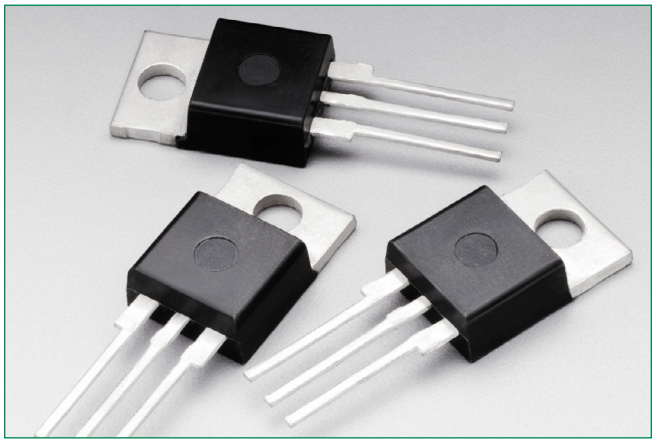
2N6394

Surface Mount – 50 - 800V



Description

The 2N6394 is designed primarily for half-wave AC control applications, such as motor controls, heating controls and power supplies.

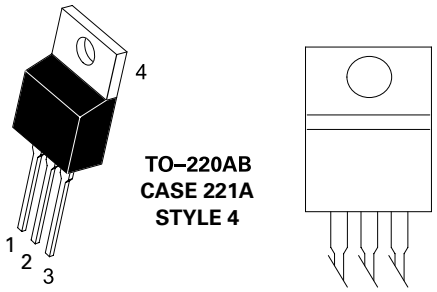
Features

- Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 800 V
- These are Pb–Free Devices

Additional Information

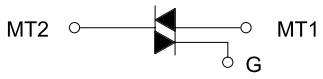
Resources | Accessories | Samples

Pin Out



TO–220AB
CASE 221A
STYLE 4

Functional Diagram



Revised: GD. 02/11/21

2N6394
Surface Mount – 50 - 800V

Maximum Ratings † (TJ = 25°C unless otherwise noted)

Rating		Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1) (T_J = -40 to 110°C, Sine Wave, 50 to 60 Hz, Gate Open)	2N6394 2N6395 2N6397 2N6399	V_{DRM}, V_{RRM}	50 100 400 800	V
On-State RMS Current (180° Conduction Angles; T_C = 90°C)		$I_{T\ (RMS)}$	12	A
Peak Non–Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T_J = 90°C)		I_{TSM}	100	A
Circuit Fusing Considerations (t = 8.3 ms)		I_{2t}	40	A^2s
Forward Peak Gate Power (Pulse Width ≤ 1.0 µs, T_C = 90°C)		P_{GM}	20	W
Forward Average Gate Power (t = 8.3 ms, T_C = 90°C)		$P_{G(AV)}$	0.5	W
Forward Peak Gate Current (Pulse Width ≤ 1.0 µs, T_C = 90°C)		I_{GM}	2.0	A
Operating Junction Temperature Range		T_J	-40 to +125	°C
Storage Temperature Range		T_{stg}	-40 to +125	°C

†Indicates JEDEC Registered Data

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

Rating	Symbol	Value	Unit
† Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	°C

† Indicates JEDEC Registered Data.

Electrical Characteristics - OFF (TC = 25°C unless otherwise noted; Electricals apply in both directions)

Characteristic		Symbol	Min	Typ	Max	Unit
*Peak Repetitive Blocking Current ($V_D = V_{DRM} = V_{RRM}$; Gate Open)	T_J = 25°C	I_{DRM}, I_{RRM}	-	-	1.0	µA
	T_J = 100°C		-	-	2.0	mA

Electrical Characteristics - ON (TC = 25°C unless otherwise noted; Electricals apply in both directions)

Characteristic		Symbol	Min	Typ	Max	Unit
†Peak Forward On–State Voltage (Note 2) (I_{TM} = 24 A Peak)		V_{TM}	–	1.7	2.2	V
†Gate Trigger Voltage (Continuous DC), All Quadrants (Continuous dc) (V_D = 12 Vdc, R_L = 100 Ohms)		I_{GT}	–	5.0	30	mA
†Gate Trigger Voltage (Continuous dc) (V_D = 12 Vdc, R_L = 100 Ohms)		V_{GT}	–	0.7	1.5	V
Gate Non–Trigger Voltage (V_D = 12 Vdc, R_L = 100 Ohms, T_J = 125°C)		V_{GD}	0.2	–	–	V
†Holding Current (V_D = 12 Vdc, Initiating Current = 200 mA, Gate Open)		I_H	–	6.0	50	mA
Turn-On Time (I_{TM} = 12 A, I_{GT} = 40 mAdc, V_D = Rated V_{DRM})		t_{gt}	–	1.0	2.0	µs
Turn-Off Time (V_D = Rated V_{DRM})	(I_{TM} = 12 A, I_R = 12 A)	t_q	-	-	15	µs
	(I_{TM} = 12 A, I_R = 12 A, T_J = 125°C)		-	-	35	

†Indicates JEDEC Registered Data

2. Pulse Test: Pulse Width ≤ 300 µsec, Duty Cycle ≤ 2%.

Revised: GD. 02/11/21

2N6394
Surface Mount – 50 - 800V

Dynamic Characteristics

Characteristic	Symbol	Min	Typ	Max	Unit
Critical Rate–of–Rise of Off-State Voltage Expovnential (V_D = Rated V_{DRM}, T_J = 125°C)	dv/dt(c)	–	50	–	V/µs

Voltage Current Characteristic of Triacs (Bidirectional Device)

Symbol	Parameter
V_{DRM}	Peak Repetitive Forward Off State Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Reverse Off State Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Maximum On State Voltage
I_H	Holding Current

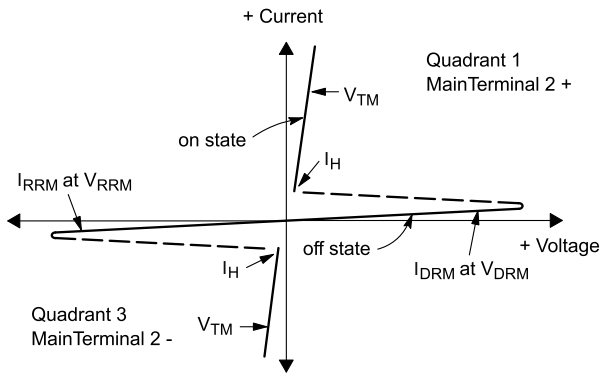


Figure 1. Current Derating

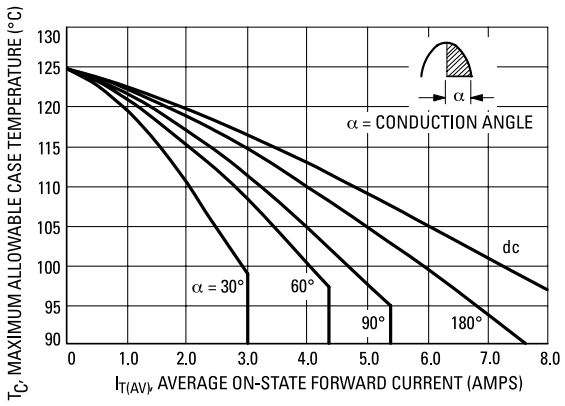
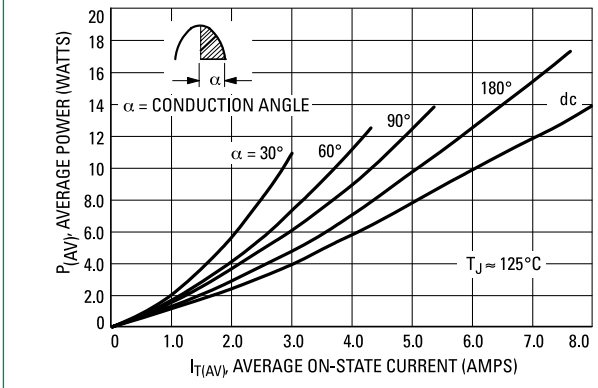


Figure 2. Maximum On-State Characteristics



2N6394
Surface Mount – 50 - 800V

Figure 3. On–State Characteristics

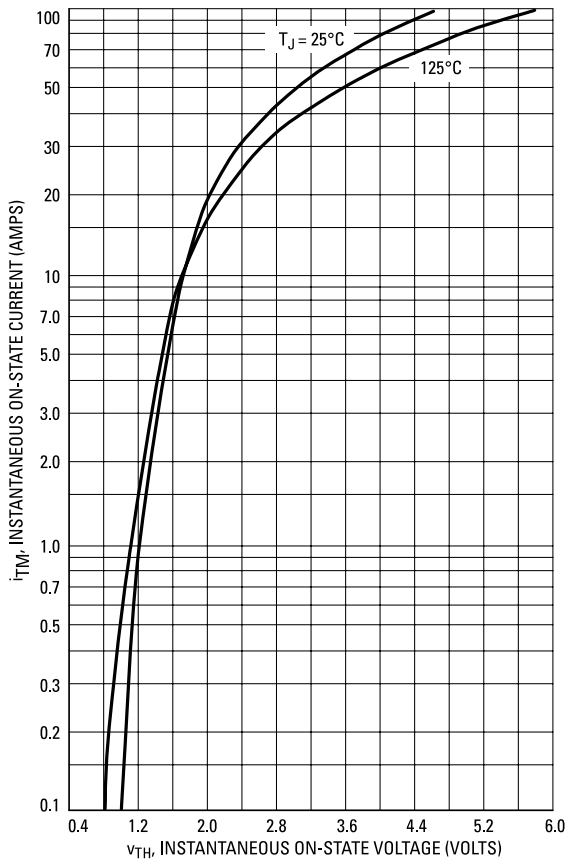


Figure 4. Maximum Non–Repetitive Surge Current

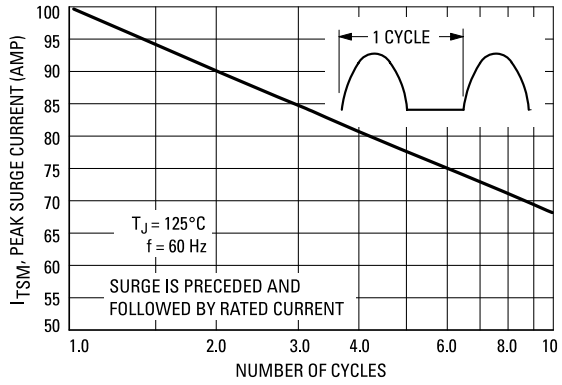
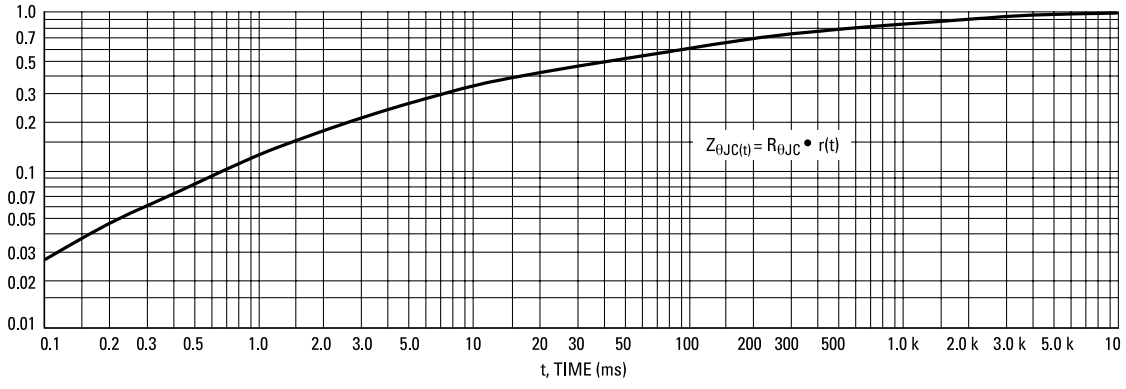


Figure 5. Typical Thermal Response



Revised: GD. 02/11/21

2N6394
Surface Mount – 50 - 800V

Typical Characteristics

Figure 6. Typical Gate Trigger Current vs. Pulse Width

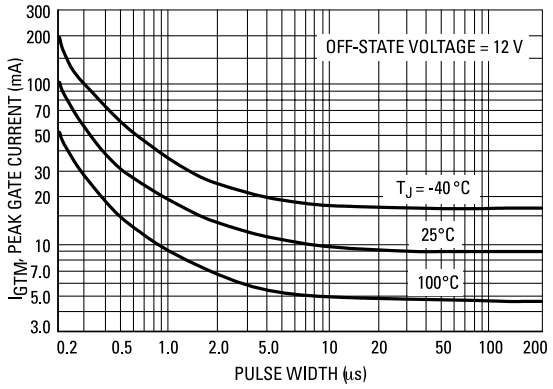


Figure 7. Typical Gate Trigger Current vs. Temperature

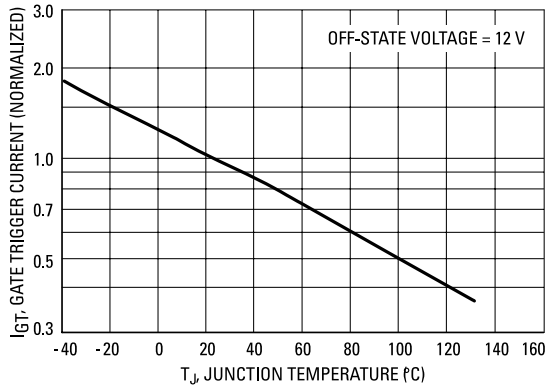


Figure 8. Typical Gate Trigger Voltage vs. Temperature

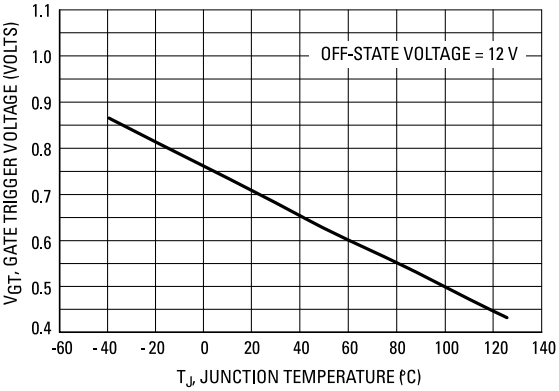
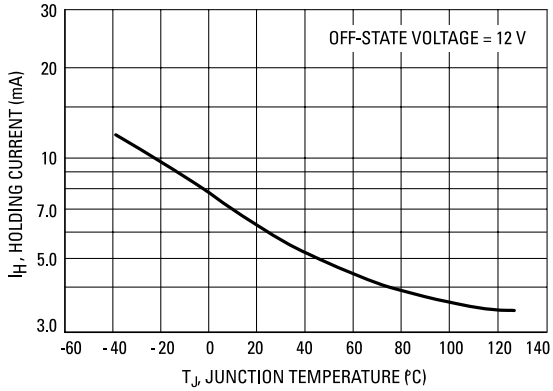
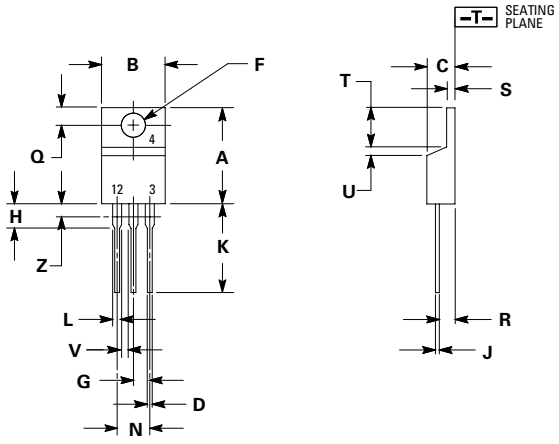


Figure 9. Typical Holding Current vs. Temperature

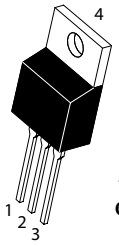


2N6394
Surface Mount – 50 - 800V

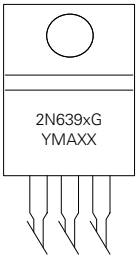
Dimensions



Part Marking System



TO–220AB
CASE 221A
STYLE 12



x =D, M, or N
Y =Year
M =Month
A =Assembly Site
XX =Lot Serial Code
G =Pb-Free Package

Dim	Inches		Millimeters	
	Min	Max	Min	Max
A	0.590	0.620	14.99	15.75
B	0.380	0.420	9.65	10.67
C	0.178	0.188	4.52	4.78
D	0.025	0.035	0.64	0.89
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.41	2.67
H	0.110	0.130	2.79	3.30
J	0.018	0.024	0.46	0.61
K	0.540	0.575	13.72	14.61
L	0.060	0.075	1.52	1.91
N	0.195	0.205	4.95	5.21
Q	0.105	0.115	2.67	2.92
R	0.085	0.095	2.16	2.41
S	0.045	0.060	1.14	1.52
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

1. Dimensioning and tolerancing per ansi y14.5m, 1982.
2. Controlling dimension: inch.
3. Dimension z defines a zone where all body and lead irregularities are allowed.

Pin Assignment	
1	Cathode
2	Anode
3	Gate
4	Anode

Ordering Information

Device	Package	Shipping
2N6394G	TO-220AB (Pb-Free)	1000 Units / Box
2N6394TG		1000 Units / Box
2N6395G		1000 Units / Box
2N6397G		1000 Units / Box
2N6397TG		1000 Units / Box
2N6399G		1000 Units / Box
2N6399TG		1000 Units / Box

Revised: GD. 02/11/21