SIEMENS

IL4208

800 V Triac Driver Optocoupler

FEATURES

- **High Input Sensitivity, I_{FT}=2 mA**
- **Blocking Voltage, 800 V**
- **Isolation Test Voltage 5300 VAC_{RMS}**
- **300 mA On-state Current**
- **High Static dv/dt 10,000 V/Ms**
- **Inverse Parallel SCRs Provide**
- **Commutating dv/dt >2K V/µs**
- **Very Low Leakage <10 µA**
- **Small 6-Pin DIP Package**
- **Underwriters Lab File #E52744**
- **VDE 0884 Available with Option 1**

Maximum Ratings

Emitter

Reverse Voltage ..... 6 V
Forward Current ..... 60 mA
Surge Current ..... 2.5 A
Thermal Resistance ..... 750 °C/W
Derate from 25°C ..... 1.33 mW/°C

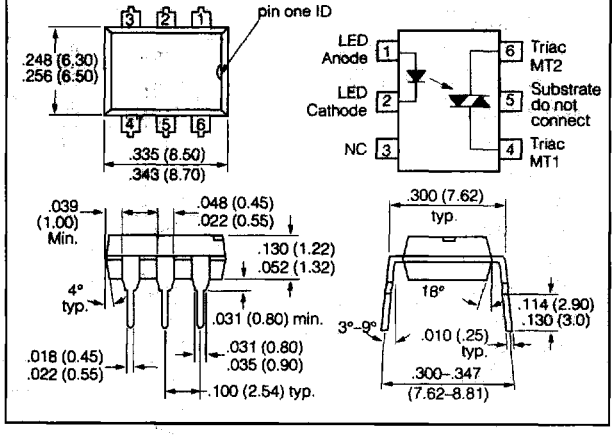
Detector

Peak Off-state Voltage ..... 800 V
Peak Reverse Voltage ..... 800 V
RMS On-state Current ..... 300 mA
Single Cycle Surge ..... 3 A
Thermal Resistance ..... 125 °C/W
Total Power Dissipation ..... 500 mW
Derate from 25°C ..... 6.6 mW/°C

Package

Isolation Test Voltage (between emitter and detector, climate per DIN 50014, part 2, Nov. 74, t=1 sec.) ..... 5300 VAC_{RMS}
Pollution Degree (DIN VDE 0109) 2
Creepage Distance ..... ≥7 mm
Clearance ..... ≥7 mm
Comparative Tracking Index per DIN IEC 112/VDE 0303 part 1, Group IIIa per DIN VDE 6110 175
Isolation Resistance
V_{IO}=500 V, T_A=25°C ..... $\geq 10^{12}\ \Omega$
V_{IO}=500 V, T_A=100°C ..... $\geq 10^{11}\ \Omega$
Storage Temperature Range ..... −55°C to +125°C
Ambient Temperature Range ..... −55°C to +100°C
Soldering Temperature (max. ≤10 sec.dip soldering ≥0.5 mm from case bottom) ..... 260°C

Dimensions in inches (mm)



DESCRIPTION

The IL4208 consists of a GaAs IRLED optically coupled to a photosensitive non-zero crossing TRIAC network. The TRIAC consists of two inverse parallel connected monolithic SCRs. These three semiconductors are assembled in a six pin 0.3 inch dual in-line package, using high insulation double molded, over/under leadframe construction.

High input sensitivity is achieved by using an emitter follower phototransistor and a cascaded SCR predriver resulting in an LED trigger current of less than 2 mA (DC).

The IL4208 uses two discrete SCRs resulting in a commutating dV/dt greater than 10 KV/µs. The use of a proprietary dv/dt clamp results in a static dV/dt of greater than 10KV/µs. This clamp circuit has a MOSFET that is enhanced when high dV/dt spikes occur between MT1 and MT2 of the TRIAC. When conducting, the FET clamps the base of the phototransistor, disabling the first stage SCR predriver.

The 800 V blocking voltage permits control of off-line voltages up to 240 VAC, with a safety factor of more than two, and is sufficient for as much as 380 VAC.

The IL4208 isolates low-voltage logic from 120, 240, and 380 VAC lines to control resistive, inductive, or capacitive loads including motors, solenoids, high current thyristors or TRIAC and relays.

Applications include solid-state relays, industrial controls, office equipment, and consumer appliances.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Emitter						
Forward Voltage	V_F		1.16	1.35	V	I_F=10 mA
Reverse Current	I_R		0.1	10	µA	V_R=6 V
Capacitance	C_0		40		pF	V_F=0 V, f=1 MHz
Thermal Resistance, Junction to Lead	R_{THJL}		750		°C/W	
Output Detector						
Repetitive Peak Off-state Voltage	V_{DRM}	800			V	I_{DRM}=100 µA
Repetitive Peak Reverse Voltage	V_{RRM}	800			V	I_{RM}=100 µA
Off-state Voltage	$V_{D(RMS)}$	565			V	$I_{D(RMS)}$=70 µA
Reverse Voltage	V_R	565			V	$I_{R(RMS)}$=70 µA
Off-state Current	$I_{D(RMS)}$		10	100	µA	V_D=800 V, T_A100°C
Reverse Current	$I_{R(RMS)}$		10	100	µA	V_R=800 V, T_A=100°C
On-state Voltage	V_{TM}		1.7	3	V	I_T=300 mA
On-state Current	I_{TM}			300	mA	PF=1.0, $V_{T(RMS)}$=1.7 V
Surge (Non-repetitive On-state Current)	I_{TSM}			3	A	f=50 Hz
Holding Current	I_H		65	500	µA	
Latching Current	I_L		5		mA	V_T=2.2 V
LED Trigger Current	I_{FT}		1	2	mA	V_{AK}=5 V
Turn-on Time Turn-off Time	t_{ON} t_{OFF}		35 50		µs µs	V_{RM}=V_{DM}=565 VAC, PF=1.0, I_T=300 mA
Critical Rate of Rise of Off-State Voltage	dv/dt_{cr} dv/dt_{cr}	10000 5000			V/µ V/µss	V_D=0.67 V_{DRM}, T_j=25°C V_D=0.67 V_{DRM}, T_j=80°C
Critical Rate of Rise of Voltage at Current Commutation	 dv/dt_{crq} dv/dt_{crq}	 10000 5000			V/µs	V_D=0.67 V_{DRM}, di/dt_{crq}<15 A/ms T_j=25°C T_j=80°C
Critical Rate of Rise of On-state Current	di/dt_{cr}			8	A/µs	
Thermal Resistance, Junction to Lead	R_{THJL}		150		°C/W	
Package						
Critical Rate of Rise of Coupled Input/Output Voltage	$dv_{(IO)}/dt$		5000		V/µs	I_T=0 A, V_{RM}=V_{DM}=565 VAC
Common Mode Coupling Capacitor	C_{CM}		0.01		pF	
Package Capacitance	C_{IO}		0.8		pF	f=1 MHz, V_{IO}=0 V
Trigger Current Temperature Gradient	$\Delta I_{FT}/\Delta T_j$		7	14	µA/K	