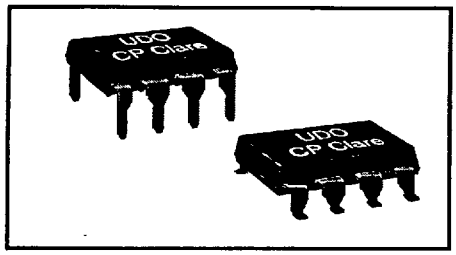
Uni-Directional Output Device (UDO)



DESCRIPTION

The Uni-Directional Output (UDO) device provides a low cost switching solution for telecom applications. *The design of this component differs from conventional switching components in that it includes a bridge rectifier that is used in a configuration where low cost switching and current steering is obtained.* Current steering is required for most "dry" DAA circuits that incorporate an electronic inductor or gyrator circuit such as those found in high speed modems. The UDO eliminates the need for the designer to add an external bridge rectifier circuit to maintain functionality of the gyrator and protect the darlington transistor in the gyrator circuit from damage due to telephone line polarity reversals. This saves valuable printed circuit board real estate, cost of an external bridge rectifier and associated assembly costs.

FEATURES

- Two Functions in One Package (Switching and Current Steering)
- Intrinsic Bridge Rectifier for Output Current Steering
- Low 5mA Turn-on Current Eliminates Relay Driver
- 3750 V_{RMS} Input/Output Isolation
- 350V Blocking Voltage
- No Contact Bounce or Snubbing Required
- Solid State Reliability
- Small 8 pin DIP Package
- Machine Insertable, Wave Solderable
- 120 mA Load Switching
- Fast Turn-on/Turn-off
- FCC Compatible

APPLICATIONS

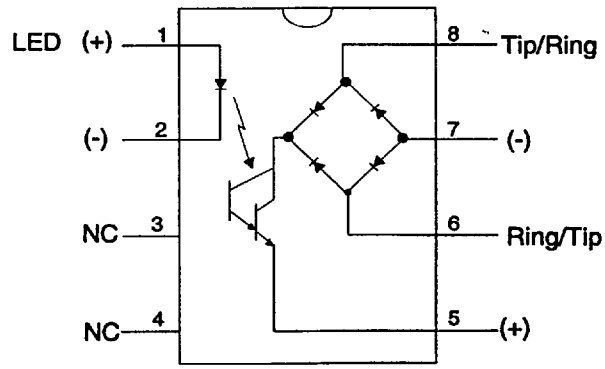
- Modem Switching/ Current Steering
- Computer Telephony
- Tip/Ring Circuits
- PBX Systems

RATINGS @ 25°C

Parameter	Min	Typ	Max	Units
Ambient Operating Temperature	-40	-	85	°C
Storage Temperature	-40	-	125	°C
Soldering Temperature (10 Seconds Max)	-	-	260	°C
Input/Output Isolation Voltage	3750	-	-	V_{RMS}
Input Control Current	-	-	100	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Total Package Power Dissipation	-	-	800[1]	mW
Input/Output Capacitance	-	3	-	pF
Output Operation:				
DC Load Voltage (I_L < 50µA)	-	-	350	V
Continuous DC Load Current	-	-	120	mA

[1] Derate linearly 6.67 mW/°C

PACKAGE PINOUT



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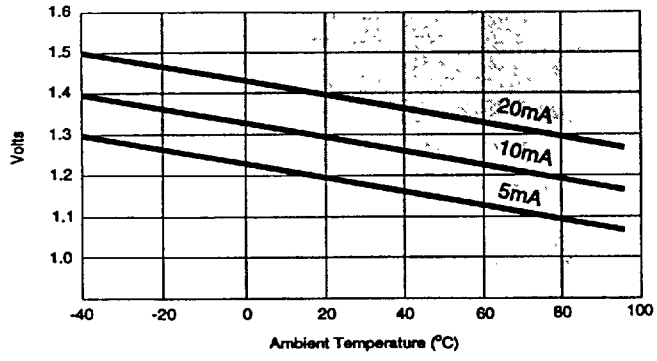
Electrical Characteristics @25°C unless otherwise specified

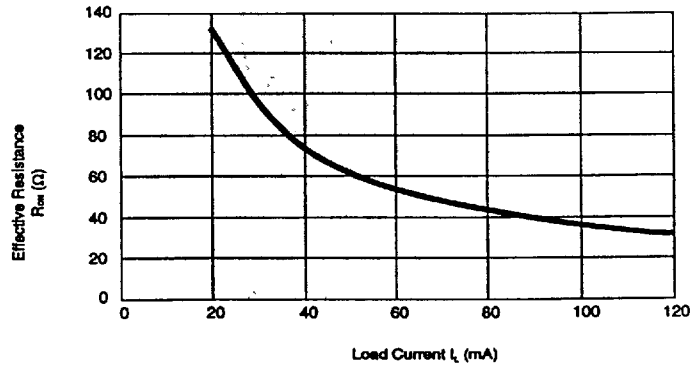
PARAMETERS	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
LED Forward Current for Switch Turn-On	I_L = 120mA, t = 10ms					
25°C		$I_{F(on)}$	5	--	100	mA
85°C			10	--	100	mA
LED Forward Voltage	I_F = 5 mA	V_F	0.9	1.2	1.4	V
On-Resistance	I_F = 5 mA, I_L = 50mA					
	T = 25° C	R_{ON}	–	60	70	Ω
	T = 85° C		–	55	65	Ω
Off-State Leakage Current Across Pins 6-8	V_L = 100 V_{DC}, I_F = 0mA	I_{LK}	–	.010	1	µA
Off-Resistance	V_L = 100 V_{DC}, I_F = 0mA	R_{OFF}	–	10	–	GΩ
On-State Voltage	I_F = 5 mA					
	I_L = 20 mA	*V_L	–	2.6	--	V
	I_L = 120 mA		–	3.8	–	V
Turn-On Time	I_F = 5 mA, V_L = +50 V, R_L = 1kΩ	t_{on}	–	35	50	µs
Turn-Off Time	I_F = 5 mA, V_L = +50 V, R_L = 1kΩ	t_{off}	–	10	100	µs
Total Harmonic Distortion	I_L = 40mA, f_0 = 350Hz@ 0dBm	THD	–	-90	-80	dB

** Note: V_L is the sum of the forward voltage drops of two diodes plus the saturation voltage of the transistor when the device is in the on state.*

Typical Forward Voltage vs. Temperature @ IF = 5mA

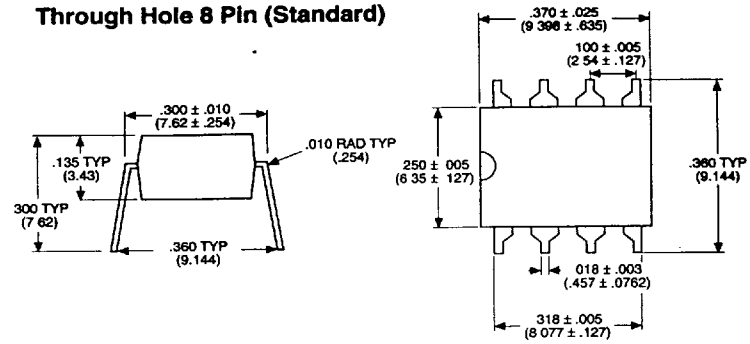


Typical R_{ON} vs. I_L

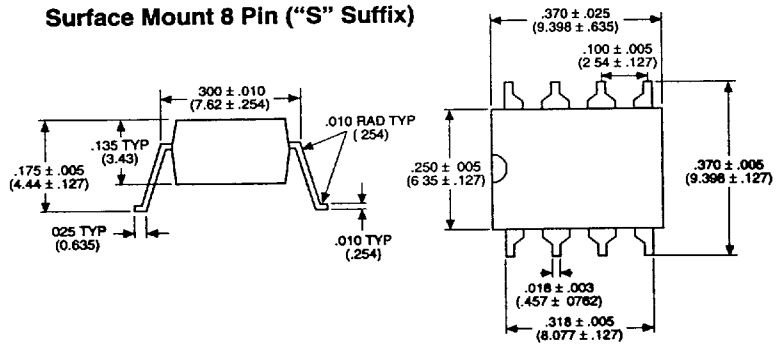


MECHANICAL DIMENSIONS

Through Hole 8 Pin (Standard)



Surface Mount 8 Pin ("S" Suffix)



TYPICAL APPLICATION

The circuit below is a typical modem application using the UDO: When the modem is on-hook, the off-hook signal from the modem's controller is high and the UDO LED is off. In this state, the full Tip/Ring voltage appears across the bridge and across the collector and emitter of the darlington in the UDO. This makes it necessary for both the bridge and darlington to have a minimum blocking voltage of 350V to accommodate the high voltage ring signal from the central office. When the modem goes off-hook, the signal is brought low and LED current begins to flow. The light generated by the LED impinges on the darlington transistor and causes it to enter saturation turning the darlington fully on. A *rectified* current then flows through the bridge, darlington and the gyrator circuit.