

PROTECTION PRODUCTS

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PP}	1000	W
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	70	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	15 8	kV
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

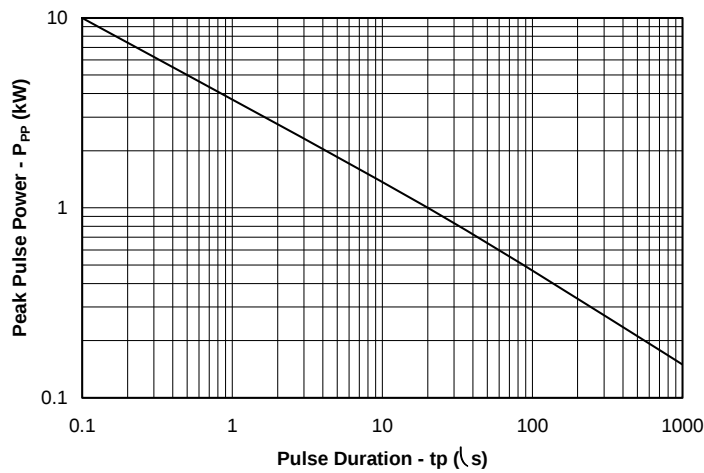
Electrical Characteristics (T=25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}				70	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 50\mu A$	85			V
Reverse Leakage Current	I_R	$V_{RWM} = 70V, T=25^\circ C$			5	μA
Forward Voltage	V_f	$I_f = 15mA$			1.2	V
Clamping Voltage	V_C	$I_{PP} = 1A, t_p = 8/20\mu s$ Any I/O pin to Ground			1.5	V
Clamping Voltage	V_C	$I_{PP} = 40A, t_p = 8/20\mu s$ Any I/O pin to Ground			10	V
Clamping Voltage	V_C	$I_{PP} = 70A, t_p = 8/20\mu s$ Any I/O pin to Ground			14.3	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$ Any I/O pin to Ground			10	pF
		$V_R = 0V, f = 1MHz$ Between I/O pins		3		pF

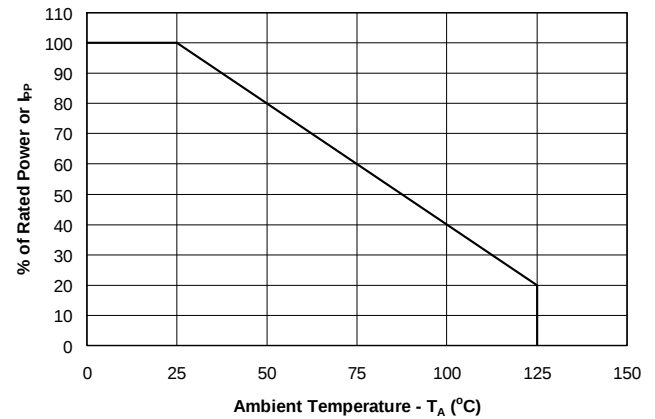
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Typical Characteristics

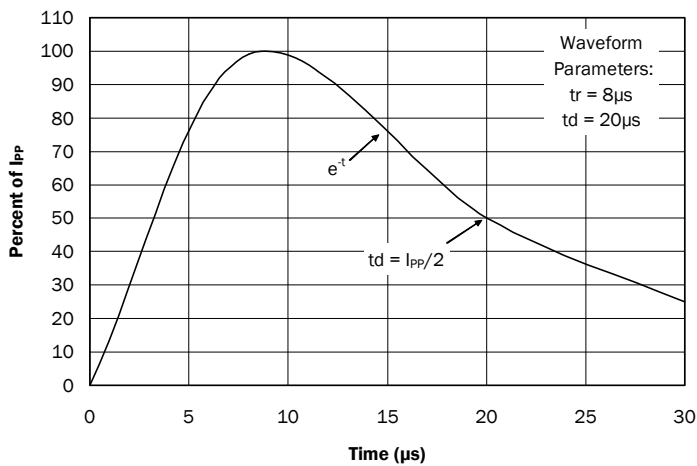
Non-Repetitive Peak Pulse Power vs. Pulse Time



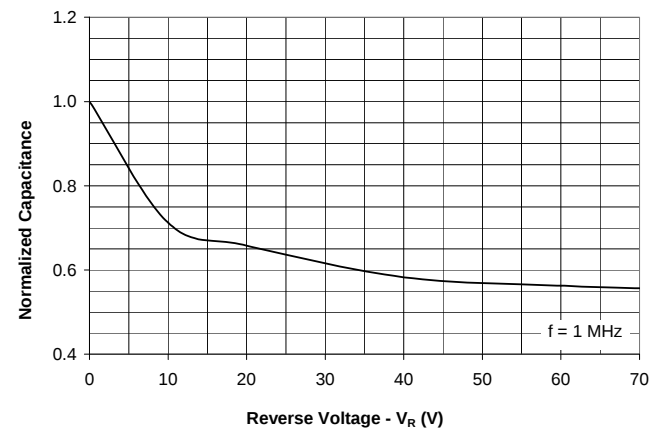
Power Derating Curve



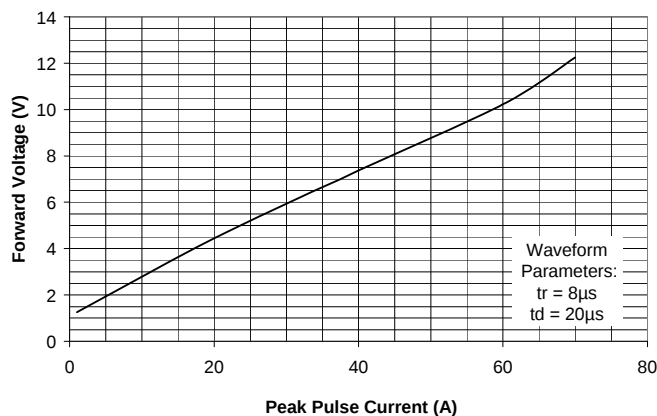
Pulse Waveform



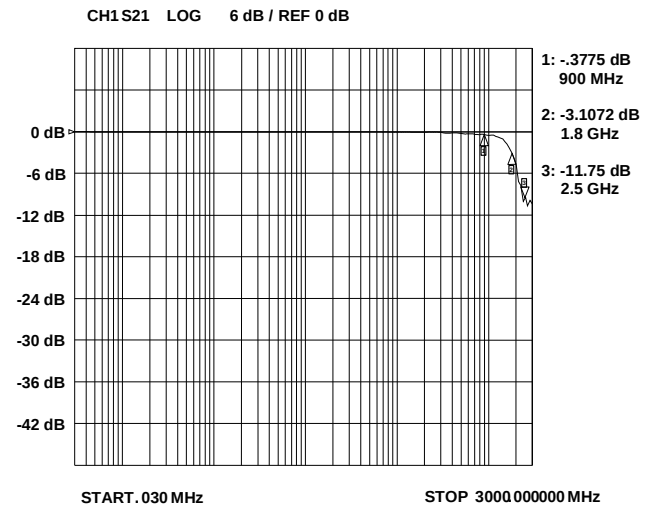
Capacitance vs. Reverse Voltage



Forward Voltage vs. Forward Current



Insertion Loss S21



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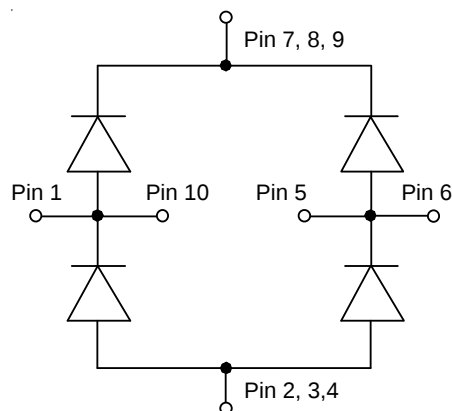
Applications Information

Device Connection Options for Protection of Two High-Speed Data Lines

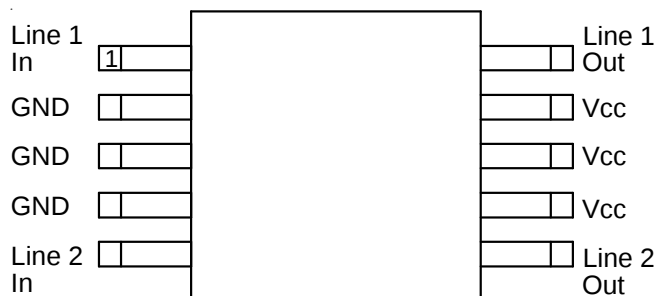
This device is designed to protect two data lines from transient over-voltages by clamping them to a fixed reference. When the voltage on the protected line exceeds the reference voltage (plus diode V_F) the steering diodes are forward biased, conducting the transient current away from the sensitive circuitry. Data line inputs are connected at pins 1 and 5. The outputs are connected at pins 10 and 6 respectively. The negative reference is connected at pins 2, 3, and 4. These pins should be connected directly to a ground plane on the board for best results. The path length is kept as short as possible to minimize parasitic inductance. The positive reference is connected at pins 7, 8, and 9. The options for connecting the positive reference are as follows:

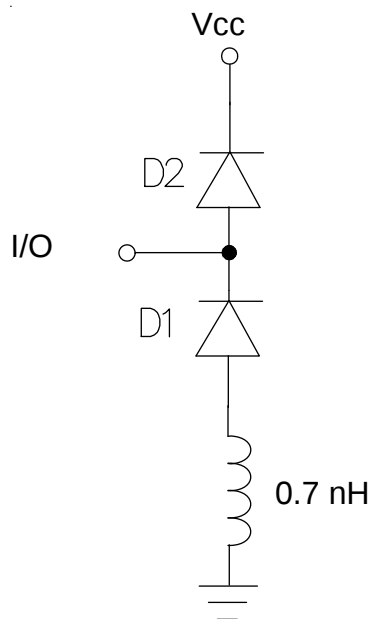
1. To protect data lines and the power line, connect pins 7, 8 and 9 directly to the positive supply rail (V_{CC}). In this configuration the data lines are referenced to the supply voltage. An external TVS diode may be added between the supply rail and ground in order to prevent over-voltage on the supply rail.
2. In applications where no positive supply reference is available, or complete supply isolation is desired, an external TVS diode may be used as the reference. The steering diodes will begin to conduct when the voltage on the protected line exceeds the working voltage of the TVS (plus one diode drop).

Schematic



Pin Configuration

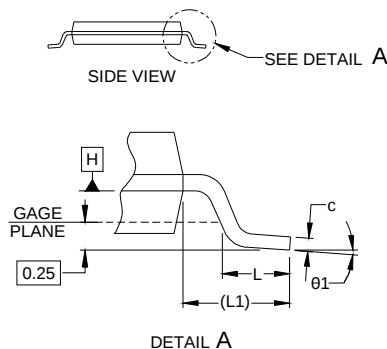
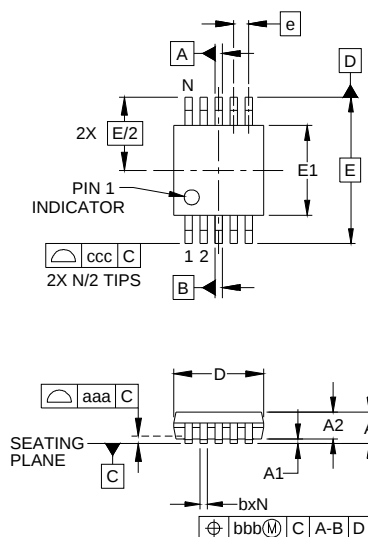


PROTECTION PRODUCTS
Applications Information - Spice Model

RClamp7002M Spice Model
Table 1 - RClamp7002M Spice Parameters

Parameter	Unit	D1 (LCRD)	D2 (LCRD)
IS	Amp	1.0E-20	1.0E-20
BV	Volt	200	200
VJ	Volt	0.53	0.53
RS	Ohm	0.037	0.14
IBV	Amp	1E-3	1E-3
CJO	Farad	3.5E-12	3.5E-12
TT	sec	2.541E-9	2.541E-9
M	--	0.142	0.142
N	--	1.1	1.1
EG	eV	1.11	1.11

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Outline Drawing - MSOP 10L

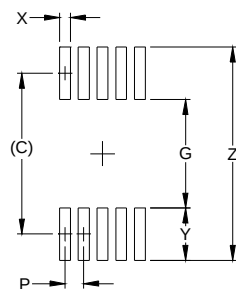


DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	-	-	.043	-	-	1.10
A1	.000	-	.006	0.00	-	0.15
A2	.030	-	.037	0.75	-	0.95
b	.007	-	.011	0.17	-	0.27
c	.003	-	.009	0.08	-	0.23
D	.114	.118	.122	2.90	3.00	3.10
E1	.114	.118	.122	2.90	3.00	3.10
E	.193 BSC			4.90 BSC		
e	.020 BSC			0.50 BSC		
L	.016	.024	.032	0.40	0.60	0.80
L1	(.037)			(.95)		
N	10			10		
θ1	0°	-	8°	0°	-	8°
aaa	.004			0.10		
bbb	.003			0.08		
ccc	.010			0.25		

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DATUMS **-A-** AND **-B-** TO BE DETERMINED AT DATUM PLANE **-H-**
3. DIMENSIONS "E1" AND "D" DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
4. REFERENCE JEDEC STD MO-187, VARIATION BA.

Land Pattern - MSOP 10L



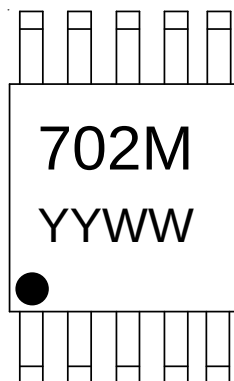
DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.161)	(4.10)
G	.098	2.50
P	.020	0.50
X	.011	0.30
Y	.063	1.60
Z	.224	5.70

NOTES:

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

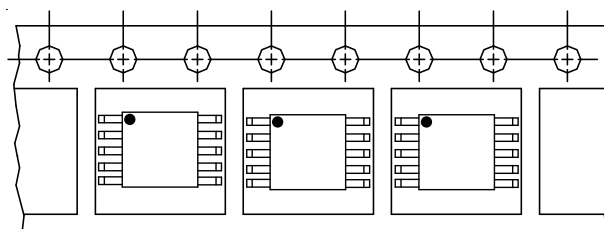
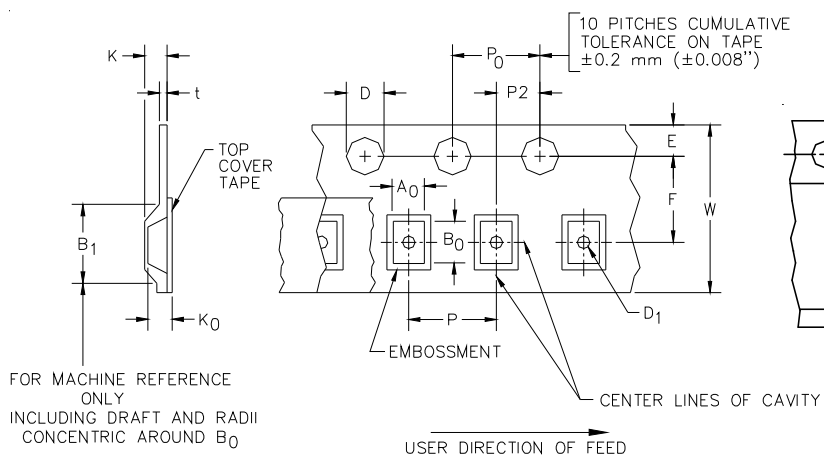
PROTECTION PRODUCTS

Marking Codes



YYWW = Date Code

Tape and Reel Specification



Device Orientation in Tape

A0	B0	K0
5.30 +/-0.20 mm	3.40 +/-0.20 mm	1.40 +/-0.10 mm

Tape Width	B, (Max)	D	D1	E	F	K (MAX)	P	P0	P2	T(MAX)	W
12 mm	8.2 mm	1.5 + 0.1 mm - 0.0 mm)	0.5 mm ±0.05	1.750±.10 mm	5.5±0.05 mm	4.5 mm	8.0±0.1 mm	4.0±0.1 mm	2.0±0.05 mm	0.4 mm	12.0 mm ± 0.3 mm

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