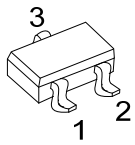
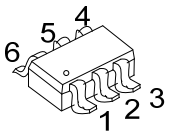
URD3105 **Preliminary** ***NPN SILICON TRANSISTOR***

INTEGRATED RELAY, INDUCTIVE LOAD DRIVER



SOT-23
(EIAJ SC-59)



SOT-26

■ DESCRIPTION

The **URD3105** is an integrated solid-state DC relay driver that can switch inductive loads. It provides a robust driver interface by acting as a buffer stage between sensitive logic circuits and that of 3V to 6V DC inductive relay coils. With a low input drive current requirement, the **URD3105** only has slight loading on the input circuitry and it will provide good transient isolation between output and input channels.

The output switch is guaranteed by design to go open-circuit and fall into the off-state condition when input drive is lost or disconnected.

The **URD3105** in the SOT23 and SOT26, the **URD3105** comes as a single or dual die which can replace three to six individual discrete components within a single integrated package, including a Zener across the output. The Zener will clamp at 6.6V to sink inductive currents to ground which will reduce EMI noise in the system. By integrating the Zener, the **URD3105** eliminates the need for an external free-wheeling diode and allows the driving of inductive loads such as relays, solenoids, incandescent lamps, and small DC motors in.

■ FEATURES

* Inductive load driver capable of driving 3 to 6V DC coils
* Optimized to switch inductive loads from supply of 3 to 5V with the capability to drive coils up to 2.5W from a 5V rail
* Fully integrated into a single SOT23 or dual SOT26 package to minimize footprint area and reduce number of components
* Includes zener across output to reduce EMI noise
* Internal low saturation BJT to reduce power dissipation in driving high currents into the coil
* Output guaranteed to be in off-state condition during no input
* Near-Zero quiescent supply current in off-state condition with minimal leakage
* With ESD capability

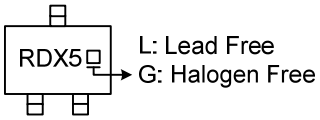
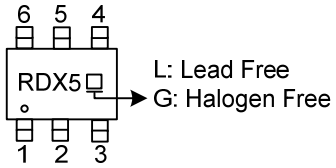
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
URD3105L-AE3-R	URD3105G-AE3-R	SOT-23	I	G	O	-	-	-	Tape Reel
URD3105L-AG6-R	URD3105G-AG6-R	SOT-26	G	I	O	G	I	O	Tape Reel

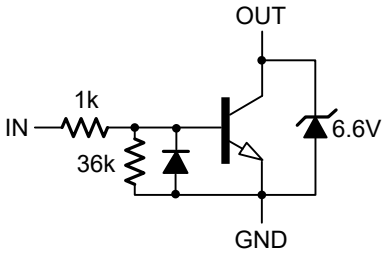
Note: Pin Assignment: I: IN G: GND O: OUT

URD3105G-AE3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE3: SOT-23, AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-23	SOT-26
	

■ INTERNAL DEVICE SCHEMATIC



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

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	6	V
Input Voltage (Forward)		V_{IN_FWD}	6	V
Input Voltage (Reverse)		V_{IN_REV}	-0.5	V
Output Sink Continuous Current		I_O	500	mA
Repetitive Pulse Zener Energy Limit (Duty Cycle 0.01%)		E_{zpk}	50	mJ
Power Dissipation	SOT-23	P_D	0.31	W
	SOT-26		0.4	W
Operating Junction Temperature		T_J	-55 ~ +150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23	θ_{JA}	403	°C/W
	SOT-26		312	°C/W

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. Device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Output Zener Breakdown Voltage	BV_{OUT}	I_T=10mA Pulse	6.2	6.6	7.0	V
	BV_{-OUT}			0.67		V
Output Leakage Current	I_{OO}	V_O=5.5V,V_{IN}=0, T_A=25°C			0.1	μA
“ON” State Input Voltage (Note 1)	V_{IN_ON}	I_O=100mA, V_O=150mV		0.84	1.5	V
“OFF” State Input Voltage (Note 2)	V_{IN_OFF}	I_O=100μA, V_O=4.9V	400	460		mV
ON CHARACTERISTICS						
Input Bias Current (HFE Limited)	I_{IN}	I_O=250mA, V_O=0.25V		0.7	1.6	mA
Output Saturation Voltage	$V_{O(SAT)}$	I_O=250mA, I_{IN}=1.5mA		90	160	mV
Output Sink Current – Continuous	I_{O_ON}	V_{CE}=0.25V, I_{IN}=1.5mA	250	500		mA

Notes: 1. The device is guaranteed to be in “ON” state with V_{IN_ON} above 1.5V.
2. The device is guaranteed to be in “OFF” state with V_{IN_OFF} below 400mV.

■ TEST CIRCUIT AND WAVEFORMS

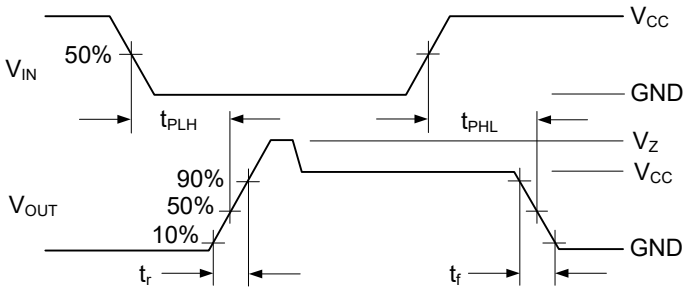


Figure 1. Switching Waveforms