SCRs
Nanosecond Switching, Planar

GA200 GB200
GA200A GB200A
GA201 GB201
GA201A GB201A

FEATURES
- Rise Time: 10ns
- Delay Time: 10ns
- Recovery Time: 0.5 μs
- Pulse Current: to 100A
- Turn-on with 20ns, 10 mA Gate Pulse

DESCRIPTION
The Microsemi Nanosecond Thyristor Switch combines the turn-on speed of logic level transistors with the high current switching capability inherent in SCRs. With this device engineers can now design circuits capable of switching pulse currents of 1A in less than 10ns or up to 30A in less than 20ns.

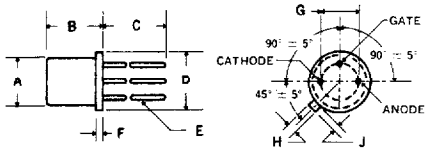
The GA/GB200 series is specifically designed for use as switching elements in high speed, low-to-medium power radar pulse modulators. Other applications include switching elements for phased array radars, laser pulse drivers, harmonic wave-form generators, line drivers and high current replacements for avalanche transistors. For applications requiring higher voltage levels, Microsemi has developed several "series string" circuits which allow the series connection of virtually an unlimited number of devices for voltages as high as 2000V with no significant decrease in speed. The circuits are described in Microsemi's Design Note #14.

ABSOLUTE MAXIMUM RATINGS

	GA200 GA200A	GA201 GA201A	GB200 GB200A	GB201 GB201A
Repetitive Peak Off-State Voltage, V_{DRM}	60V	100V	60V	100V
Repetitive Peak On-State Current, I_{TRM}	up to 100A		up to 100A	
D.C. On-State Current, I_T				
70°C Ambient	200mA		—	
70°C Case	400mA		6A	
Peak Gate Current, I_{GM}	250mA		250mA	
Average Gate Current, $I_{G(AV)}$	25mA		50mA	
Reverse Gate Current, I_{GR}	3mA		3mA	
Reverse Gate Voltage, V_{GR}	5V		5V	
Thermal Resistance, $R_{\theta CA}$	300°C/W			
Storage Temperature Range	−65°C to +200°C			
Operating Temperature Range	−65°C to +150°C			

MECHANICAL SPECIFICATIONS

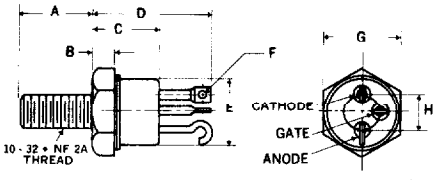
GA200 GA200A GA201 GA201A



	INCHES	MILLIMETERS
A	.178-.195 DIA.	4.52-4.95 DIA.
B	.170-.210	4.31-5.33
C	.5 MIN.	12.70 MIN.
D	.209-.230 DIA.	5.31-5.84 DIA.
E	.017 ± .002 DIA. .001 DIA.	.432 ± .051 .025
F	.020 MAX.	.508 MAX.
G	.100±.010 DIA.	2.54±.254 DIA.
H	.041±.005	1.04±.127
J	.028-.048	.711-1.22

TO-18

GB200 GB200A GB201 GB201A



	INCHES	MILLIMETERS
A	.400-.456	10.16-11.66
B	.090-.150	2.28-3.81
C	.320-.468	8.13-11.88
D	.570-.763	14.48-19.38
E	.318-.380	8.07-9.65
F	.055 ± .010 .015	1.40 ± .254 .381
G	.424-.437	10.77-11.10
H	.185-.215	4.70-5.46

NOTE: Anode connected to case.

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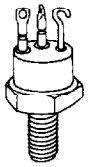

Microsemi Corp.
Watertown
The diode experts

ELECTRICAL SPECIFICATIONS (at 25°C unless noted)

Test	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Delay Time	t_d	— —	20 10	30 —	ns ns	$I_G = 20mA$, $I_T = 1A$ $I_G = 30mA$, $I_T = 1A$
Rise Time GA200, 200A, GB200, 200A	t_r	— —	15 25	25 —	ns ns	$V_D = 60V$, $I_T = 1A$ (1) $V_D = 60V$, $I_T = 30A$ (1)
Rise Time GA201, 201A, GB201, 201A	t_r	— —	10 20	20 —	ns ns	$V_D = 100V$, $I_T = 1A$ (1) $V_D = 100V$, $I_T = 30A$ (1)
Gate Trigger on Pulse Width	$t_{pg(on)}$	—	.02	.05	μs	$I_G = 10mA$, $I_T = 1A$
Circuit Commutated Turn-off Time GA200, 201, GB200, 201	t_q	—	0.8	2.0	μs	$I_T = 1A$, $I_R = 1A$, $R_{GK} = 1K$
GA200A, 201A, GB200A, 201A	t_q	—	0.3	0.5	μs	
Off-State Current	I_{DRM}	— —	.01 20	0.1 100	μA μA	V_{DRM} = Rating, $R_{GK} = 1K$ V_{DRM} = Rating, $R_{GK} = 1K$, 150°C
Reverse Current	I_{RRM}	—	1.0	10	mA	$V_{RRM} = 30V$, $R_{GK} = 1K$ (2)
Reverse Gate Current	I_{GR}	—	.01	0.1	mA	$V_{GRM} = 5V$
Gate Trigger Current	I_{GT}	—	10	200	μA	$V_D = 5V$, $R_{GS} = 10K$
Gate Trigger Voltage	V_{GT}	0.4 0.10	.6 0.2	0.75 —	V V	$V_D = 5V$, $R_{GS} = 100\Omega$, T = 25°C T = +150°C
On-State Voltage	V_T	—	1.1	1.5	V	$I_T = 2A$
Holding Current	I_H	0.3 0.05	2.0 0.2	5.0 —	mA mA	$V_D = 5V$, $R_{GK} = 1K$, T = 25°C T = +150°C
Off-State Voltage-Critical Rate of Rise	dv/dt	20	40	—	V/μs	$V_D = 30V$, $R_{GK} = 1K$

Notes: 1. I_G = 10mA; Pulse Test, Duty Cycle <1%.

2. Pulse test intended to guarantee reverse anode voltage capability for pulse commutation. Device should not be operated in the Reverse blocking mode on a continuous basis.

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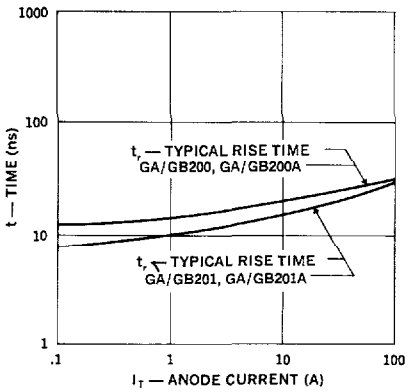
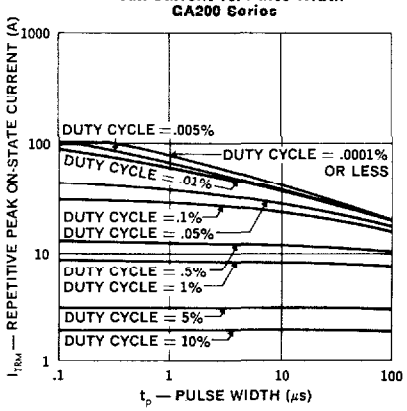
Switching Speed (Typical)
GA/GB200 Series



NOTES: 1. V_o = Rated V_{DRM}
2. $T_A = 25°C$
3. $I_G = 20mA$
4. $t_d = 20ns$ TYPICALLY FOR ALL TYPES INDEPENDENT OF ANODE CURRENT

Peak Current vs. Pulse Width
GA200 Series



NOTES: 1. DATA BASED ON ON-STATE VOLTAGE GRAPH AT $T_j = 150°C$. BLOCKING VOLTAGE MAY BE APPLIED IMMEDIATELY AFTER TERMINATION OF CURRENT PULSE.
2. $T_A = 75°C$

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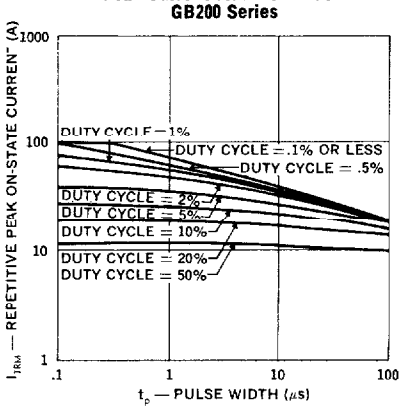
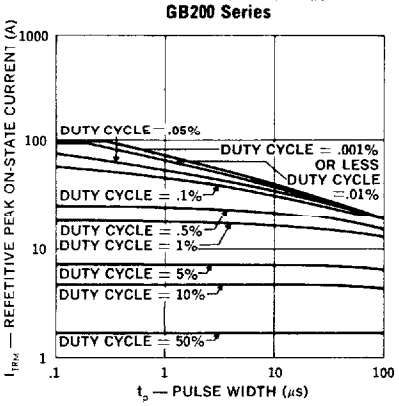
Peak Current vs. Pulse Width
GB200 Series



NOTES: 1. DATA BASED ON ON-STATE VOLTAGE GRAPH AT $T_j = 150°C$. BLOCKING VOLTAGE MAY BE APPLIED IMMEDIATELY AFTER TERMINATION OF CURRENT PULSE.
2. $T_C = 75°C$

Peak Current vs. Pulse Width
GB200 Series



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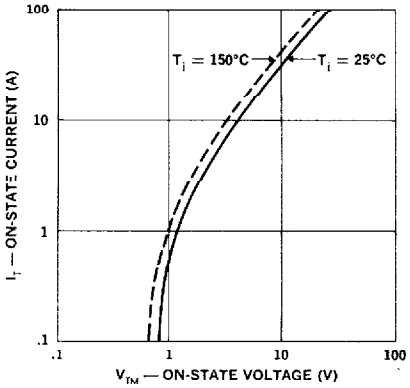
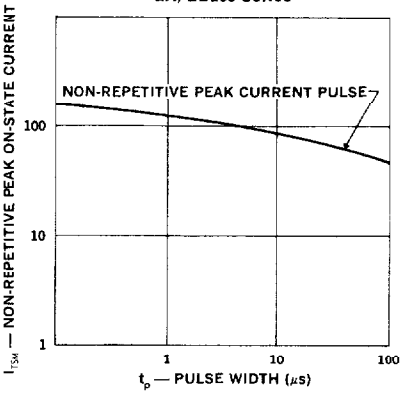
2. $T_A = 75°C$

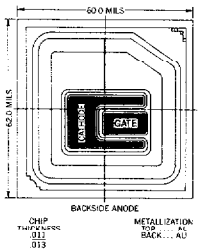
On-State Current vs. Voltage
GA/GB200 Series



Surge Rating Maximum
GA/GB200 Series



NOTES: 1. BLOCKING VOLTAGE MAY NOT BE APPLIED FOR .001 SEC. AFTER TERMINATION OF SURGE PULSE AS JUNCTION TEMPERATURE WILL EXCEED 150°C.
2. $T_C = 75°C$



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