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T6401, T6411, T6421 Series

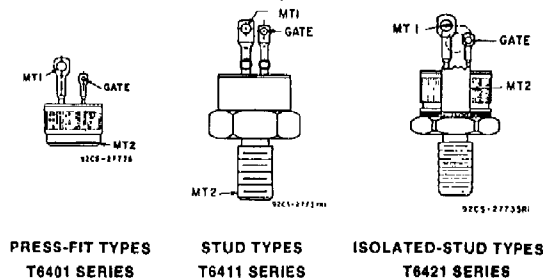
30-A Silicon Triacs

For Power-Switching and Power Control

Features:

- 800V, 125 Deg. C T_J Operating
- High dv/dt and di/dt Capability
- Low Switching Losses
- High Pulse Current Capability
- Low Forward and Reverse Leakage
- Sipos Oxide Glass Multilayer Passivation System
- Advanced Unisurface Construction
- Precise Ion Implanted Diffusion Source

TERMINAL DESIGNATIONS



MAXIMUM RATINGS, Absolute-Maximum Values:

REPETITIVE PEAK OFF-STATE VOLTAGE:*

Gate open, $T_J = -50$ to 125°C

RMS ON-STATE CURRENT (Conduction angle = 350°):

Case temperature

$T_C = 80^\circ\text{C}$ (Press-fit types)

$= 85^\circ\text{C}$ (Stud types)

$= 80^\circ\text{C}$ (Isolated-stud types)

For other conditions

PEAK SURGE (NON-REPETITIVE) ON-STATE CURRENT:

For one cycle of applied principal voltage

60 Hz (sinusoidal)

50 Hz (sinusoidal)

For more than one cycle of applied principal voltage

RATE-OF-CHANGE OF ON-STATE CURRENT:

$V_{DM} = V_{DROM}$, $I_{GT} = 200\text{ mA}$, $t_i = 0.1\text{ }\mu\text{s}$ (See Fig. 13)

FUSING CURRENT (for triac protection):

$T_J = -40$ to 100°C , $I = 1.25$ to 10 ms

PEAK GATE-TRIGGER CURRENT:†

For $1\text{ }\mu\text{s}$ max., See Fig. 7

GATE POWER DISSIPATION:

PEAK (For $1\text{ }\mu\text{s}$ max., $I_{GTM} \leq 4\text{ A}$, See Fig. 7)

AVERAGE

TEMPERATURE RANGE:‡

Storage

Operating (Case)

TERMINAL TEMPERATURE (During soldering):

For 10 s max. (terminals and case)

STUD TORQUE:

Recommended

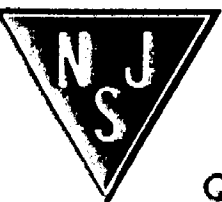
Maximum (DO NOT EXCEED)

	T6401B T6411B T6421B	T6401D T6411D T6421D	T6401M T6411M T6421M	T6401N T6411N —	
V_{DROM}	200	400	600	800	V
$I_{T(RMS)}$	30	30	30	30	A
I_{TSM}	300	265	See Fig. 3	See Fig. 3	A
di/dt	100	450	12	40	A/ μs
I_{GT}	40	0.75	—	—	W
P_{GM}	—	—	—	—	W
T_{BQ}	—65 to 150	—65 to 100	—	—	$^\circ\text{C}$
T_C	—	—	—	—	$^\circ\text{C}$
T_J	—	—	—	—	$^\circ\text{C}$
Recommended	35	—	—	—	in-lb
Maximum (DO NOT EXCEED)	50	—	—	—	in-lb

*For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.

†For either polarity to gate voltage (V_G) with reference to main terminal 1.

‡For temperature measurement reference point, see Dimensional Outline.



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Quality Semi-Conductors

T6401, T6411, T6421 Series

ELECTRICAL CHARACTERISTICS, At Maximum Ratings Unless Otherwise Specified, and at Indicated Temperature

CHARACTERISTIC	SYMBOL	LIMITS			UNITS	
		For All Types Unless Otherwise Specified				
		Min.	Typ.	Max.		
Peak Off-State Current:* Gate open, $T_J = 125^\circ\text{C}$, $V_{\text{DROM}} = \text{Max. rated value}$	I_{DROM}	—	0.2	4	mA	
Maximum On-State Voltage:* For $I_T = 100\text{ A (peak)}$, $T_C = 25^\circ\text{C}$	V_{TM}	—	2.1	2.5	V	
DC Holding Current:* Gate open, Initial principal current = 150 mA (DC), $V_D = 12\text{V}$: $T_C = 25^\circ\text{C}$ For other case temperatures	I_{HO}	—	25 See Fig. 6	60	mA	
Critical Rate-of-Rise of Commutation Voltage:* For $V_D = V_{\text{DROM}}$, $I_{\text{T(RMS)}} = 30\text{ A}$, commutating $di/dt = 16\text{ A/ms}$, gate unenergized (See Fig. 14): $T_C = 90^\circ\text{C}$ (Press-fit types) = 85°C (Stud types) = 80°C (Isolated-stud types)	dv/dt	3 3 3	20 20 20	— — —	V/ μs	
Critical Rate-of-Rise of Off-State Voltage:* For $V_D = V_{\text{DROM}}$, exponential voltage rise, gate open, $T_C = 125^\circ\text{C}$: T6401B, T6411B, T6421B T6401D, T6411D, T6421D T6401M, T6411M, T6421M T6401N, T6411N	dv/dt	40 25 20 10	200 150 100 50	— — — —	V/ μs	
DC Gate-Trigger Current:*** For $V_D = 12\text{ V (DC)}$, $R_L = 30\ \Omega$, $T_C = 25^\circ\text{C}$ For other case temperatures	Mode I^+ positive III $^-$ negative I^- positive III $^+$ negative I_{GT}	— — — — —	15 20 30 40	50 50 80 80	mA	
			See Figs. 8 & 9			
DC Gate-Trigger Voltage:*** For $V_D = 12\text{ V (DC)}$, $R_L = 30\ \Omega$, $T_C = 25^\circ\text{C}$ For other case temperatures For $V_D = V_{\text{DROM}}$, $R_L = 125\ \Omega$, $T_C = 100^\circ\text{C}$	V_{GT}	— 0.2	1.35 See Fig. 10 —	2.5 —	V	
Gate-Controlled Turn-On Time: (Delay Time = Rise Time) For $V_D = V_{\text{DROM}}$, $I_{\text{GT}} = 200\text{ mA}$, $t_r = 0.1\ \mu\text{s}$, $i_T = 45\text{ A (peak)}$, $T_C = 25^\circ\text{C}$ (See Figs. 7 & 12)	t_{gr}	—	1.7	3	μs	
Thermal Resistance, Junction-to-Case: Steady-State Press-fit types Stud Transient (Press-fit & stud types)	R_{JC}	— — —	See Fig. 2			$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Hex (Stud, See Dim. Outline): Steady-State (Isolated-stud types)	R_{JH}	—	—	1		

*For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.

***For either polarity of gate voltage (V_G) with reference to main terminal 1.