



## High Voltage Stack

### DESCRIPTION

This 688 high voltage stack device is constructed utilizing individual voidless glass packages with an epoxy filled plastic casing. Add suffix R for fast recovery trr of 500 ns maximum. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### FEATURES

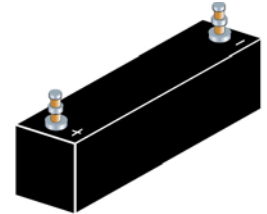
- Current ratings to 0.6 amps
- $V_{RWM}$  from 10 kV to 25 kV (see [part nomenclature](#) for all options)
- 150 °C junction temperature
- Surge ratings to 20 amps
- Bonded plate for maximum heat transfer mounting
- MIL-PRF-19500 similarity
- RoHS compliant versions available

### APPLICATIONS / BENEFITS

- Fused-in voidless glass diode design
- Controlled avalanche characteristics

### MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	$T_J$ and $T_{STG}$	-65 to +150	°C
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	10	°C/W
Thermal Resistance Junction-to-Case per package	$R_{\theta JC}$	25	°C/W
Forward Surge Current (Peak): @ $T_C = 25$ °C	$I_{FSM}$	20	A
Maximum Average DC Output Current: @ $T_C = 100$ °C	$I_O$	0.60 688-12(R) 688-15(R) 688-18(R) 688-20(R) 688-25(R)	A
Solder Temperature @ 10 s		260	°C



#### **MSC – Lawrence**

6 Lake Street,  
Lawrence, MA 01841  
Tel: 1-800-446-1158 or  
(978) 620-2600  
Fax: (978) 689-0803

#### **MSC – Ireland**

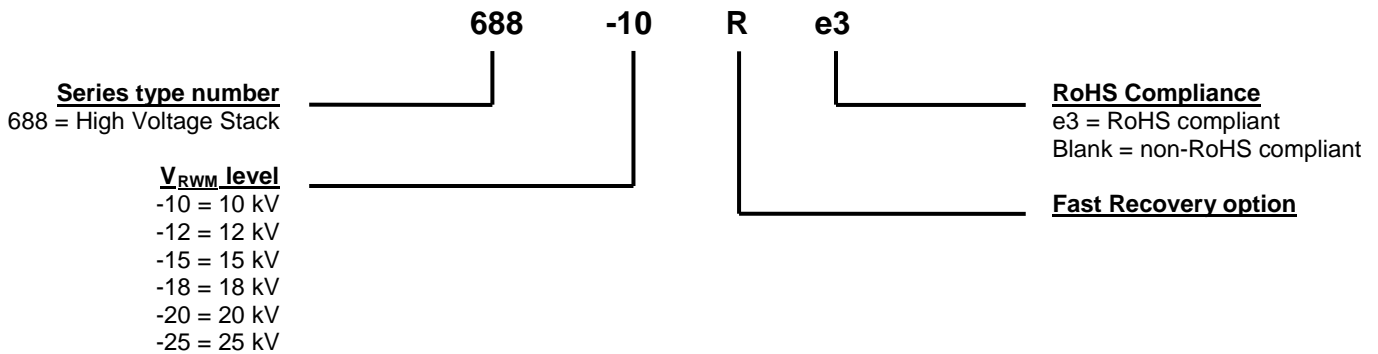
Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

#### **Website:**

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

**MECHANICAL and PACKAGING**

- CASE: Plastic filled with epoxy
- TERMINALS: Gold (Ag) plate over brass with a tin/lead (Sn/Pb) finish or RoHS compliant matte tin
- MARKING: Anode and cathode marked next to terminal along with part number and date code in center of device
- MOUNTING: Taped 10-32 screw inserts on bottom side that are brass
- WEIGHT: 70 grams (typical)
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

Symbol	Definition
$I_{FSM}$	Maximum Forward Surge Current: The forward current, surge peak or rated forward surge current.
$I_O$	Average Rectified Forward Current: The output current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.
$V_{FM}$	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
$I_{RM}$	Maximum Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.
$V_{RWM}$	Working Peak Reverse Voltage: The peak voltage excluding all transient voltages (ref JESD282-B). Also sometimes known historically as PIV.
$t_{rr}$	Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified decay point after a peak reverse current occurs.

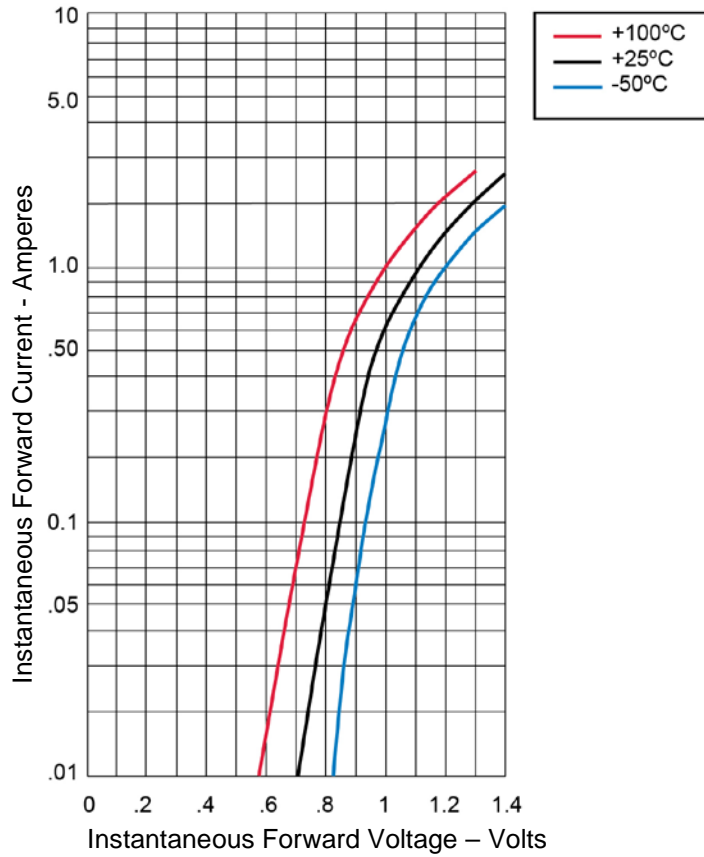
**ELECTRICAL CHARACTERISTICS**

PART NUMBER (Note 1)	WORKING PEAK REVERSE VOLTAGE $V_{RWM}$	MINIMUM BREAKDOWN VOLTAGE $V_{(BR)}$	MAX FORWARD VOLTAGE PER LEG $V_{FM}$ (Note 2)	MAX REVERSE PEAK CURRENT $I_{RM}$ @ $V_{RWM}$	
			@ 25 °C	@ 25 °C	@ 100 °C
	kV	kV	Volts	$\mu A$	$\mu A$
688-10(R)	10	11.0	17 @ 0.4 A	2	100
688-12(R)	12	13.2	20 @ 0.4 A	2	100
688-15(R)	15	16.5	25 @ 0.4 A	2	100
688-18(R)	18	19.8	30 @ 0.4 A	2	100
688-20(R)	20	22.0	34 @ 0.4 A	2	100
688-25(R)	25	27.5	42 @ 0.4 A	2	100

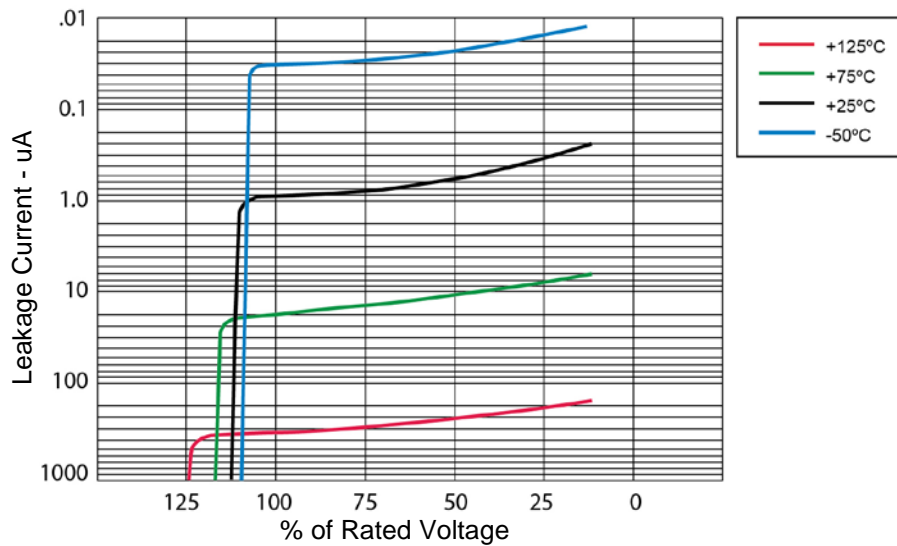
**NOTES:** 1. Add suffix R for fast recovery with a  $t_{rr}$  of 500 ns maximum (test conditions of  $I_F = 10$  mA,  $I_{RM} = 10$  mA,  $I_{R(REC)} = 5$  mA).

2. Pulse test: Pulse width 300  $\mu$ sec, duty cycle 2%.

## GRAPHS

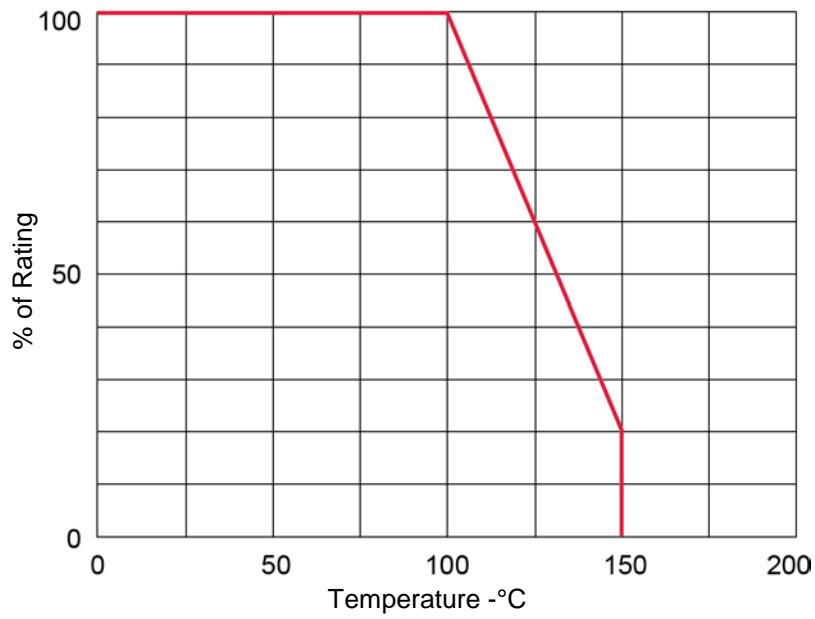


**FIGURE 1**  
Thermal Impedance

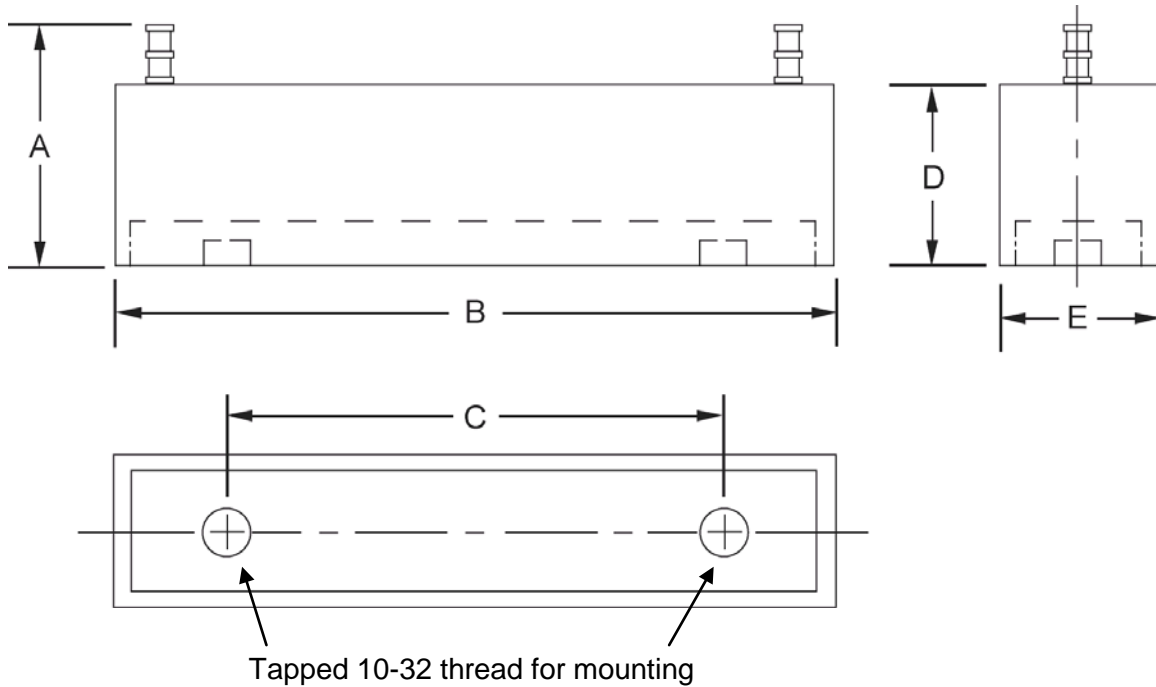


**FIGURE 2**  
Typical Reverse Leakage Current

GRAPHS (continued)



**FIGURE 3**  
Current Derating

**PACKAGE DIMENSIONS**


Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	-	1.140	-	28.96
B	2.985	3.015	75.82	76.58
C	2.110	2.140	53.59	54.36
D	0.740	0.770	18.80	19.56
E	0.720	0.750	18.29	19.05