

# TELEDYNE RELAYS

## CENTIGRID<sup>®</sup> ESTABLISHED RELIABILITY RELAY DPDT

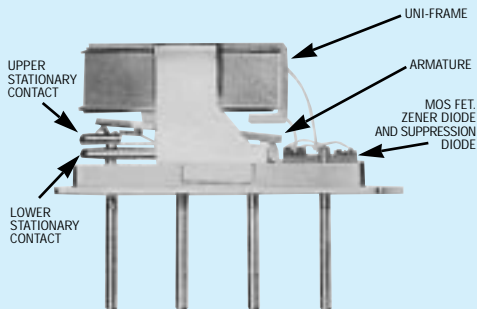
SENSITIVE  
CMOS COMPATIBLE

SERIES  
**136C**



SERIES DESIGNATION	RELAY TYPE
136C	DPDT sensitive relay with internal power MOSFET driver, Zener diode gate protection, and diode coil suppression.

### INTERNAL CONSTRUCTION



### DESCRIPTION

The sensitive 136C Centigrid<sup>®</sup> relay is an ultraminiature, hermetically sealed, armature relay capable of being directly driven by most IC logic families. Its low profile height and .100" grid spaced terminals, which precludes the need for spreader pads, make it ideal for applications where extreme packaging density and/or close PC board spacing are required.

The basic concept and internal structure are similar to the Teledyne DPDT TO-5 relay (412 Series). The following unique construction features and manufacturing techniques provide overall high reliability and excellent resistance to environmental extremes.

- All welded construction.
- Unique uni-frame design providing high magnetic efficiency and mechanical rigidity.
- High force/mass ratios for resistance to shock and vibration.
- Advanced cleaning techniques provide maximum assurance of internal cleanliness.
- Precious metal alloy contact material with gold plating assures excellent high current and dry circuit switching capabilities.

The sensitive 136C Centigrid<sup>®</sup> relay features exceptionally high coil resistance thus providing for extremely low operating power (200 mW typical). The advantages of reduced heat dissipation and power supply demands are obvious.

By virtue of its inherently low intercontact capacitance and contact circuit losses, the Centigrid<sup>®</sup> relay has shown itself to be an excellent ultraminiature RF switch for frequency ranges well into the UHF spectrum. A typical RF application for the Centigrid<sup>®</sup> relay is in hand held radio transceivers, wherein the combined features of good RF performance, small size, low coil power dissipation and high reliability make it a preferred method of Transmit-Receive switching (see Figure 1).

The sensitive 136C Series utilizes internal silicon diode for coil suppression, a Zener diode to protect the MOSFET gate input, and an N-channel enhancement mode MOSFET chip which enables direct relay interfacing with most Microprocessor and IC logic families (CMOS, TTL and MOS).

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS	
Temperature (Ambient)	-65°C to +125°C
Vibration	30 g's to 3000 Hz (Note 1)
Shock	75 g's for 6 msec. (Note 1) half-sine
Acceleration	50 g's (Note 1)
Enclosure	All welded, hermetically sealed
Weight	0.18 oz (5.11 gms.) max.

GENERAL ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted) (Notes 2 & 7)

Contact Arrangement	2 Form C (DPDT)	
Rated Duty	Continuous	
Contact Resistance	0.1 ohm max. before life: 0.2 ohm max. after life at 1A/28VDC, (measured 1/8" from header)	
Contact Load Rating (DC) (See Fig. 2 for other DC resistive voltage/current ratings)	Resistive: 1 Amp/28VDC Inductive: 200 mA/28VDC (320 mH) Lamp: 100 mA/28VDC Low Level: 10 to 50 µA/10 to 50 mV	
Contact Load Ratings (AC)	Resistive: 250 mA/115VAC, 60 and 400Hz (Case ungrounded) 100 mA/115VAC, 60 and 400Hz (Case grounded)	
Contact Life Ratings	10,000,000 cycles (typical) at low level 1,000,000 cycles (typical) at 0.5A/28VDC resistive 100,000 cycles min. at all other loads specified above	
Contact Overload Rating	2A/28VDC Resistive (100 cycles min.)	
Contact Carry Rating	Contact factory	
Operate Time	4.0 msec max. at nominal rated coil voltage	
Release Time	7.5 msec max.	
Contact Bounce	1.5 msec max.	
Intercontact Capacitance	0.4 pf typical	
Insulation Resistance	10,000 megohms min. between mutually isolated terminals (Note 3)	
Dielectric Strength	Atmospheric pressure: 500 VRMS/60 Hz	70,000 ft.: 125 VRMS/60Hz (Note 3)
Diode P.I.V. (VDC)		100 min.
Negative Coil Transient (VDC)		1.0 max.
Zener Voltage (VDC)		17 min. to 23 max.
Zener Leakage Current (µA @ 15.2 VDC)		2.5 max.
Power FET Characteristics -65°C to +125°C	Gate Voltage to Turn Off (VDC, Max.)	0.5
	Gate Voltage to Turn On (VDC, Min.)	3.8 (Note 4)
	Drain-Source Voltage (VDC, Max.)	55

DETAILED ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted) (Note 7)

CHARACTERISTICS	BASE PART NUMBERS (See Note 10 for full P/N)	136C-5	136C-6	136C-9	136C-12	136C-18	136C-26
		Coil Voltage (VDC)	Nom.	5.0	6.0	9.0	12.0
	Max.	5.6	8.0	12.0	16.0	24.0	32.0
Coil Current (mADC @ 25°C)	Max.	56.0	33.0	26.4	17.7	13.8	10.2
	Min.	43.0	27.0	17.8	11.3	8.4	5.8
Nominal Coil Operating Power @ 25°C (Milliwatts)		250	180	203	180	203	219
Pick-up Voltage (VDC) (Note 5)	Max.	4.0	4.9	7.3	9.8	14.6	19.5
Drop-out Voltage (VDC) (Note 5)	Min.	0.13	0.18	0.27	0.36	0.54	0.72
	Max.	2.3	3.2	4.9	6.5	9.8	13.0

PERFORMANCE CURVES  
(NOTE 2)

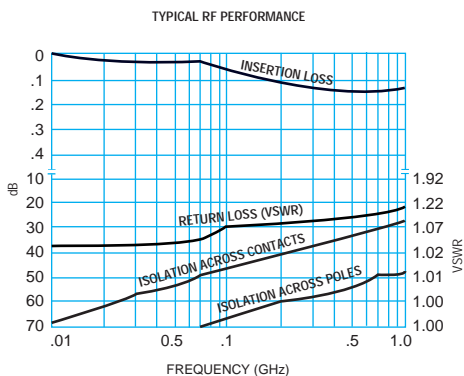


FIGURE 1

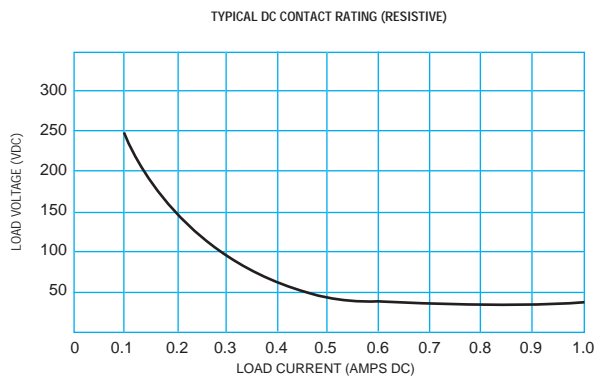


FIGURE 2

### OUTLINE DIMENSIONS

#### CASE DETAIL

#### TERMINAL LOCATIONS

(Viewed from Terminals, Numbers for Reference only)

DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)

### SCHEMATIC DIAGRAMS

PIN 1: + SUPPLY  
PIN 9: - SUPPLY  
PIN 10: GATE

SCHEMATIC IS VIEWED FROM TERMINALS

### SPACER PAD

Relays can be supplied with a spacer pad attached to the relay header. The pad permits the relay to be spaced away from the mounting surface facilitating solder joint inspection. To order add **M9** to the part number (Example: 136CM9-26).

#### NOTES:

1. Pad Material: Polyester film.
2. Add 0.01 ohm to contact resistance with mounting pad.

### TYPICAL CMOS INTERFACE CIRCUIT

DC Logic Voltage Supply

(A) Internal Suppression Diode  
(B) FET Gate Input  
(C) Internal Zener Diode  
(D) Integral FET Body Diode

### NOTES:

1. Relays contacts will exhibit no chatter in excess of 10 μsec or transfer in excess of 1 μsec.
2. "Typical" characteristics are based on available data and are best estimates. No on-going verification tests are performed.
3. Pins 9 and 10 must be shorted when tested for Insulation Resistance and Dielectric Withstanding Voltage.
4. Maximum rated gate voltage = 15 Vdc.
5. Unless otherwise specified, relays will be supplied with either gold plated or solder coated leads. Contact your local representative for ordering information.
6. The slash and character appearing after the slash are not marked on the relay.
7. Unless otherwise specified, parameters are initial values.
8. Screened HI-REL versions available. Contact factory.

RELIABILITY LEVEL	FAILURE RATE %/10,000 CYCLES
A	1.5
B	0.75

### Teledyne Part Numbering System for Established Reliability Relays (See T<sup>2</sup>R<sup>®</sup> Program Introduction)

**EXAMPLE:** ER 136C Z M9 - 26 A / Q

Established Reliability Designator: ER  
Relay Series: 136C  
Mounting Variant Ground Pin (See page 112): Z M9 (M9 = 194-19 Spacer Pad)  
Reliability and Screening Level (Note 9): - 26  
Termination Variant: A / Q (Q = Solder Coated Leads (Notes 5 and 6))  
Coil Voltage: A / Q