

**DESCRIPTION**

Designed for high current narrow-pulse switching applications where size and current handling capability are critical. These devices may be triggered on using low power logic drivers from (+0.8 V at 200  $\mu$ A).

Epoxy packaged, oxide passivated planar SCR chips with metallurgic bonds on both sides to achieve high reliability. Internal wire bond connection allows high current surge capability for narrow pulse applications.

**KEY FEATURES**

- Powermite 3<sup>®</sup> Package
- Small Mechanical Outline
- High speed switching capability
- Logic drive capability (0.8V, 200 $\mu$ A)
- UIS Rated Available with Lot Acceptance Testing
- Ideal for Laser Range finder and Camera Applications
- Ideal for Automotive Collision Avoidance Applications
- Available in 16mm Tape and Reel—6000 units/reel

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

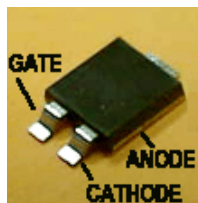
**ABSOLUTE MAXIMUM RATINGS AT 25° C  
(UNLESS OTHERWISE SPECIFIED)**

Rating	Symbol	Value	Unit
Repetative peak Off-State Voltage	$V_{DRM}$	125	V
Peak On-State Current	$I_{TSM}$	100	A
Peak Gate Current	$I_{GM}$	250	mA
Reverse Gate Voltage	$V_{GR}$	5	V
Storage Temperature Range	$T_s$	-50 to 150	°C
Operating Temperature Range	$T_J$	-25 to 125	°C


**THERMAL CHARACTERISTICS  
(UNLESS OTHERWISE SPECIFIED)**

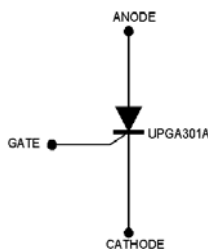
Thermal Resistance			
Junction-to Case (Anode)	R <sub>J</sub>	4.0	°C/Watt

- (1) Mounted on 2" square by 0.06" thick FR4 board with a 1" x 1" square 2 ounce copper pattern.  
 (2) Mounted on 0.06 thick FR4 board, using recommended footprint.



Small foot print

 .100 X .160 inches  
 Foot print Area 16.51 mm<sup>2</sup>  
 1:1 Actual size (anode contact)


**APPLICATIONS/BENEFITS**

- Microsemi Corp DN14 design note

Nanosecond SCR switch for reliable high current pulse generators, modulators and photo-flash quenching.

Several new applications for nanosecond SCR switches include automotive collision avoidance systems, laser drivers, photo-flash quenching circuits, specially developed circuits for the emerging digital imaging range finders and communication markets.

**ELECTRICAL PARAMETERS@25°C (unless otherwise specified)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
► On characteristics (up to 100 A w/ 100 ns pulse @ Duty Cycle = 0.0001% or less)						
Forward Blocking Current	$I_{DRM}$	$V_{DRM} = 100V, R_{GK} = 1k\Omega$			1.0	$\mu A$
On - State Voltage	$V_T$	$I_T = 1A, I_g = 10mA$		1.1	1.5	V
Gate Trigger Voltage	$V_{GT}$	$V_D = 5V, R_{GS} = 100\Omega$		0.5	0.75	V
Gate Trigger Current	$I_{GT}$	$V_D = 5V, R_{GS} = 10k\Omega$		2	20	$\mu A$
Reverse Gate Current	$I_{GR}$	$V_{GR} = 5V$		0.01	0.1	mA
Holding Current	$I_H$	$V_D = 5V, R_{GK} = 1k\Omega$	0.3	1.0	2.5	mA
Reverse Current (note 1)	$I_{RRM}$	$V_{RRM} = 30V, R_{GK} = 1k\Omega$		1	10	mA
► Switching characteristics ( $T_c = 25^\circ C$ )						
Delay Time	td	$I_g = 20 mA, I_T = 1A$		20	30	ns
Rise Time	tr	$V_D = 100V, I_T = 1A, I_g = 10mA$ DC < 1%		15	25	ns
Circuit Commutated Turn—off Time	tq	$I_T = I_R = 1A, R_{GK} = 1k\Omega$		0.3	0.5	$\mu s$
Gate Trigger—on Pulse Width	tpg(on)	$I_g = 10mA, I_T = 1A$		20	50	ns
Critical Rate of Rise Off –State Voltage	dv/dt	$V_D = 30V, R_{GK} = 1k\Omega$	15	30		V/ $\mu s$

Note 1: Pulse Test intended to guarantee reverse anode voltage capability for pulse commutation.

**SPICE MODEL**

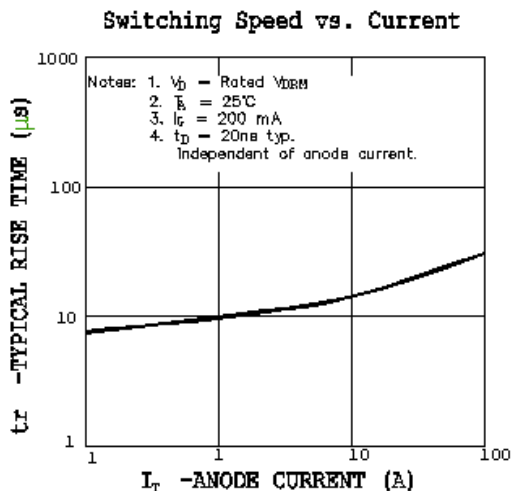
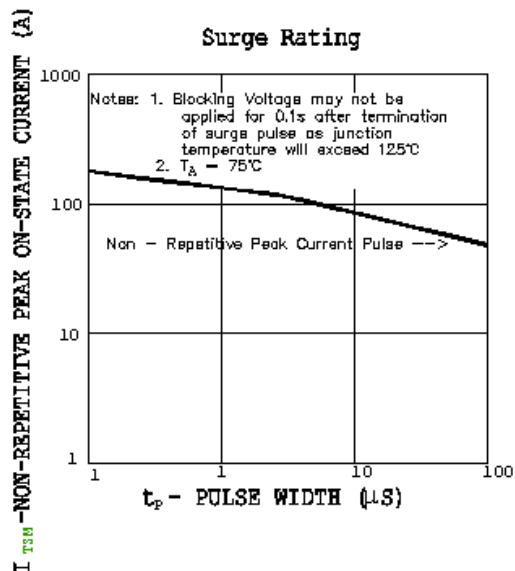
.subckt SCR anode gate cathode PARAMS:

\* Powermite 3 UPGA301A high-speed thyristor

+Vdrm=125V    Vrrm=30V    Idm=1 $\mu A$     lh=5mA  
 +dvdt=7E5V/s    lgt=200 $\mu A$     Vgt=0.75V    Vtm=1.5V  
 +ltm=2A    ton=55ns    toff=500ns

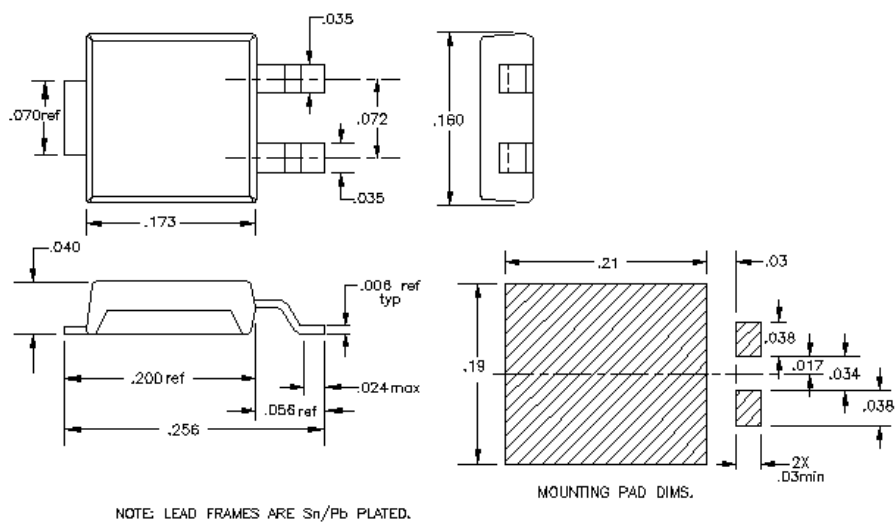
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Case: Molded Epoxy  
Meets UL94VO at 1/8 inch  
Weight: 72 milligrams  
Lead and Mounting Temperature: 260°C max for 10 seconds

NOTE: All dimensions are in inches.



**PACKAGE DATA**



*PRELIMINARY*

UPGA301A

Nanosecond SCR SWITCH

PRODUCT PREVIEW

NOTES:

www.Microsemi.com

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