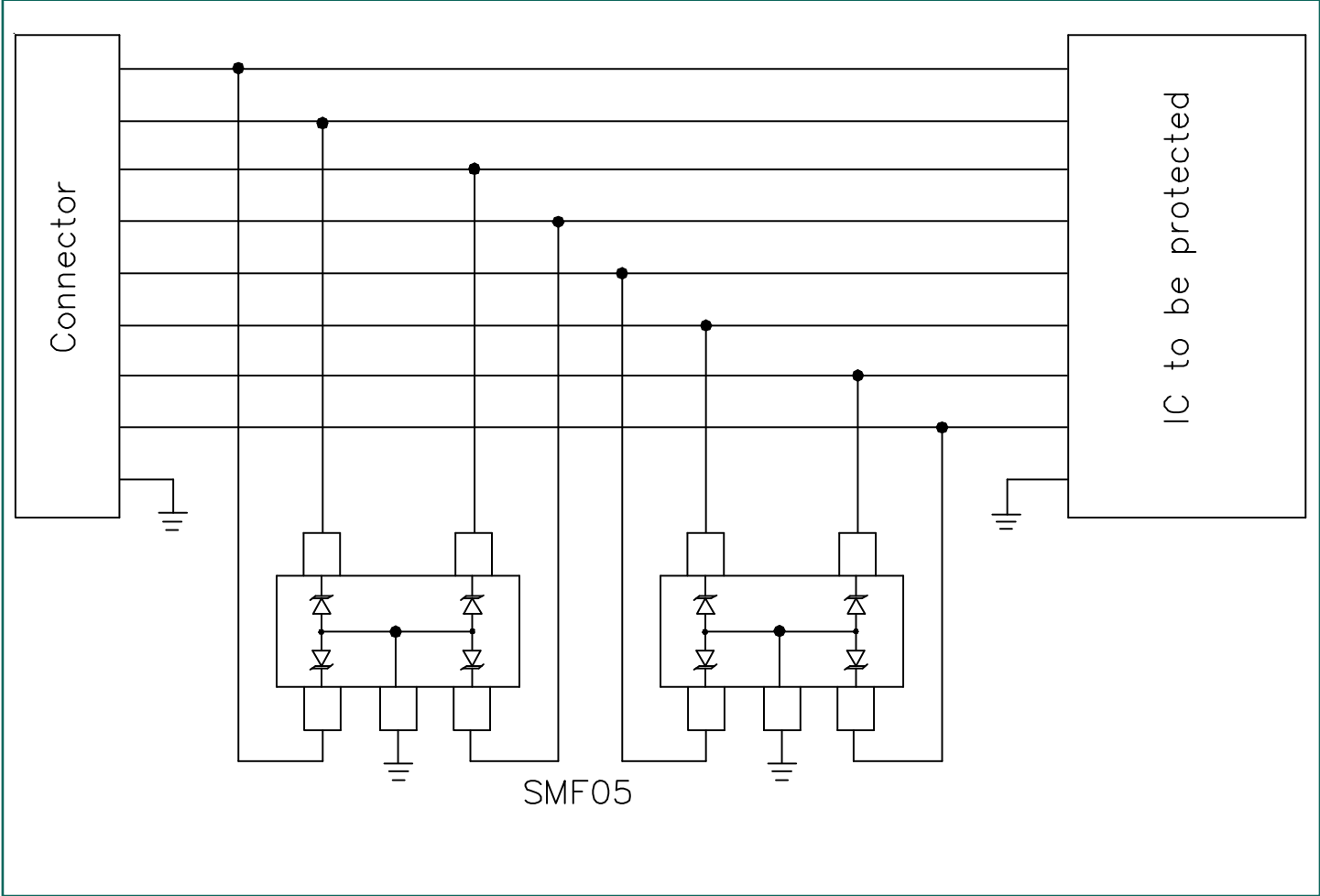
SMF Circuit Diagram



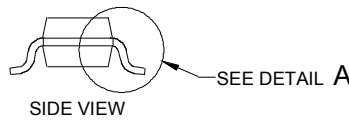
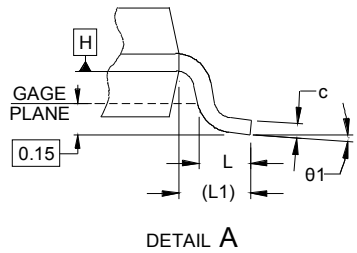
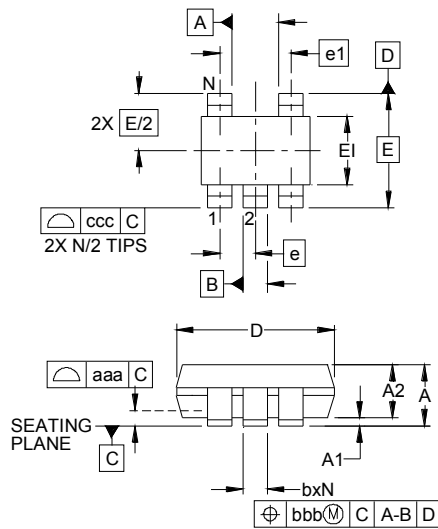
Protection of Four Unidirectional Lines



Typical Applications



Outline Drawing - SC70 5L

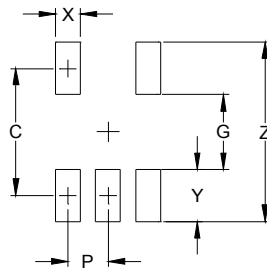


DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	-	-	.043	-	-	1.10
A1	.000	-	.004	0.00	-	0.10
A2	.028	.035	.039	0.70	0.90	1.00
b	.004	-	.012	0.10	-	0.30
c	.003	-	.009	0.08	-	0.22
D	.071	.079	.087	1.80	2.00	2.20
E1	.045	.049	.053	1.15	1.25	1.35
E	.083 BSC			2.10 BSC		
e	.026 BSC			0.65 BSC		
e1	.051			1.30 BSC		
L	.010	.014	.018	0.26	0.36	0.46
L1	(.017)			(0.42)		
N	5			5		
01	0°	-	8°	0°	-	8°
aaa	.004			0.10		
bbb	.004			0.10		
ccc	.012			0.30		

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DATUMS \square -A \square AND \square -B \square TO BE DETERMINED AT DATUM PLANE \square -H \square .
3. DIMENSIONS "E1" AND "D" DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
4. REFERENCE JEDEC STD MO-203, VARIATION AA.

Land Pattern - SC70 5L



DIM	DIMENSIONS	
	INCHES	MILLIMETERS
C	(.073)	(1.85)
G	.039	1.00
P	.026	0.65
X	.016	0.40
Y	.033	0.85
Z	.106	2.70

NOTES:

1. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking

Part Number	Marking code
SMF05	F05
SMF12	F12

Notes:

Pin 1 Identified with a dot

Ordering Information

Part Number	Lead Finish	Qty per Reel	Reel Size
SMF05.TC	SnPb	3,000	7"
SMF12.TC	SnPb	3,000	7"
SMF05.TCT	Pb free	3,000	7"
SMF12.TCT	Pb free	3,000	7"



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