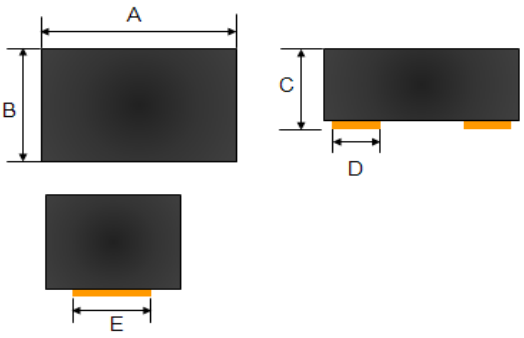
TAIWAN SEMICONDUCTOR

TESDU5V0/TESDU12V/TESDU24V
Bi-directional ESD Protection Diode

Small Signal Diode

0603



Features

- ✧Meet IEC61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- ✧Designed for mounting on small surface.
- ✧Moisture sensitivity level 1
- ✧Protects one birectional I/O line
- ✧Working Voltage : 5V, 12V, 24V
- ✧Pb free version, RoHS compliant, and Halogen free

Mechanical Data

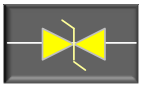
- ✧Case : 0603 standard package, molded plastic
- ✧Terminal: Gold plated,solder per MIL-STD-750, Method 2026 guaranteed
- ✧High temperature soldering guaranteed: 260°C/10s
- ✧Mounting position: Any
- ✧Weight :3 mg (approximately)
- ✧Marking Code : E05, E12, E24

Dimensions	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	1.60	1.80	0.063	0.071
B	0.80	1.00	0.031	0.039
C	0.70	0.85	0.027	0.033
D	0.45(Typ.)		0.018(Typ.)	
E	0.70(Typ.)		0.028(Typ.)	

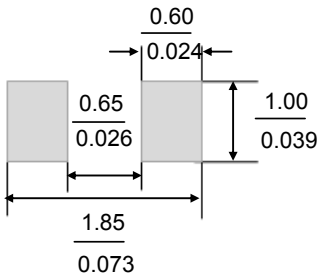
Applications

- ✧Cell Phone Handsets and Accessories
- ✧Notebooks, Desktops, and Servers
- ✧Keypads, Side Keys, USB 2.0, LCD Displays
- ✧Portable Instrumentation
- ✧Touch panel

Pin Configutation



Suggested PAD Layout



Unit : mm / inch

Ordering Information

Part No.	Package code	Package	Packing	Marking
TESDU5V0	RZG	0603	5K / 7" Reel	E05
TESDU12V	RZG	0603	5K / 7" Reel	E12
TESDU24V	RZG	0603	5K / 7" Reel	E24

Maximum Ratings and Electrical Characteristics

Rating at 25°C ambient temperature unless otherwise specified.

Maximum Ratings

Type Number		Symbol	Value	Units
Peak Pulse Power (tp=8/20μs waveform)	TESDU5V0	P_{PP}	75	W
	TESDU12V		25	
	TESDU24V		47	
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)		V_{ESD}	±15 ±8	KV
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to + 150	°C

Small Signal Diode

Electrical Characteristics

Type Number			Symbol	Min	Max	Units
Reverse Stand-Off Voltage	TESDU5V0		V_{RWM}	-	5	V
	TESDU12V				12	
	TESDU24V				24	
Reverse Breakdown Voltage	TESDU5V0	I_R= 1mA	$V_{(BR)}$	5.1	-	V
	TESDU12V			13	-	
	TESDU24V			25	-	
Reverse Leakage Current	TESDU5V0	V_R= 5V	I_R	-	2	uA
	TESDU12V	V_R= 12V				
	TESDU24V	V_R= 24V				
Clamping Voltage	TESDU5V0	I_{PP}= 1A	Vc	-	9.8	V
		I_{PP}= 5A		-	15	
Clamping Voltage	TESDU12V	I_{PP}= 1A	Vc	-	25	V
		I_{PP}= 5A		-	33	
Clamping Voltage	TESDU24V	I_{PP}= 1A	Vc	-	47	V
		I_{PP}= 5A		-	51	
Junction Capacitance	TESDU5V0	V_R=0V, f=1.0MHz	C_J	15 (Typ.)		pF
	TESDU12V			12 (Typ.)		
	TESDU24V			10 (Typ.)		

Small Signal Diode

Rating and Sharacteristic Curves

FIG 1 Non-Repetitive Peak Pulse Power vs. Pulse Time

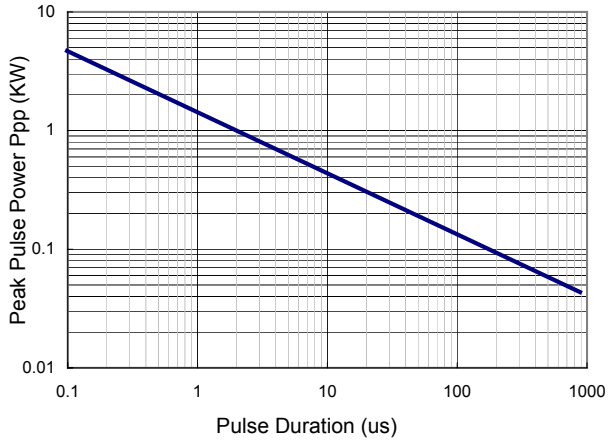


FIG 2 Pulse Waveform

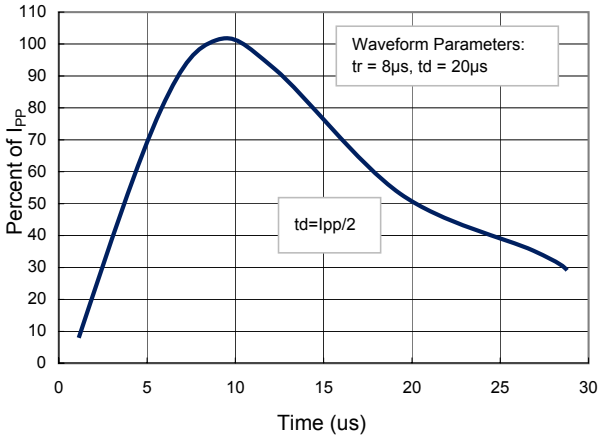


FIG 3 Admissible Power Dissipation Curve

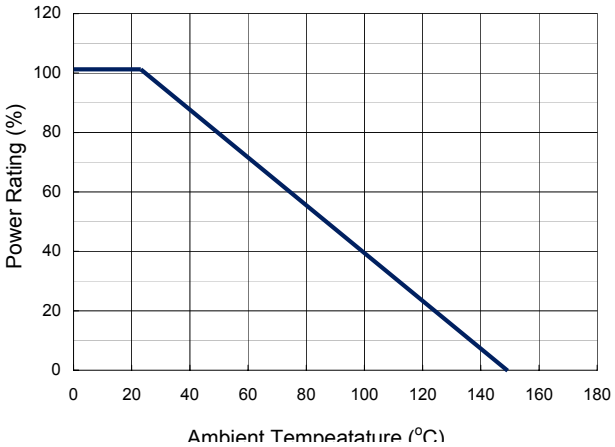


FIG 4 Typical Junction Capacitance

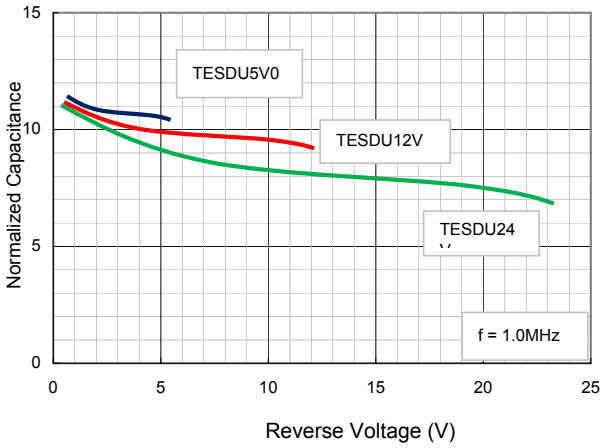
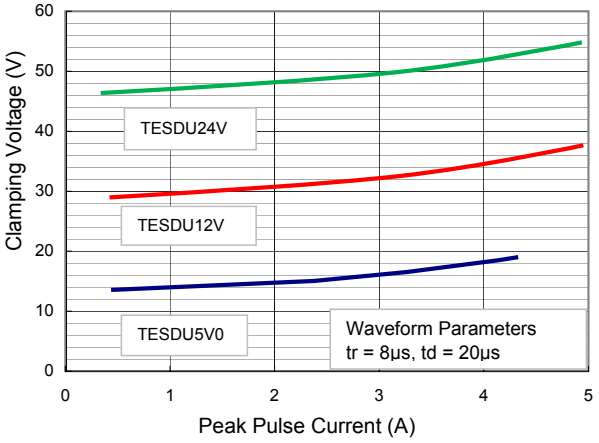


FIG 5 Clamping Voltage vs. Peak Pulse Current)



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Bi-directional ESD Protection Diode

Small Signal Diode

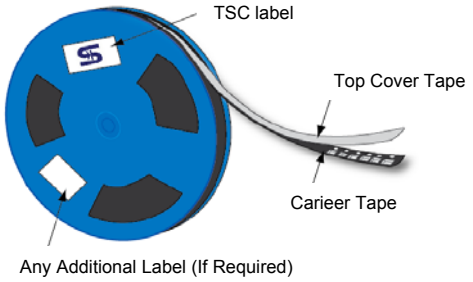
Applications Information

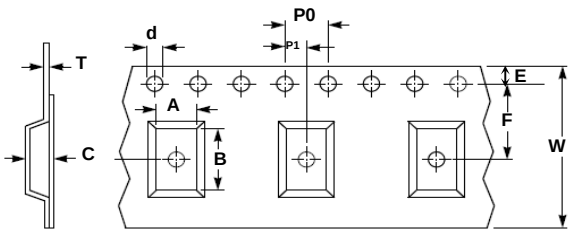
✧Designed to protect one data, I/O, or power supply line.
✧Designed to protect sensitive electronics from damage or latch-up due to ESD
✧Designed to replace multilayer varistors (MLVs) in portable applications
✧Features large crosssectional area junctions for conducting high transient currents
✧Offers superior electrical characteristics such as lower clamping voltage and no device degradation when compared to MLVs
✧The combination of small size and high ESD surge capability makes them ideal for use in portable applications.

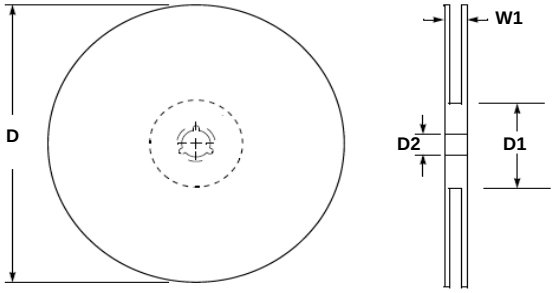
Circuit Board Layout Recommendations

Good circuit board layout is critical for the suppression of ESD induced transients.
✧Place the ESD Protection Diode near the input terminals or connectors to restrict transient coupling.
✧Minimize the path length between the ESD Protection Diode 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.

Tape & Reel specification







Item	Symbol	Dimension (mm)
Carrier width	A	1.00 ± 0.10
Carrier length	B	1.85 ± 0.10
Carrier depth	C	1.00 ± 0.10
Sprocket hole	d	1.55 ± 0.05
Reel outside diameter	D	178 ± 1
Reel inner diameter	D1	60.0 Min
Feed hole width	D2	13.0 ± 0.20
Sprocket hole position	E	1.75 ±0.10
Punch hole position	F	3.50 ±0.05
Punch hole pitch	P	4.00 ±0.10
Sprocket Hole pitch	P0	4.00 ±0.10
Embossment center	P1	2.00 ±0.05
Overall tape thickness	T	0.23 ± 0.05
Tape width	W	8.00 ±0.20
Reel width	W1	13.5 Max