SMD Diodes Specialist

Comchip Technology Corporation

ESD Protection Diode
CPDTR03 Series (SOT-23F-3P Package)
New Product Announcement

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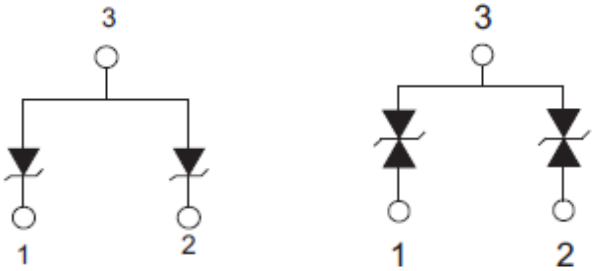
Product Description

Comchip's ESD diode array CPDTR03 series are designed to protect sensitive electronics from the damages caused by ESD and other transients. The device protects up to two signal lines and is available in both unidirectional and bidirectional protection. This series utilizes the SOT-23F-3P flat chip package which is a direct drop-in replacement for the lead-framed SOT-23 package. The device is RoHS compliant, Tin-free, Halogen-free, and has gold plated terminals to improve conductivity, reliability, and life longevity. Available applications for the CPDTR03 series include: 5V, 12V, and 24V.

SCHEMATIC DIAGRAMS

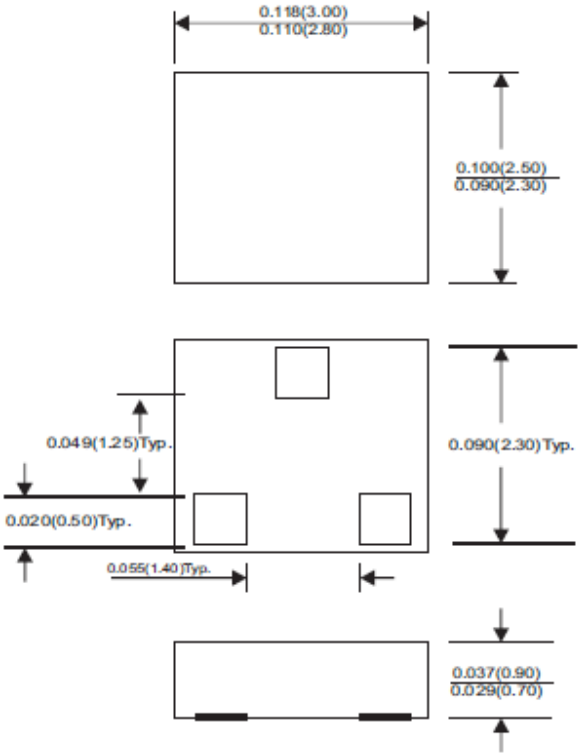


Unidirectional
CPDTR03XXU-Series

Bidirectional
CPDTR03XX-Series

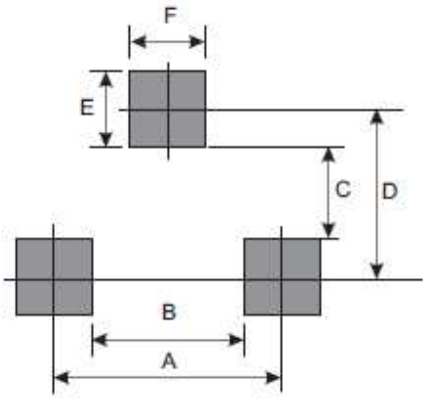
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SOT-23F-3P



Suggested PAD Layout

SIZE	CPDTR03	
	(mm)	(inch)
A	1.90	0.075
B	1.10	0.043
C	0.90	0.035
D	1.70	0.067
E	0.80	0.031
F	0.80	0.031



Features

Available in multiple voltage ranges: 5V to 24V
Unidirectional or bidirectional configurations
Protects two I/O lines
Low clamping voltage
Low leakage current
Drop-in replacement for the SOT-23 package
Halogen-free
RoHS compliant

Applications

Portable handheld devices
Portable GPS devices
MP3 players
Notebooks
Digital cameras
Displays

Specifications

Electrical Characteristics (at T_A=25℃ unless otherwise noted)

Parameter		Conditions	Symbol	Min	Typ	Max	Unit
Diode breakdown voltage	CPDTR035V0U-HF	IR=1mA	VBD	6.1		7.1	V
	CPDTR035V0C-HF			6.1	7		
	CPDTR0312V0U-HF			13.3	15.5	17.5	
	CPDTR0312V-HF			13	17		
	CPDTR0324V0U-HF			26.5			
	CPDTR0324V-HF			25	28		
Leakage current	CPDTR035V0U-HF	VR=5V	IL		0.1	1	uA
	CPDTR035V0C-HF				0.1	2	
	CPDTR0312V0U-HF	VR=12V			0.1	1	
	CPDTR0312V-HF				0.1	2	
	CPDTR0324V0U-HF	VR=24V				0.25	
	CPDTR0324V-HF				0.1	2	
Junction capacitance	CPDTR035V0U-HF	VR=0V, f=1MHz	CT		60	80	pF
	CPDTR035V0C-HF				25	30	
	CPDTR0312V0U-HF					60	
	CPDTR0312V-HF				12		
	CPDTR0324V0U-HF					35	
	CPDTR0324V-HF				10		
Clamping voltage	CPDTR035V0U-HF	IPP=8A, TP=8/20us	Vc			10	V
	CPDTR035V0C-HF	IPP=, TP=8/20us					
	CPDTR0312V0U-HF	IPP=5A, TP=8/20us				24	
	CPDTR0312V-HF	IPP=1A, TP=8/20us				25	
	CPDTR0324V0U-HF	IPP=3A, TP=8/20us				50	
	CPDTR0324V-HF	IPP=1A, TP=8/20us				47	
Peak pulse power	CPDTR035V0U-HF		Ppp			80	W
	CPDTR035V0C-HF						
	CPDTR0312V0U-HF					120	
	CPDTR0312V-HF					25	
	CPDTR0324V0U-HF					150	
	CPDTR0324V-HF					47	
ESD	CPDTR035V0U-HF	IEC-61000-4-2(air) IEC-61000-4-2(contact)	ESD			16/8	kV
	CPDTR035V0C-HF					16/8	
	CPDTR0312V0U-HF					30/30	
	CPDTR0312V-HF					16/8	
	CPDTR0324V0U-HF					20/15	
	CPDTR0324V-HF					16/8	
Operation Temperature			TJ			125	℃
Storage Temperature			TSGT	-55		150	℃

Application Information

Protection of Two Lines

With the CPDTR03 series, two different signals (or data lines) can be protected from electrostatic discharge (ESD).
Directions: Ground pin 3 and connect pin 1 and pin 2 to the signal lines that require protection.
When the voltage on the signal line is between 0V (ground) and the diode breakdown voltage (VBD), the diode between the signal line and the grounded pin offers a high isolation to the grounded line and the diode behaves like an open switch.
When the signal line has a transient voltage that exceeds the break through voltage of the diode, the diode becomes conductive and directs the transient current to the grounded pin. Now the protection device will behave like a closed switch (figures 1 and 2).

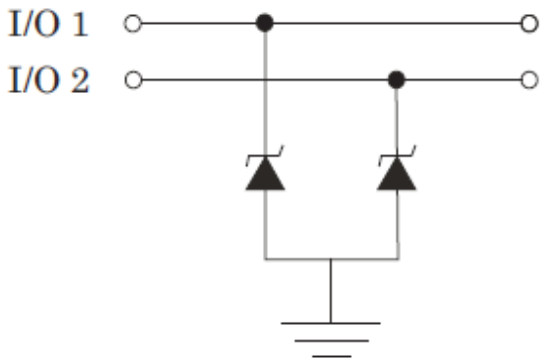


Figure 1

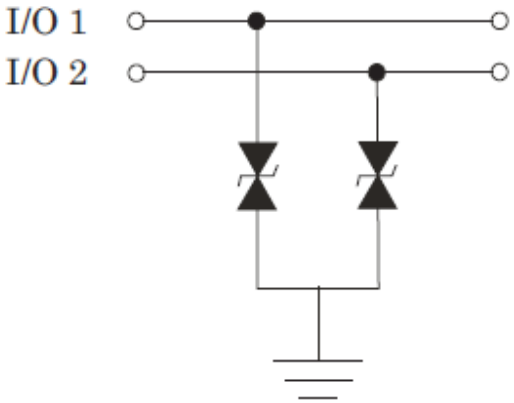


Figure 2

Bidirectional Protection of One Line

If only one line needs symmetrical clamping, the CPDTR03XXU-Series can be used for bidirectional symmetrical protection as well. In this case pin 3 must not be connected (figure 3).

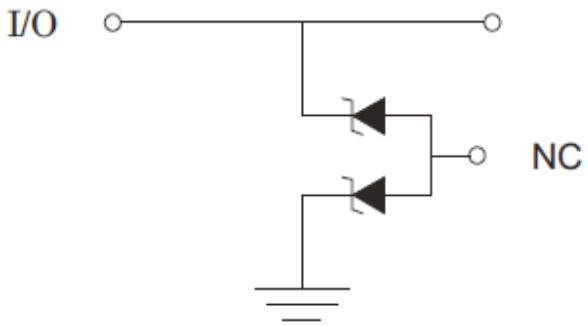


Figure 3

Parallel Protection of One Line

If protection from high surge currents is needed for one line, the CPDTR03-Series can be used in parallel for enhanced protection performance. Peak pulse current is twice the Ipp (2 x Ipp) but line capacitance and reverse leakage current doubles (figure 4 and 5).

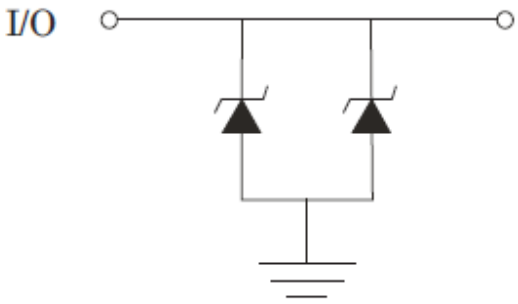


Figure 4

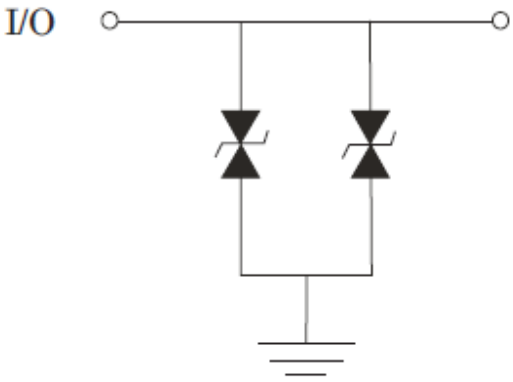


Figure 5