

T6401, T6411, T6421 Series

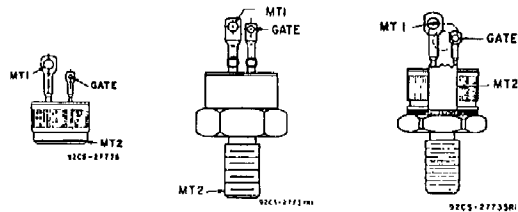
30-A Silicon Triacs

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



PRESS-FIT TYPES
T6401 SERIES

STUD TYPES
T6411 SERIES

ISOLATED-STUD TYPES
T6421 SERIES

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°C (Press-fit types)
 = 85°C (Stud types)
 = 80°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_{DRM}, I_{GT} = 200 mA, t_r = 0.1 μs (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 μs max., See Fig. 7

GATE POWER DISSIPATION:
 PEAK (For 1 μs max., I_{GT} ≤ 4 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 _{DRM}	200	400	600	800	V
I _{T(RMS)}	_____	_____	30	_____	A
	_____	_____	30	_____	A
	_____	_____	30	_____	A
	_____	_____	See Fig. 3	_____	
I _{TSM}	_____	_____	300	_____	A
	_____	_____	285	_____	A
	_____	_____	See Fig. 4	_____	
di/dt	_____	_____	100	_____	A/μs
I _T	_____	_____	450	_____	A°s
I _{GT(M)}	_____	_____	12	_____	A
P _{GM}	_____	_____	40	_____	W
P _{G(AV)}	_____	_____	0.75	_____	W
T _{stg}	_____	_____	-65 to 150	_____	°C
T _C	_____	_____	-65 to 100	_____	°C
T _T	_____	_____	225	_____	°C
	_____	_____	35	_____	in-lb
	_____	_____	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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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, $T_J = 125^\circ\text{C}$, $V_{DROM} = \text{Max. rated value}$	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	60	mA
See Fig. 6					
Critical Rate-of-Rise of Commutation Voltage:* For $V_D = V_{DROM}$, $I_{T(RMS)} = 30\text{ A}$, commutating $di/dt = 16\text{ A/ms}$, gate unenergized (See Fig. 14): $T_C = 90^\circ\text{C}$ (Press-fit types) $= 85^\circ\text{C}$ (Stud types) $= 80^\circ\text{C}$ (Isolated-stud types)	dv/dt	3	20	—	V/ μs
See Fig. 6					
Critical Rate-of-Rise of Off-State Voltage:* For $V_D = V_{DROM}$, 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:* Mode For $V_D = 12\text{ V (DC)}$, $R_L = 30\ \Omega$, $T_C = 25^\circ\text{C}$ For other case temperatures	I_{GT}	— — — —	15 20 30 40	50 50 80 80	mA
See Figs. 8 & 9					
DC Gate-Trigger Voltage:* Mode For $V_D = 12\text{ V (DC)}$, $R_L = 30\ \Omega$, $T_C = 25^\circ\text{C}$ For other case temperatures For $V_D = V_{DROM}$, $R_L = 125\ \Omega$, $T_C = 100^\circ\text{C}$	V_{GT}	— 0.2	1.35 See Fig. 10	2.5 —	V
Gate-Controlled Turn-On Time: (Delay Time = Rise Time) For $V_D = V_{DROM}$, $I_{GT} = 200\text{ mA}$, $t_r = 0.1\ \mu\text{s}$, $i_T = 45\text{ A (peak)}$, $T_C = 25^\circ\text{C}$ (See Figs. 7 & 12)	t_{gt}	—	1.7	3	μs
Thermal Resistance, Junction-to-Case: Steady-State Press-fit types Stud Transient (Press-fit & stud types)	$R_{\theta JC}$	— — —	— — —	0.8 0.9	°C/W
See Fig. 2					
Thermal Resistance, Junction-to-Hex (Stud, See Dim. Outline): Steady-State (Isolated-stud types)	$R_{\theta JH}$	—	—	1	°C/W

*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.