



WATERTOWN DIVISION

PRELIMINARY

UPGA301A

Nanosecond SCR SWITCH

PRODUCT PREVIEW

**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 <sub>DRM</sub>	125	V
Peak On-State Current	I <sub>TSM</sub>	100	A
Peak Gate Current	I <sub>GM</sub>	250	mA
Reverse Gate Voltage	V <sub>GR</sub>	5	V
Storage Temperature Range	T <sub>s</sub>	-50 to 150	°C
Operating Temperature Range	T <sub>J</sub>	-25 to 125	°C

**APPLICATIONS/BENEFITS**

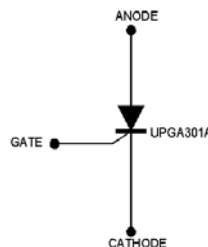
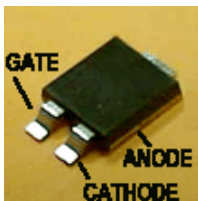
- Microsemi Corp DN14 design note

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

**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)

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.



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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
<b>► On characteristics (up to 100 A w/ 100 ns pulse @ Duty Cycle = 0.0001% or less)</b>						
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
<b>► Switching characteristics (Tc = 25 °C)</b>						
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/ $\mu s$

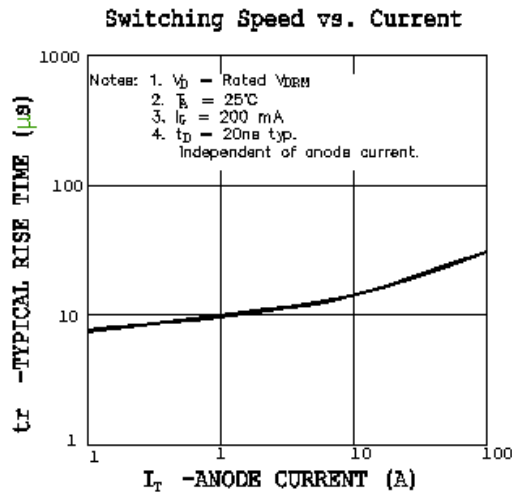
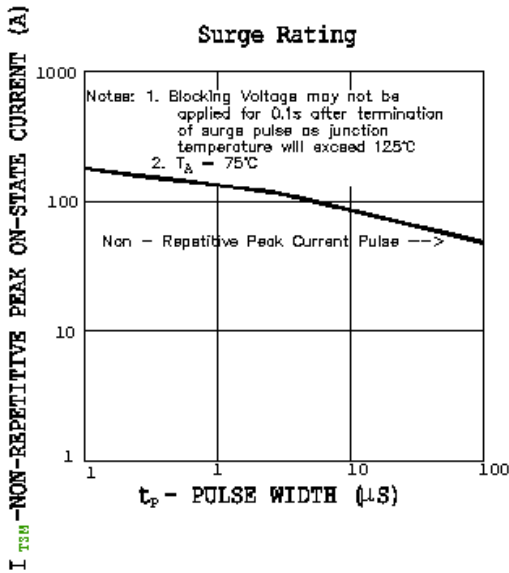
Note 1: Pulse Test intended to guarantee reverse anode voltage capability for pulse commutation.

**SPICE MODEL**

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.subckt SCR anode gate cathode PARAMS:
* Powermite 3 UPGA301A high-speed thyristor
+Vdrm=125V   Vrrm=30V   Idrm=1µA   lh=5mA
+dvdt=7E5V/s  Igt=200µA  Vgt=0.75V  Vtm=1.5V
+ltm=2A      ton=55ns  toff=500ns
.END
```

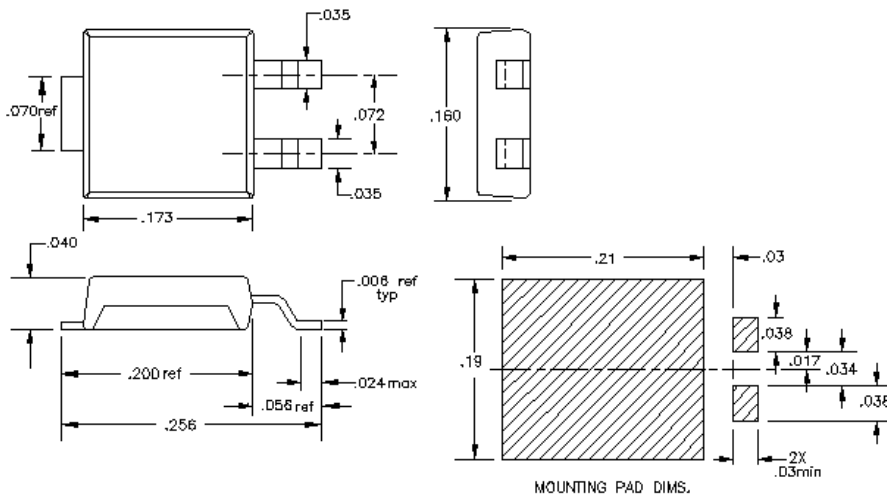
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**ELECTRICALS**



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**



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**NOTES:**

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