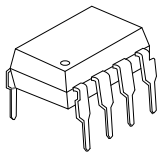
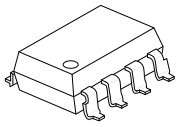
UPT0133

Preliminary ***PHOTOCOUPLER***

RANDOM PHASE POWER TRIAC DIP TYPE SSR IDEAL FOR AC LOAD CONTROL



DIP-8A



SMD-8A

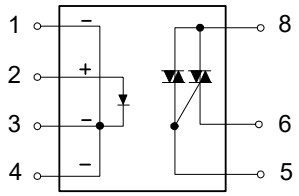
■ DESCRIPTION

The **UPT0133** Solid State Relays (SSR) are an integration of an infrared emitting diode (I_{RED}), a Phototriac Detector and a main output Triac. These devices are ideally suited for controlling high voltage AC loads with solid state reliability while providing 4kV isolation (V_{ISO}(RMS)) from input to output.

■ FEATURES

* Output current, $I_{T(RMS)}$≤0.3A
* Non-zero crossing functionary
* High repetitive peak off-state voltage (V_{DRM} : 600V)
* Superior noise immunity (dV/dt : Min. 100V/μs)
* Response time, ton: Max. 100μs
* High isolation voltage between input and output ($V_{ISO(RMS)}$: 4kV)

■ SYMBOL

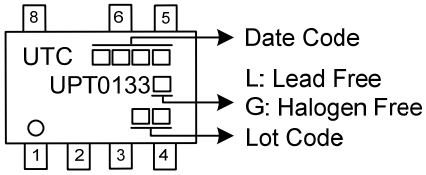


■ ORDERING INFORMATION

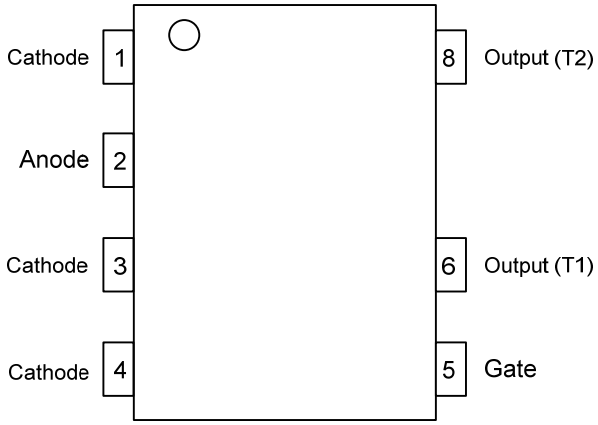
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UPT0133L-C08A-T	UPT0133G-C08A-T	SMD-8A	Tube
UPT0133L-D08A-T	UPT0133G-D08A-T	DIP-8A	Tube

UPT0133G-C08A-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) C08A: SMD-8A, D08A: DIP-8A (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Input	LED Forward Current	I_F	50	mA
	LED Reverse Voltage	V_R	6	V
Output	RMS ON-State Current	$I_{T(RMS)}$	0.3	A
	Peak One Cycle Surge Current (Note 3)	I_{SURGE}	3	A
	Repetitive Peak OFF-State Voltage	V_{DRM}	600	V
Isolation Voltage (Note 2)		$V_{ISO(RMS)}$	4	kV
Operating Temperature		T_{OPR}	-40 ~ +100	°C
Storage Temperature		T_{STG}	-40 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. AC for 1 minute, R.H.= 40~60% R.H. f=60Hz.
3. f=50Hz sine wave.

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
INPUT						
LED Dropout Voltage	V_F	I_F=20mA		1.2	1.4	V
LED Reverse Voltage	I_R	V_R=3V			10	μA
OUTPUT						
Repentitive Peak OFF-State Current	I_{DRM}	V_D=V_{DRM}			100	μA
Peak ON-State Voltage	V_T	I_T=0.3A			2.5	V
Holding Current	I_H	V_D=6V			25	mA
Critical Rate of Rise of OFF-State Voltage	dv/dt	V_D=1 $\sqrt{2}$ ×V_{DRM}	100			V/μs
TRANSFER CHARACTERISTICS						
Trigger LED Current	I_{FT}	V_D=6V, R_L=100Ω			10	mA
Turn on Time	t_{ON}	I_F=20mA V_D=6V, R_L=100Ω			100	μs
I/O Isolation Resistance	R_{ISO}	500V DC, 40~60RH	5×10^{10}	10^{11}		Ω

■ DEGRADATION

In order for the SSR to turn off, the triggering current (I_F) must be 0.1mA or less.

In phase control applications or where the SSR is being by a pulse signal, please ensure that the pulse width is a minimum of 1ms.

When the input current (I_F) is below 0.1mA, the output Triac will be in the open circuit mode. However, if the voltage across the Triac, V_D, increases faster than rated dv/dt, the Triac may turn on. To avoid this situation, please incorporate a snubber circuit. Due to the many different types of load that can be driven, we can merely recommend some circuit values to start with : C_S=0.022μF and R_S=47Ω. The operation of the SSR and snubber circuit should be tested and if unintentional switching occurs, please adjust the snubber circuit component values accordingly.

When making the transition from On to Off state, a snubber circuit should be used ensure that sudden drops in current are not accompanied by large instantaneous changes in voltage across the Triac.

This fast change in voltage is brought about by the phase difference between current and voltage.

Primarily, this is experienced in driving loads which are inductive such as motors and solenods.

Following the procedure outlined above should provide suffi cient results.

Any snubber or Varistor used for the above mentioned scenarios should be located as close to the main output triac as possible.

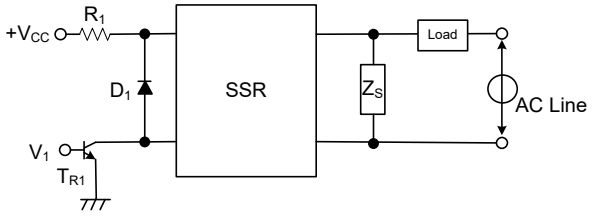
All pins shall be used by soldering on the board. (Socket and others shall not be used.)

In general, the emission of the I_{RED} used in SSR will degrade over time.

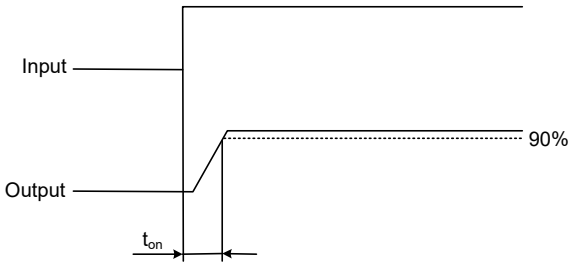
In the case where long term operation and / or constant extreme temperature fluctuations will be applied to the devices, please allow for a worst case scenario of 50% degradation over 5years.

Therefore in order to maintain proper operation, a design implementing these SSRs should provide at least twice the minimum required triggering current from initial operation

■ TEST CIRCUITS AND WAVEFORMS



Z_S: Surge absorption circuit (Snubber)



Turn on Time

■ SCHEMATIC AND WIRING DIAGRAMS