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Silicon Controlled Rectifiers

2N3228, 2N3525, 2N4101

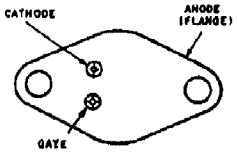
5-A Silicon Controlled Rectifiers

For Low-Cost Power-Control and Power-Switching Applications

Features

- *High di/dt and dv/dt capabilities*
- *Low leakage currents, both forward and reverse*
- *Low forward voltage drop at high current levels*
- *Low thermal resistance*

TERMINAL DESIGNATIONS



JEDEC TO-213AA

Types 2N3228, 2N3525, and 2N4101 use the JEDEC TO-66 package and have a blocking voltage capability of up to 600 volts and a forward current rating of 5 amperes (rms value) at a case temperature of 75°C.

**Formerly Dev. Types TA1222, TA1225, and TA2773, respectively.*

ABSOLUTE-MAXIMUM RATINGS, *for Operation with Sinusoidal AC Supply Voltage at a Frequency between 50 and 400 Hz, and with Resistive or Inductive Load.*

	2N3228	2N3525	2N4101	
Transient Peak Reverse Voltage (Non-Repetitive), v_{RM} (non-rep)	330	660	700	V
Peak Reverse Voltage (Repetitive), v_{RM} (rep)	200	400	600	V
Peak Forward Blocking Voltage (Repetitive), v_{FBOM} (rep)	200	400	600	V
Forward Current: For case temperature (T_C) of + 75°C, and unit mounted on heat sink				
Average DC value at a conduction angle of 180°, I_{FAV}	3.2	3.2	3.2	A
RMS value, I_{FRMS}	5.0	5.0	5.0	A
For free-air temperature (T_{FA}) of 25°C, and with no heat sink employed—				
Average DC value at a conduction angle of 180°, I_{FAV}	1.7	1.7	1.7	A
For other conditions, See Fig. 2				
Peak Surge Current, I_{FM} (surge): For one cycle of applied principal voltage.				
60 Hz (sinusoidal), T_C = 75°C		60		A
50 Hz (sinusoidal), T_C = 75°C		50		A
For more than one cycle of applied voltage, See Fig. 5				
Fusing Current (for SCR protection):				
T_J = -40 to 100°C, t = 1 to 8.3 ms, I^2t		15		A^2s
Rate of Change of Forward Current, di/dt		200*		A/μs
I_{GT} = 200 mA, 0.5 μs rise time				
Gate Power*; Peak, Forward or Reverse, for 10 μs duration, P_{GM}		13		W
Average, P_{GAV}		0.5		W
Temperature:				
Storage, T_{stg}		-40 to +125		°C
Operating (Case), T_C		-40 to +100		°C

*Any values of peak gate current or peak gate voltage to give the maximum gate power is permissible.

2N3228, 2N3525, 2N4101

Characteristics at Maximum Ratings (unless otherwise specified), and at Indicated Case Temperature (T_C)

CHARACTERISTICS	CONTROLLED-RECTIFIER TYPES									UNITS
	2N3228			2N3525			2N4101			
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Forward Breakover Voltage, V_{BOO}: At T_C = +100°C	200	—	—	400	—	—	600	—	—	volts
Peak Blocking Current, at T_C = +100°C: Forward, I_{FBOM} (V_{FBO} = V_{BOO} (min. value))	—	0.10	1.5	—	0.20	3.0	—	0.40	4.0	mA
Reverse, I_{RBOM} (V_{RBO} = V_{RM} (rep) value)	—	0.05	0.75	—	0.10	1.5	—	0.20	2.0	mA
Forward Voltage Drop, v_F At a Forward Current of 30 amperes and a T_C = +25°C	—	2.15	2.8	—	2.15	2.8	—	2.15	2.8	volts
DC Gate-Trigger Current, I_{GT} At T_C = +25°C	—	8	15	—	8	15	—	8	15	mA(dc)
Gate-Trigger Voltage, V_{GT} At T_C = +25°C	—	1.2	2.0	—	1.2	2.0	—	1.2	2.0	volts(dc)
Holding Current, I_{HOO} At T_C = +25°C	—	10	20	—	10	20	—	10	20	mA
Critical Rate of Applied Forward Voltage, Critical dv/dt (V_{FB} = V_{BOO} (min. value), exponential rise, T_C = +100°C	10	200	—	10	200	—	10	200	—	volts/ microsecond
Turn-On Time, t_{on}, (Delay Time + Rise Time) (V_{FB} = V_{BOO} (min. value), i_F = 4.5 amperes, I_{GT} = 200mA, 0.1 μs rise time, T_C = +25°C	0.75	1.5	—	0.75	1.5	—	0.75	1.5	—	microseconds
Turn-Off Time, t_{off} (i_F = 2 amperes, 50 μs pulse width, dv_{FB}/dt = 20 v/μs, di_r/dt = 30 A/μs, I_{GT} = 200mA, T_C = +75°C	—	15	50	—	15	50	—	15	50	microseconds
Thermal Resistance: Junction-to-case	—	—	4	—	—	4	—	—	4	°C/W
Junction-to-ambient	—	—	40	—	—	40	—	—	40	°C/W

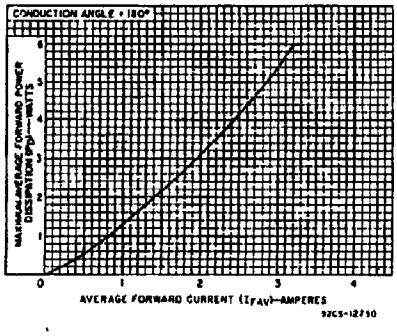


Fig. 1 — Power dissipation chart for all types.

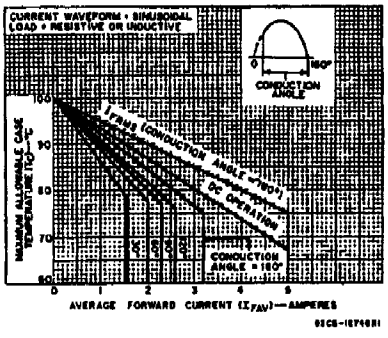


Fig. 2 — Rating chart (case temperature).