

# MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

Product data sheet

[www.msksemi.com](http://www.msksemi.com)

- Solid-state silicon-avalanche technology
- Low operating and clamping voltage
- Up to four I/O Lines of Protection
- Ultra low capacitance: 0.5pF typical(I/O to I/O)
- Low Leakage
- Low operating voltage:3.3V
- Flow-Through design

**IEC COMPATIBILITY (EN61000-4)**

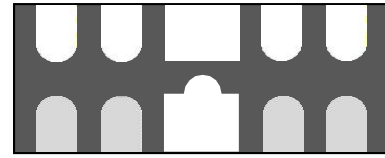
- IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 5A (8/20µs)

**Mechanical Characteristics**

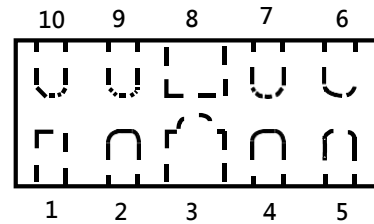
- Molding compound flammability rating: UL 94V-0
- Marking: Marking Code
- Packaging: Tape and Reel
- RoHS/WEEE Compliant

**Applications**

- Digital Visual Interface(DVI)
- MDDI Ports
- DisplayPort™ Interface
- PCI Express
- High Definition Multi-Media Interface(HDMI)
- eSATA Interfaces



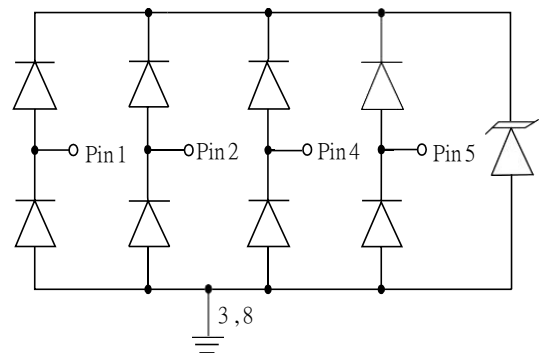
DFN10



**Schematic & PIN Configuration**

Pin	Identificaion
1,2,4,5	Input Lines
6,7,9,10	Output Lines (No Internal Connection)
3,8	Ground

**Circuit Diagram**

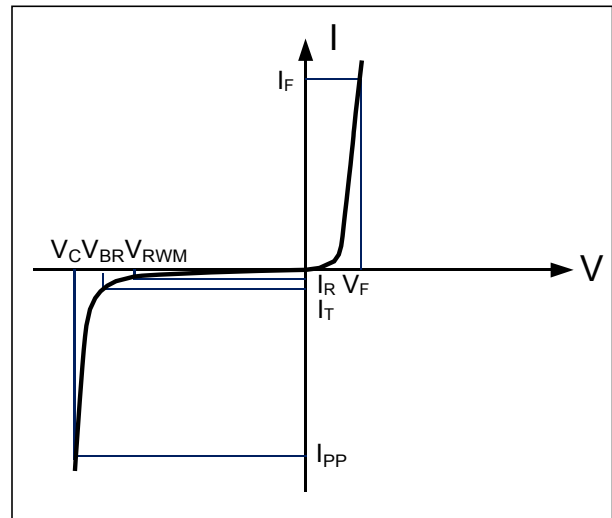


4-Line Protection

Rating	Symbol	Value	Units
Peak Pulse Power ( $t_p=8/20\mu s$ )	$P_{PP}$	150	Watts
Peak Pulse Current ( $t_p=8/20\mu s$ )	$I_{PP}$	5	A
ESD per IEC 61000-4-2(Air) ESD per IEC 61000-4-2(contact)	$V_{ESD}$	+/-17 +/-12	kV
Operating Temperature	$T_J$	-55 to + 125	°C
Storage Temperature	$T_{STG}$	-55 to +150	°C

### Electrical Parameters (T=25°C )

Symbol	Parameter
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$V_{RWM}$	Working Peak Reverse Voltage
$I_R$	Maximum Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_T$	Test Current
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$

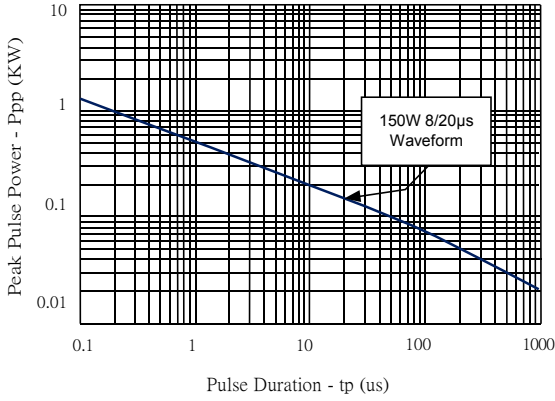


### Electrical Characteristics

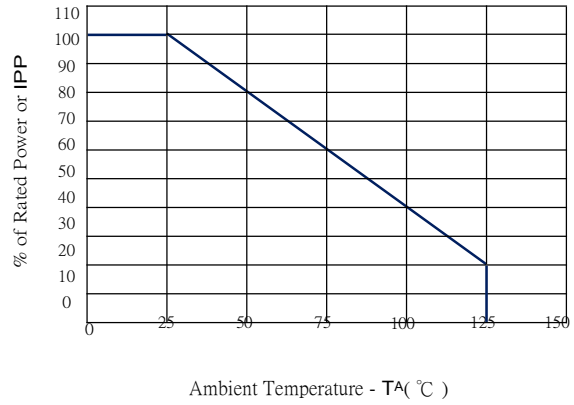
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	$V_{RWM}$	Any I/O pin to ground			3.3	V
Reverse Breakdown Voltage	$V_{BR}$	$I_T = 1mA$ Any I/O pin to ground	6.0			V
Reverse Leakage Current	$I_R$	$V_{RWM} = 5V, T=25^\circ C$ Any I/O pin to ground			1	$\mu A$
Clamping Voltage	$V_C$	$I_{pp}=5A, t_p=8/20\mu s$ Any I/O pin to ground			15	V
Junction Capacitance	$C_j$	$V_R = 0V, f = 1MHz$ I/O pin to GND			0.8	pF
		$V_R = 0V, f = 1MHz$ Between I/O pins		0.3		pF

## Typical Characteristics

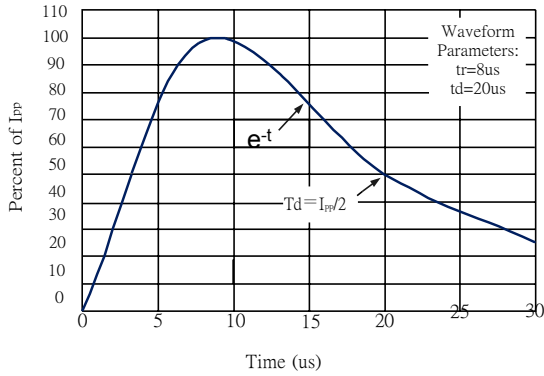
Non-Repetitive Peak Pulse Power vs. Pulse Time



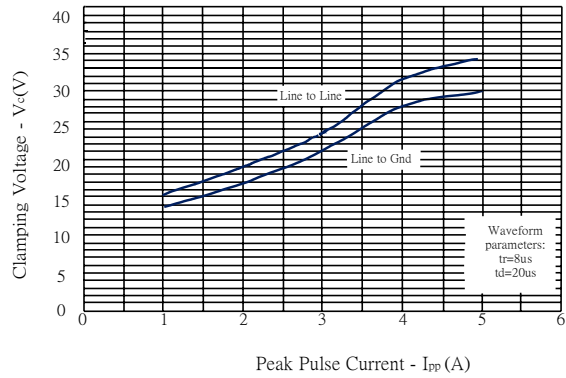
Power Derating curve



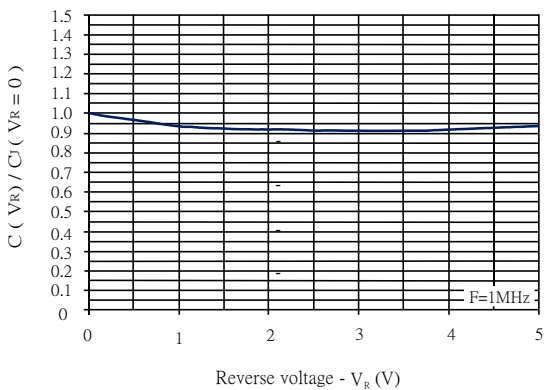
Pulse Waveform



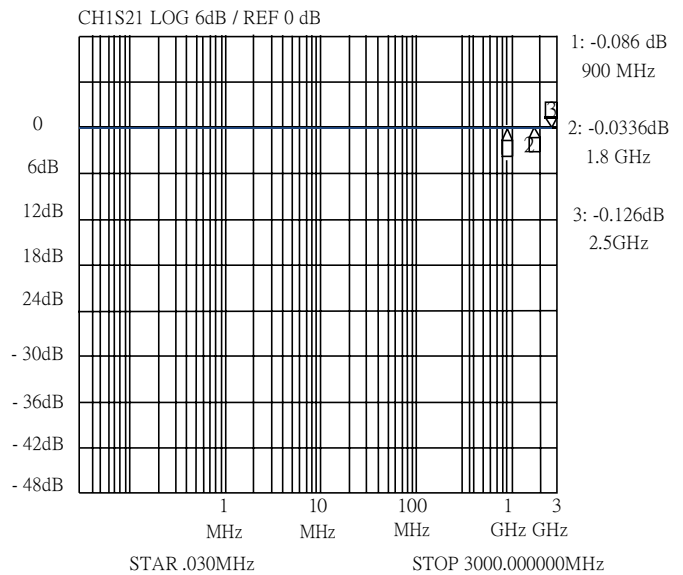
Clamping Voltage vs. Peak Pulse Current



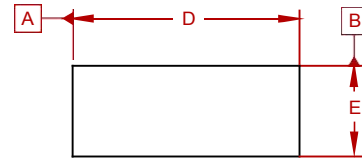
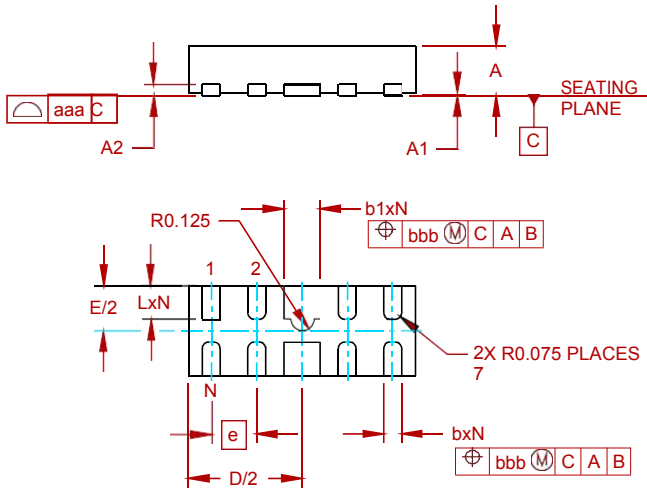
Normalized Capacitance vs. Reverse Voltage



Insertion Loss S21 - I/O to GND



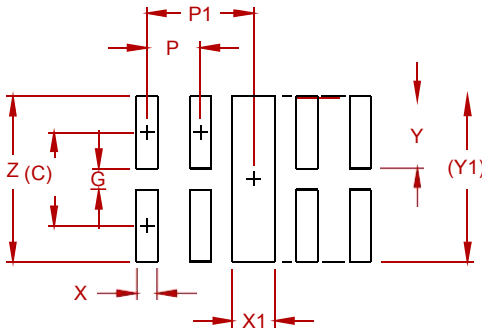
**PACKAGE MECHANICAL DATA**



DIM	DIMENSI ONS					
	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.020	.023	.026	0.50	0.58	0.65
A1	0.00	.001	.002	0.00	0.03	0.05
A2	(.005)			(0.13)		
b	.006	.008	.010	0.15	0.20	0.25
b1	.014	.016	.018	0.35	0.40	0.45
D	.094	.098	.102	2.40	2.50	2.60
E	.035	.039	.043	0.90	1.00	1.10
e	.020 BSC			0.50 BSC		
L	.012	.015	.017	0.30	0.38	0.425
N	8			8		
aaa	.003			0.08		
bbb	.004			0.10		

Dimensions in millimeters

**Suggested Pad Layout**



DIM	DIMENSIONS	
	INCHES	MILLIMETERS
C	(.034)	(0.875)
G	.008	0.20
P	.020	0.50
P1	.039	1.00
X	.008	0.20
X1	.016	0.40
Y	.027	0.675
Y1	(.061)	(1.55)
Z	.061	1.55

**NOTES:**

CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).  
THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.  
CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

**REEL SPECIFICATION**

P/N	PKG	QTY
ESD3V3U4ULC-MS	TSLP-9-1	3000

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