

2N6400-2N6405

SILICON CONTROLLED RECTIFIERS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage ⁽¹⁾ ($T_J = -40$ to 125°C , sine wave 50 to 60Hz, gate open)			
2N6400		50	Volts
2N6401	V_{DRM}	100	
2N6402	V_{RRM}	200	
2N6403		400	
2N6404		600	
2N6405		800	
On-state RMS current (180° conduction angles), $T_C = 100^\circ\text{C}$)	$I_{\text{T(RMS)}}$	16	Amps
Average on-state current (180° conduction angles), $T_C = 100^\circ\text{C}$)	$I_{\text{T(AV)}}$	10	Amps
Peak non-repetitive surge current (1/2 cycle, sine wave 60Hz, $T_J = 90^\circ\text{C}$)	I_{TSM}	160	Amps
Circuit fusing ($t = 8.3\text{ms}$)	I^2t	145	A^2s
Forward peak gate power (pulse width $\leq 1.0\mu\text{s}$, $T_C = 100^\circ\text{C}$)	P_{GM}	20	Watts
Forward average gate power ($t = 8.3\text{ms}$, $T_C = 100^\circ\text{C}$)	$P_{\text{G(AV)}}$	0.5	Watts
Forward peak gate current (Pulse width $\leq 1.0\mu\text{s}$, $T_C = 100^\circ\text{C}$)	I_{GM}	2.0	Amps
Operating junction temperature range	T_J	-40 to 125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-40 to 150	$^\circ\text{C}$

1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage, however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal resistance, junction to case	$R_{\theta\text{JC}}$	1.5	$^\circ\text{C}/\text{W}$
Maximum lead temperature for soldering purposes 1/8" from case for 10 seconds	T_L	260	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak repetitive forward or reverse blocking current ($V_{\text{AK}} = \text{rated } V_{\text{DRM}}$ or V_{RRM} , gate open)	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	I_{DRM} I_{RRM}	- -	- -	10 2.0 μA mA
ON CHARACTERISTICS					
Peak forward on-state voltage ($I_{\text{TM}} = 32\text{A}$ peak, pulse width $\leq 1\text{ms}$, duty cycle $\leq 2\%$)	V_{TM}	-	-	1.7	Volts
Gate trigger current (continuous dc) ($V_D = 12\text{Vdc}$, $R_L = 100\text{ohms}$)	$T_C = 25^\circ\text{C}$ $T_C = -40^\circ\text{C}$	I_{GT}	- -	9.0 60	mA
Gate trigger voltage (continuous dc) ($V_D = 12\text{Vdc}$, $R_L = 100\text{ohms}$)	$T_C = 25^\circ\text{C}$ $T_C = -40^\circ\text{C}$	V_{GT}	- -	0.7 2.5	Volts
Gate non-trigger voltage ($V_D = 12\text{Vdc}$, $R_L = 100\text{ohms}$)	$T_C = 125^\circ\text{C}$	V_{GD}	0.2	-	Volts

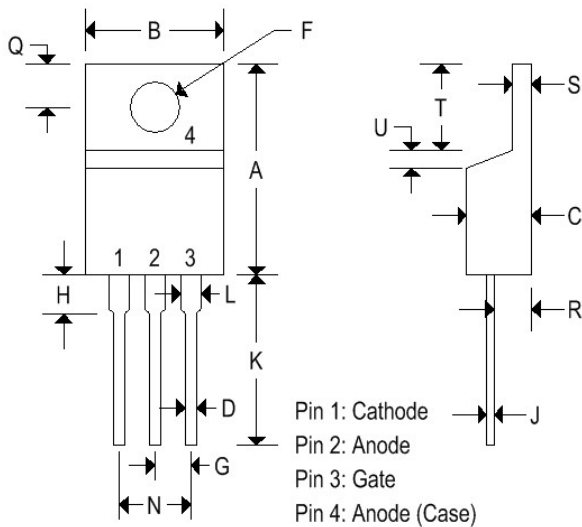
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ON CHARACTERISTICS						
Holding current ($V_D = 12\text{Vdc}$, initiating current = 200mA, gate open)	$T_C = 25^\circ\text{C}$	I_H	-	18	40	mA
	$T_C = -40^\circ\text{C}$		-	-	60	
Turn-on time ($I_{TM} = 16\text{A}$, $I_{GT} = 40\text{mA}$, $V_D = \text{rated } V_{DRM}$)		t_{gt}	-	1.0	-	μs
Turn-off time ($I_{TM} = 16\text{A}$, $I_R = 16\text{A}$, $V_D = \text{rated } V_{DRM}$)	$T_C = 25^\circ\text{C}$	t_q	-	15	-	μs
	$T_J = 125^\circ\text{C}$		-	35	-	
DYNAMIC CHARACTERISTICS						
Critical rate of rise of off state voltage ($V_D = \text{rated } V_{DRM}$, exponential waveform)	$T_J = 125^\circ\text{C}$	dv/dt	-	50	-	$\text{V}/\mu\text{s}$

MECHANICAL CHARACTERISTICS

Case	TO-220AB
Marking	Alpha-numeric
Pin out	See below



	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	1.140	1.390
N	0.190	0.210	4.830	5.330
Q	0.100	0.120	2.540	3.040
R	0.080	0.110	2.040	2.790
S	0.045	0.055	1.140	1.390
T	0.235	0.255	5.970	6.480
U	-	0.050	-	1.270
V	0.045	-	1.140	-
Z	-	0.080	-	2.030

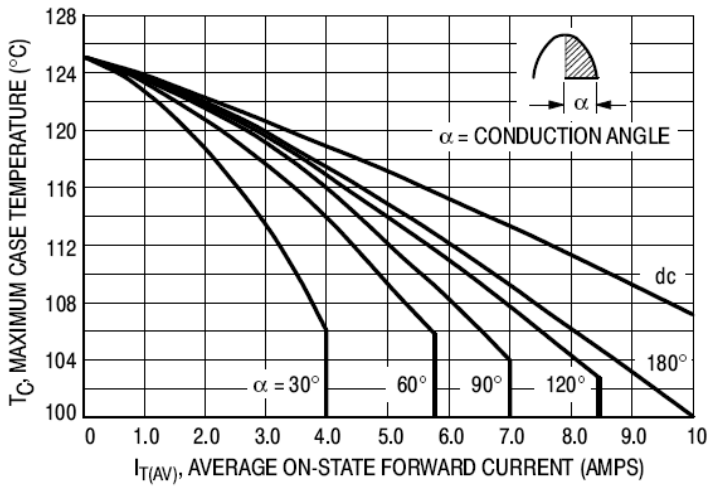
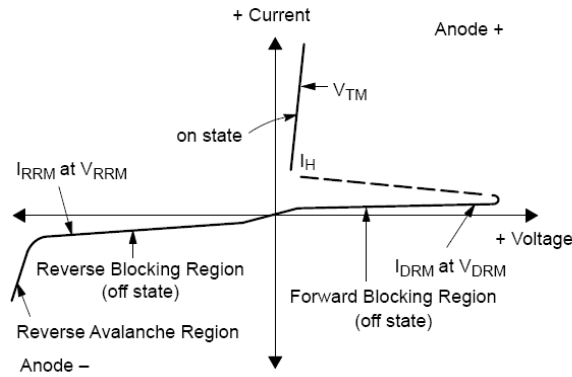


Figure 1. Average Current Derating

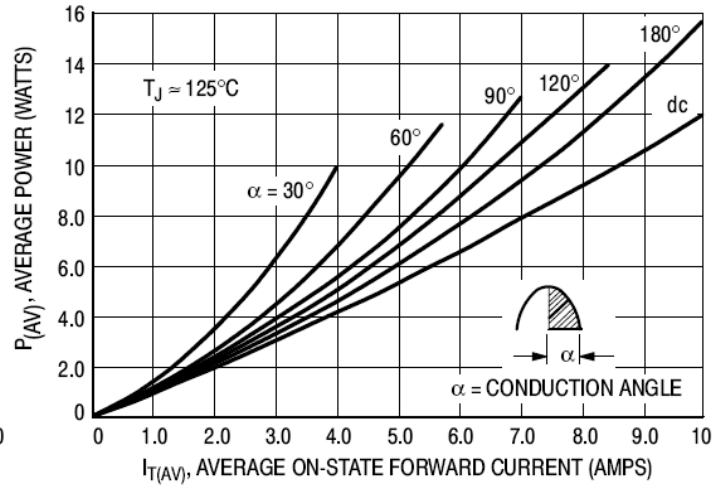


Figure 2. Maximum On-State Power Dissipation

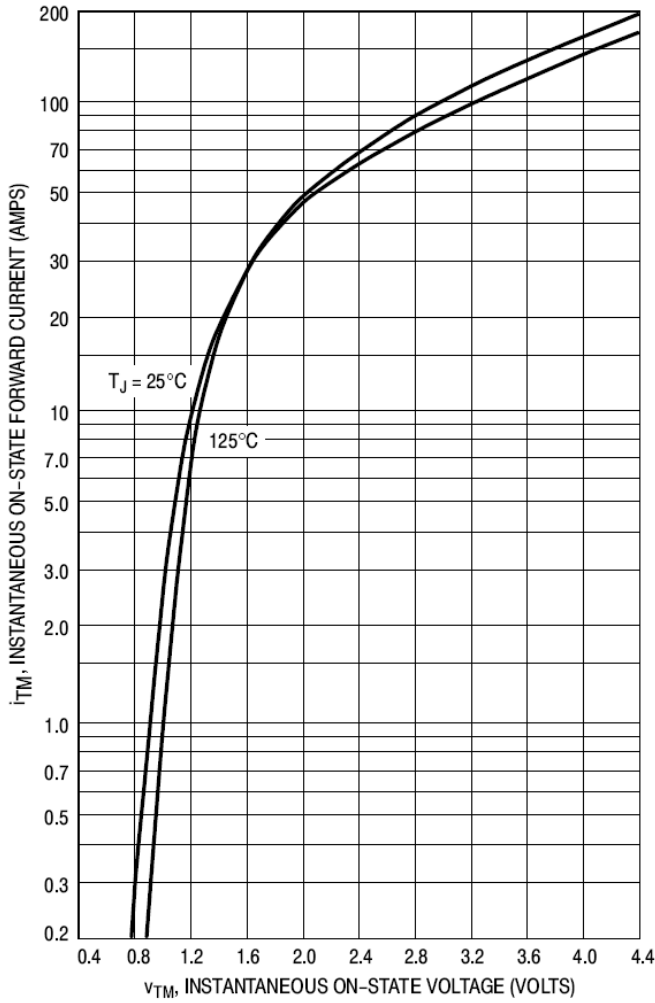


Figure 3. On-State Characteristics

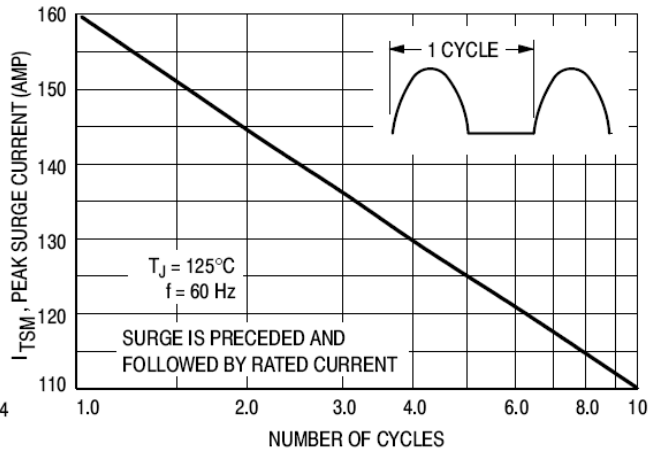


Figure 4. Maximum Non-Repetitive Surge Current

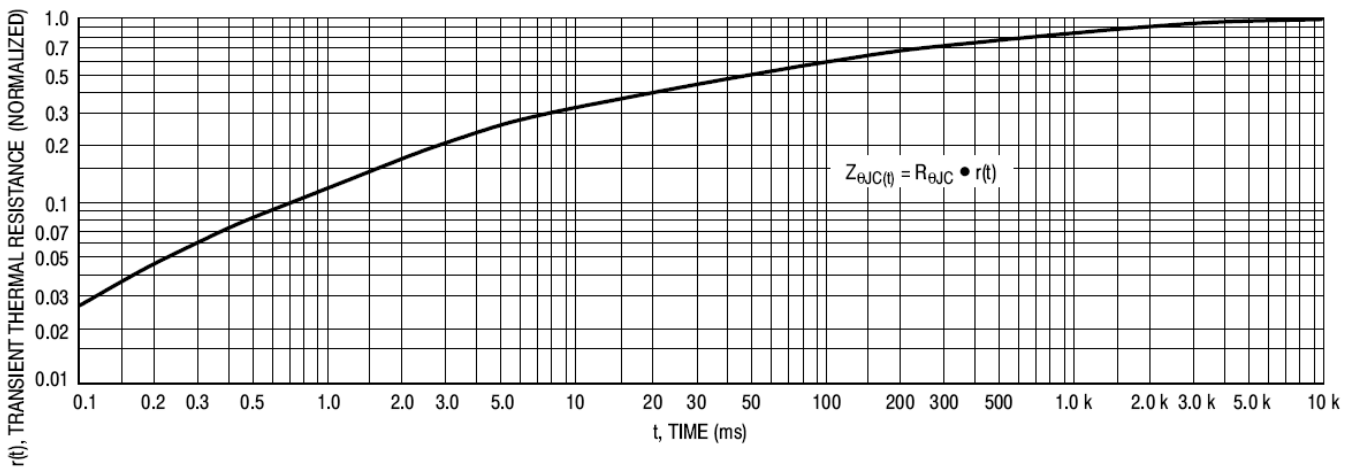


Figure 5. Thermal Response

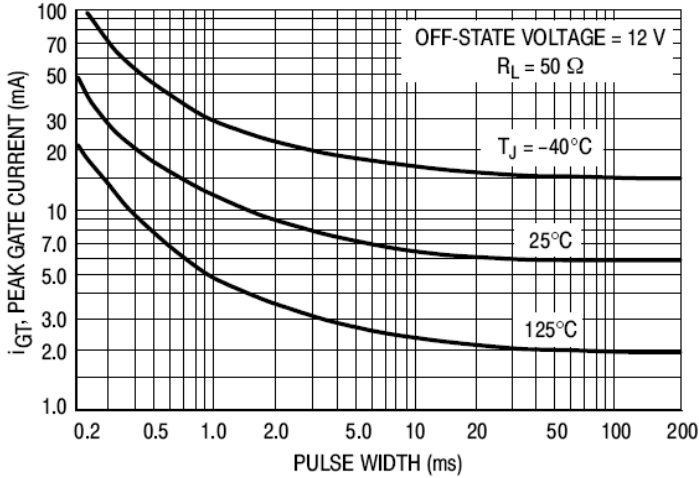


Figure 6. Typical Gate Trigger Current versus Pulse Width

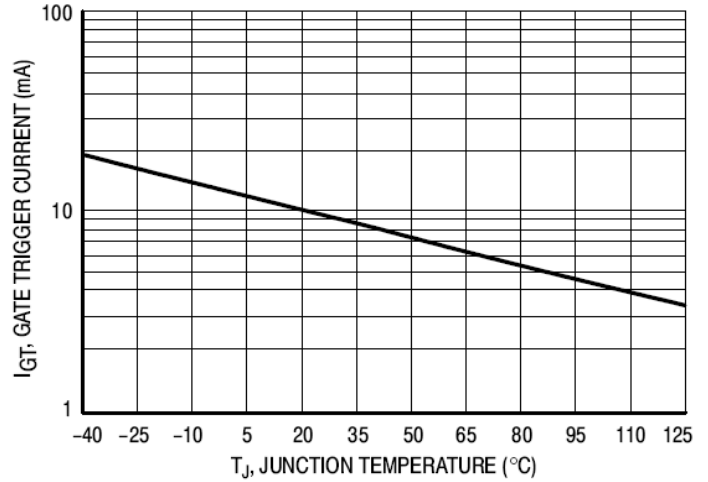


Figure 7. Typical Gate Trigger Current versus Junction Temperature

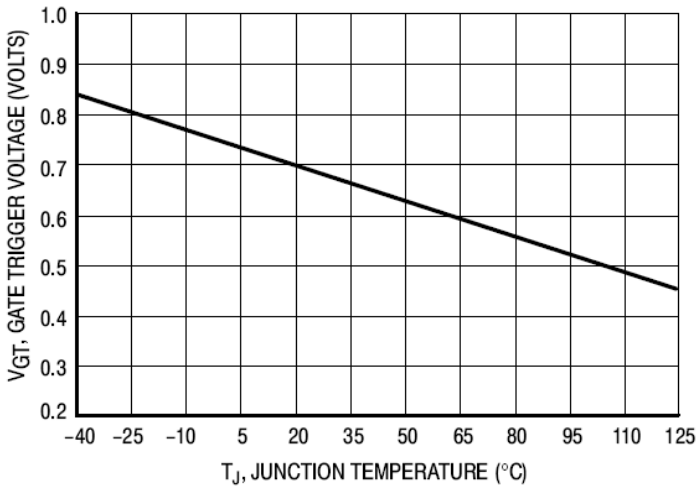


Figure 8. Typical Gate Trigger Voltage versus Junction Temperature

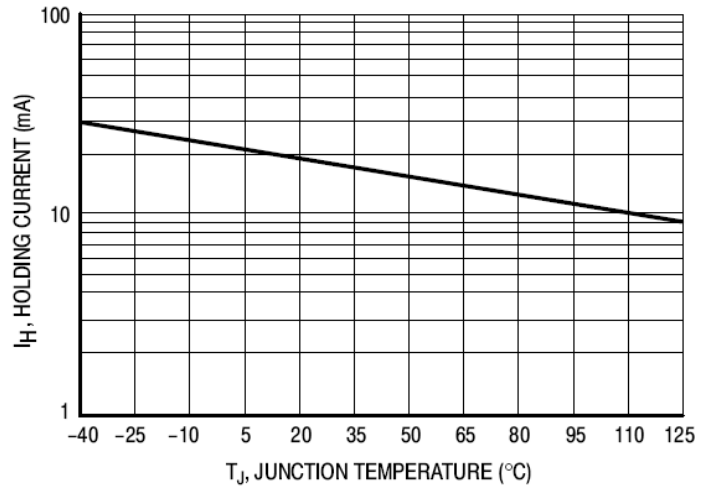


Figure 9. Typical Holding Current versus Junction Temperature