

## NTE5424 Silicon Controlled Rectifier (SCR) for TV Power Supply Switching

**Description:**

The NTE5424 is a silicon controlled rectifier (SCR) in a TO220 type package designed for high-speed switching applications such as power inverters, switching regulators, and high-current pulse applications. This device features fast turn-off, high dv/dt, and high di/dt characteristics and may be used at frequencies up to 25kHz.

**Features:**

- Fast Turn-Off Time
- High di/dt and dv/dt Capabilities
- Shorted-Emitter Gate-Cathode Construction
- Low Thermal Resistance
- Center-Gate Construction

**Absolute Maximum Ratings:**

Repetitive Peak Off-State Voltage (Gate Open, Note 1), $V_{DRM}$ .....	400V
Repetitive Peak Reverse Voltage (Gate Open, Note 1), $V_{RRM}$ .....	400V
RMS On-State Current ( $T_C = +60^\circ\text{C}$ , $t_1/t_2 = 0.5$ ), $I_{T(RMS)}$ .....	5.0A
Average On-State Current ( $T_C = +60^\circ\text{C}$ , $t_1/t_2 = 0.5$ ), $I_{T(AV)}$ .....	3.2A
Peak Surge (Non-Repetitive) On-State Current (One Cycle), $I_{TSM}$	
60Hz Sinusoidal .....	80A
50Hz Sinusoidal .....	75A
Peak Forward Gate Power Dissipation (10 $\mu$ s max, Note 2), $P_{GM}$ .....	13W
Peak Reverse Gate Power Dissipation (10 $\mu$ s max, Note 2), $P_{RGM}$ .....	13W
Average Gate Power Dissipation (10ms max, Note 2), $P_{G(AV)}$ .....	500mW
Rate of Change of On-State Current $V_{DM} = 400\text{V}$ , $I_{GT} = 500\text{mA}$ , $t_r = 0.5\mu\text{s}$ , di/dt .....	200A/ $\mu$ s
Fusing Current ( $T_C = +60^\circ\text{C}$ , 8.3ms), $I^2t$ .....	26A <sup>2</sup> s
Operating Case Temperature Range, $T_C$ .....	-40° to +100°C
Storage Temperature Range, $T_{stg}$ .....	-40° to +150°C
Lead Temperature (During Soldering, 10sec max), $T_L$ .....	+225°C
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	2.2°C/W

Note 1. These values do not apply if there is a positive gate signal. Gate must be open or negatively biased.

Note 2. Any product of gate current and gate voltage which results in a gate power less than the maximum is permitted.

**Electrical Characteristics:** ( $T_C = +25^\circ\text{C}$ , "Maximum Ratings" unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Peak Forward Blocking Current	$I_{DRM}$	$V_D = 400\text{V}$ , $T_C = +100^\circ\text{C}$	–	0.5	3.0	mA
Peak Reverse Blocking Current	$I_{RRM}$	$V_R = 400\text{V}$ , $T_C = +100^\circ\text{C}$	–	0.3	1.5	mA
Forward ON Voltage	$V_{TM}$	$I_{TM} = 30\text{A}$	–	2.34	4.0	V
Gate Trigger Current, Continuous DC	$I_{GT}$	Anode Voltage = 12V, $R_L = 30\Omega$	–	–	50	mA
Gate Trigger Voltage, Continuous DC	$V_{GT}$	Anode Voltage = 12V, $R_L = 30\Omega$	–	1.2	2.5	V
DC Holding Current	$I_H$		–	20	50	mA
Rate of Rise of Off-State Voltage	dv/dt	$V_D = 400\text{V}$ , $T_C = +80^\circ\text{C}$	100	250	–	V/ $\mu\text{s}$
Turn-On Time	$t_{gt}$	$V_D = 400\text{V}$ , $I_T = 8\text{A}$ (Peak), $I_{GT} = 300\text{mA}$ , $t_r = 0.1\mu\text{s}$	–	0.7	–	$\mu\text{s}$
Circuit Commutated Turn-Off Time	$t_q$	$V_D = 400\text{V}$ , Pulse Duration = 50 $\mu\text{s}$ , dv/dt = 100V/ $\mu\text{s}$ , $-di/dt = -10\text{A}/\mu\text{s}$ , $I_{GT} = 100\text{mA}$ at turn-on, $I_T = 4\text{A}$ , $V_{GK} = 0\text{V}$ at turn-off, $T_C = +75^\circ\text{C}$	–	4.4	–	$\mu\text{s}$

