

# NUP45V6P5 Series

## Product Preview

### Low Capacitance Quad Array for ESD Protection

These integrated transient voltage suppressor devices (TVS) are designed for applications requiring transient overvoltage protection. They are intended to be used in sensitive equipment such as wireless headsets, PDAs, digital cameras, computers, printers, communication systems, medical equipment, and other applications. Their integrated design provides very effective and reliable protection for four separate lines using only one package. These devices are ideal for situations where board space is at a premium.

#### Features

- ESD Protection: IEC61000-4-2: Level 4  
MILSTD 883C - Method 3015-6: Class 3
- Four Separate Unidirectional Configurations for Protection
- Low Leakage Current < 1  $\mu$ A @ 3 V
- Small SOT-953 SMT Package
- Low Capacitance
- These are Pb-Free Devices

#### Benefits

- Provides Protection for ESD Industry Standards: IEC 61000, HBM
- Protects Four Lines Against Transient Voltage Conditions
- Minimize Power Consumption of the System
- Minimize PCB Board Space

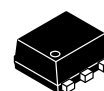
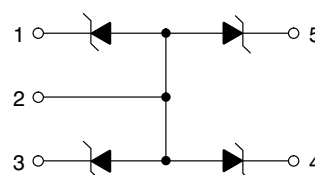
#### Typical Applications

- Cellular and Portable Electronics
- Serial and Parallel Ports
- Microprocessor Based Equipment
- Notebooks, Desktops, Servers



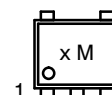
ON Semiconductor®

<http://onsemi.com>



SOT-953  
CASE 526AB

#### MARKING DIAGRAM



x = Specific Device Code  
M = Date Code  
G or ■ = Pb-Free Package

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NUP45V6P5T5G	SOT-953 (Pb-Free)	8000 / Tape & Reel
NUP46V8P5T5G	SOT-953 (Pb-Free)	8000 / Tape & Reel
NUP412VP5T5G	SOT-953 (Pb-Free)	8000 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

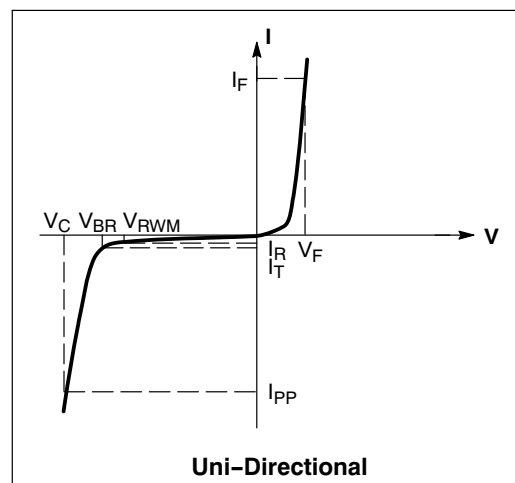
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## NUP45V6P5 Series

### ELECTRICAL CHARACTERISTICS

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

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
$\Theta_{V_{BR}}$	Maximum Temperature Coefficient of $V_{BR}$
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$
$Z_{ZT}$	Maximum Zener Impedance @ $I_{ZT}$
$I_{ZK}$	Reverse Current
$Z_{ZK}$	Maximum Zener Impedance @ $I_{ZK}$



### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Value	Unit
Peak Power Dissipation (8 X 20 $\mu\text{s}$ @ $T_A = 25^\circ\text{C}$ ) (Note 1) NUP45V6P5 NUP46V8P5 NUP412VP5	$P_{PK}$	14 20 65	W
Thermal Resistance Junction-to-Ambient Above $25^\circ\text{C}$ , Derate	$R_{\theta JA}$	560 4.5	$^\circ\text{C/W}$ mW/ $^\circ\text{C}$
Maximum Junction Temperature	$T_{Jmax}$	150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_J T_{stg}$	-55 to +150	$^\circ\text{C}$
Lead Solder Temperature (10 seconds duration)	$T_L$	260	$^\circ\text{C}$
Human Body Model (HBM) Machine Model (MM) IEC61000-4-2 Air (ESD) IEC61000-4-2 Contact (ESD)	ESD	8000 400 15000 8000	V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

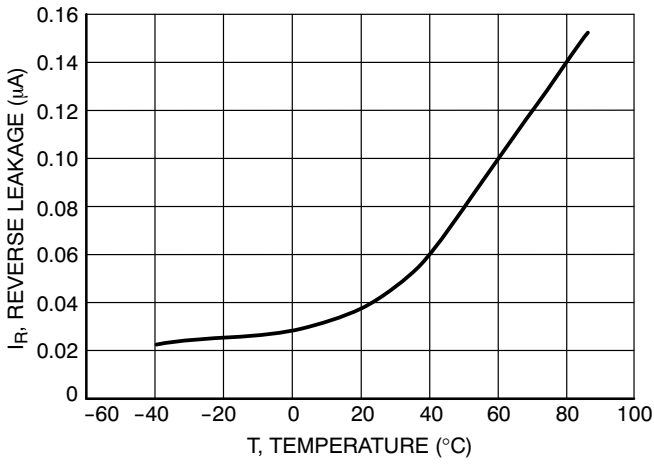
### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

Device	Device Marking	Breakdown Voltage $V_{BR}$ @ 1 mA (Volts)			Leakage Current $I_{RM}$ @ $V_{RM}$		Typ Capacitance @ 0 V Bias (pF) (Note 2)		Typ Capacitance @ 3 V Bias (pF) (Note 2)	
		Min	Nom	Max	$V_{RWM}$	$I_{RWM}$ ( $\mu\text{A}$ )	Typ	Max	Typ	Max
NUP45V6P5	5	5.3	5.6	5.9	3.0	1.0	13	17	7.0	11.5
NUP46V8P5	6	6.47	6.8	7.14	4.3	1.0	12	15	6.7	9.5
NUP412VP5 (Note 3)	2	11.4	12	12.7	9.0	0.5	6.5	10	3.5	5.0

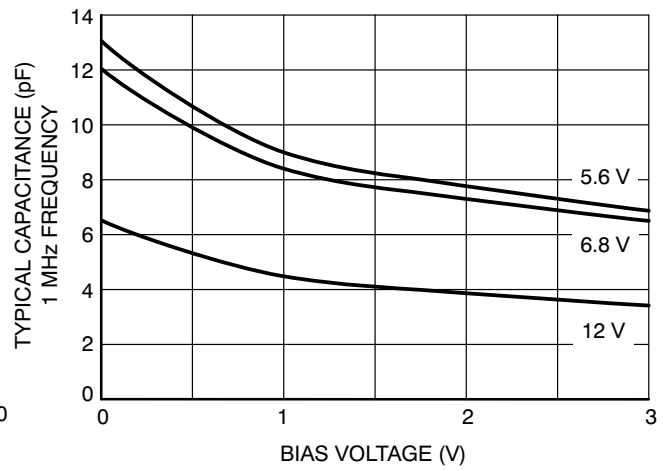
- Non-repetitive current per Figure 1.
- Capacitance of one diode at  $f = 1 \text{ MHz}$ ,  $V_R = 0 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .
- $V_{BR}$  at 5 mA.

# NUP45V6P5 Series

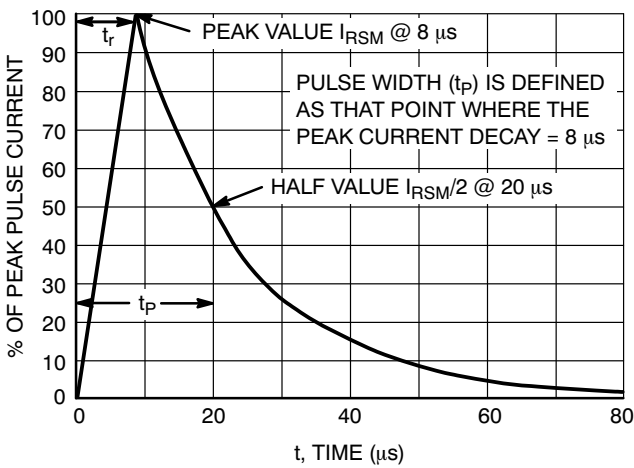
## TYPICAL ELECTRICAL CHARACTERISTICS



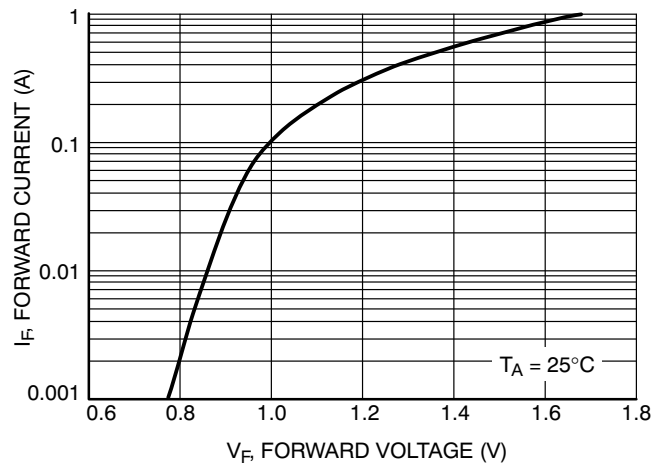
**Figure 1. Reverse Leakage versus Temperature**



**Figure 2. Capacitance**



**Figure 3. 8 × 20 µs Pulse Waveform**

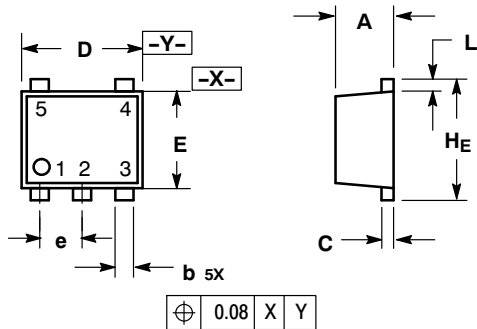


**Figure 4. Forward Voltage**

# NUP45V6P5 Series

## PACKAGE DIMENSIONS

SOT-953  
CASE 527AB-01  
ISSUE O

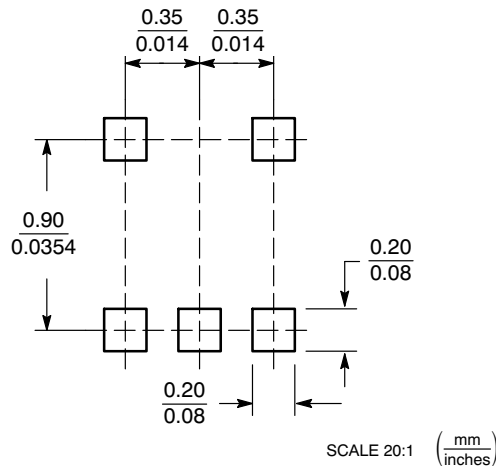


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.44	0.48	0.50	0.017	0.019	0.020
b	0.10	0.15	0.20	0.0039	0.0059	0.0079
C	0.05	0.10	0.15	0.002	0.004	0.006
D	0.95	1.00	1.05	0.037	0.039	0.041
E	0.75	0.80	0.85	0.03	0.032	0.034
e	0.35 BSC			0.014 BSC		
L	0.05	0.10	0.15	0.0019	0.0039	0.0059
HE	0.95	1.00	1.05	0.037	0.039	0.041

### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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