



Part number scheme  
**TO-94 A 110 N 12 STD**  
 1 2 3 4 5 6

- 1) Package designation
- 2) Anode to tread
- 3) Series number
- 4) Designates standard recovery time
- 5) Voltage Multiplier (example: 12 x 100 = 1200)
- 6) Specifies 1/2 - 20 UNF-2A Tread

### Features:

- ✓ All diffused silicone.
- ✓ Amplifying gate.
- ✓ Standard recovery time for phase control applications.
- ✓ Vibration resistant.
- ✓ Metal and ceramic package construction.

### Voltage

Parameter	Symbol	Rating	Units
Maximum Repetitive Off-State Voltage <small>Notes: 1, 3, 4, 5, 6, 7</small>	$V_{DRM}$	1200 ~ 1600	Volts
Maximum Repetitive Reverse Voltage <small>Notes: 1, 3, 4, 5, 6</small>	$V_{RRM}$	1200 ~ 1600	Volts
Maximum non repetitive Surge of Reverse Voltage <small>Notes: 2, 3, 4, 5, 6</small>	$V_{RSM}$	$V_{RRM} + 100$	Volts
Maximum non repetitive on-state Voltage drop <small>Notes: 2, 3</small>	$V_{TM} @ I_{TM}$	1.6 @ 238	V @ A
Critical rate of rising off-state Voltage, Linear to 80% of $V_{DRM}$ <small>Note: 2</small>	$dv/dt$	500	V/ $\mu s$
<small>Note 1: <math>T_J 25^\circ C</math>. Note 2: <math>T_J 125^\circ C</math>. Note 3: Measured at the peak of the sine wave, Note 4: Below <math>0^\circ C</math> derate <math>V_{DRM}</math> and <math>V_{RRM}</math> 10%.            Note 5: <math>V_{DRM}</math> and <math>V_{RRM}</math> have <math>I_{DRM}</math>, <math>I_{RRM}</math> of up to 35mA. Note 6: <math>V_{DR}</math> and <math>V_{RR}</math> have typical <math>I_{DR}</math>, <math>I_{RR}</math> of 2-7mA. Note 7: For DC applications derate <math>V_{DRM}</math> 45%.</small>			
<small>Specifying voltage: 1400V, TO-94A110N14            1200V, TO-94A110N12 1600V, TO-94A110N16 Above 1600V inquire for availability.</small>			

### Gate

Parameter	Symbol	Rating			Units
		Temp.	Typ.	Max.	
Gate Trigger Voltage <small>Note 3</small>	$V_{GT}$	-20 $^\circ C$	1.9 ~ 2.2	3	Volts
		25 $^\circ C$	1.4 ~ 1.6		
		125 $^\circ C$	1.9 ~ 2.3		
Maximum Gate Trigger Current <small>Notes 1,3</small>	$I_{GT}$	150			mA
Minimum Forward Current to Latch on-state <small>Notes 1, 5</small>	$I_L$	300			mA
Minimum Forward Current to Hold on-state <small>Notes 1, 5</small>	$I_H$	300			mA
Average Gate Power (recommended) <small>Note 2, 3</small>	$P_{G(AVE)}$	0.9 ~ 2			Watts
<small>Note 1: <math>T_J 25^\circ C</math>. Note 2: <math>T_J 125^\circ C</math>. Note 3: Rectangular pulse, <math>t_p \leq 8.3</math> ms. Note 4: Rectangular -<math>V_{DC}</math> pulse, <math>t_p \leq 8.3</math> ms. Note 5: Test conditions: <math>I_{DC}</math>, <math>R_L = 12\Omega</math>.</small>					

### Current

Parameter	Symbol	Rating	Units
Maximum, Average, On state, Current <small>Notes: 3, 4</small>	$I_{T(AVE)}$	108	Amperes
Maximum, RMS, On state, Current <small>Notes: 3, 5</small>	$I_{T(RMS)}$	169	Amperes
Maximum non repetitive, Surge, On state, Current, with no reverse voltage reapplied. <small>Notes: 2, 4</small>	$I_{TSM} 0\% V_{RRM}$	2.1	kA
Critical rate of rising On-state Current, non repetitive <small>Note: 6, 7</small>	$di/dt$	150	A/ $\mu s$
$I_{DRM}$ = Maximum (threshold), Repetitive, Off-State, Current. <small>Note: 1</small>	$I_{DRM}$ & $I_{RRM}$	10	mA
$I_{RRM}$ = Maximum (threshold), Repetitive, Reverse, Current. <small>Note: 1</small>			
Fuse's absolute maximum $I^2 t$ with no reverse voltage reapplied <small>Note: 2, 4</small>	$I^2 t, 0\% V_{RR}$	32.5	kA
<small>Note 1: <math>T_J 25^\circ C</math>. Note 2: <math>T_J 125^\circ C</math>. Note 3: <math>T_{Case} 85^\circ C</math>, air cooled. Note 4: 180<math>^\circ</math> conduction, 60Hz sine wave.            Note 5: Test conditions: <math>I_{DC}</math>, <math>R_L = 12\Omega</math>. Note 6: Switching from <math>V_{DRM} \leq 1000V</math> Note 7: In addition to 0.2<math>\mu F</math> and 20<math>\Omega</math> snubber circuit</small>			

### Thermal & Mechanical

Parameter	Symbol	Rating	Units
Operating Temperature Range	$T_J$	-40 $^\circ$ ~ 125 $^\circ$	$^\circ C$ /Celsius
Maximum Thermal resistance, Junction to Case	$R_{th-J-C}$	0.30	$^\circ C/W$
Maximum Thermal resistance, Case to Heat Sink	$R_{th-C-HS}$	0.13	$^\circ C/W$
Mounting Torque <small>Non Lubricated Treads (Lubricated Treads)</small>		15.5 (14.0)	Nm
		137 (120)	lbf-in