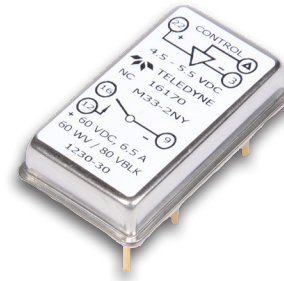


Part Number	Description
M33-2NW	High Surge Current Capability SSR with W screening*
M33-2NY	High Surge Current Capability SSR with Y screening*

\* Add -01 to suffix for Solder Dipped leads (Sn60/ Pb40)  
 W denotes parameters tested to Teledyne Specifications.  
 Y denotes parameters tested to MIL-PRF-28750 specifications.  
 (See Appendix on pg. 3 for test plan for each screening level)



## ELECTRICAL SPECIFICATIONS

(-55°C to +125°C UNLESS OTHERWISE NOTED)

### INPUT (CONTROL) SPECIFICATIONS

	Min	Typ	Max	Units
Control Current @ 5 Vdc (Note 5)			80	uA
Control Voltage Range			6.5	Vdc
Bias Supply Range V <sub>DD</sub> (Note 7)	4.5		5.5	Vdc
Bias Current			16	mA
Turn-Off (Guaranteed Off)			0.4	Vdc
Turn-On (Guaranteed On)	2.8			Vdc

### OUTPUT (LOAD) SPECIFICATIONS

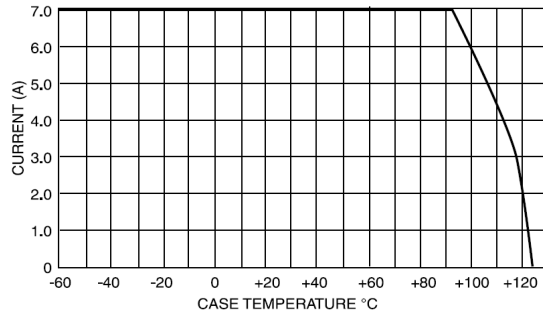
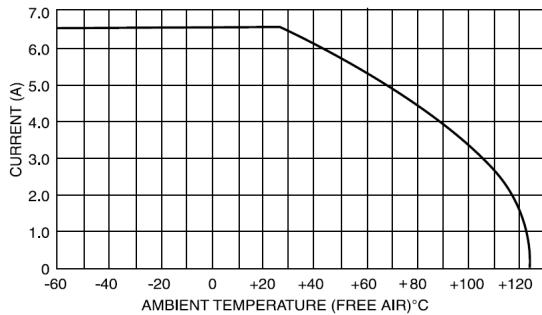
	Min	Typ	Max	Units
Continuous Output Current (See Figure 1)	@25°C (Case)		7.0	A
	@120°C (Case)		3.0	A
Pulse/Surge Current (See Notes 1,2,3 Fig. 4)	@100µs		100	A
	@100ms		23.5	A
Operating Output Voltage			60	Vdc
Continuous Blocking Voltage			80	Vdc
On-State Resistance R <sub>ds</sub> (on) (Note 4)			0.09	Ohm
Turn-On Time (Figure 2)			60	µs
Turn-Off Time (Figure 2)			3.0	ms
Off-State Leakage at 60 Vdc	@25°C		10	µA
	@125°C		100	µA
Off-State Leakage at 80 Vdc	@25°C		1.0	mA
Capacitance Across Output @V <sub>DS</sub> = 25Vdc F = 1.0MHz			1700	pF
Insulation Resistance @ 500Vdc	10 <sup>9</sup>			Ohm
Capacitance (Input to Output at 1KHz)			15	pF
Dielectric Strength, Input to Case			1000	Vrms
Input to Output, Output to Case				
Thermal Resistance Junction To Ambient (θ <sub>JA</sub> )		35		°C/W
Thermal Resistance Junction To Case (θ <sub>JC</sub> )		7		°C/W

## FEATURES

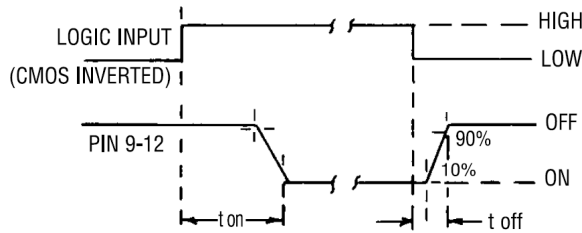
- Up to 100 Amp pulse load capability
- Fast switching speed
- Low ON resistance
- Power FET output
- Transformer Isolated
- CMOS logic compatible input control
- Low-profile metal DIP, hermetically sealed
- Meets 80V surge and ±600V spike requirements
- Built and tested to requirements of MIL-PRF-28750

## DESCRIPTION

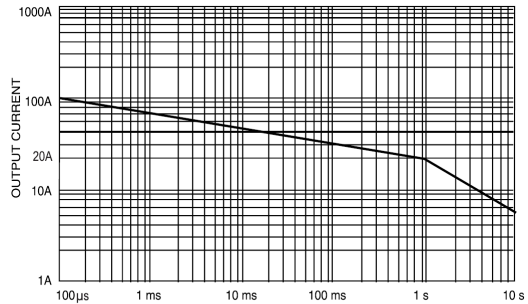
The M33-2N is a military-style DC solid-state relay designed specifically for high-current pulse load applications. This device is constructed utilizing state-of-the-art solid-state techniques and features the latest power FET output technology to minimize ON resistance. This feature provides minimum output voltage drop and allows the M33-2N to switch high pulse currents up to 100 amps at higher temperatures than those allowable with bipolar devices. The input and output are magnetically isolated to protect delicate input logic circuits from output voltage transients. The M33-2N is designed to switch loads on MILSTD-704 28 Vdc power systems, and meets 80V surge and ±600V spike requirements. The M33-2N is packaged in a low-profile hermetically sealed 22-pin DIP.



**LOAD CURRENT DERATING CURVE**  
**FIGURE 1**



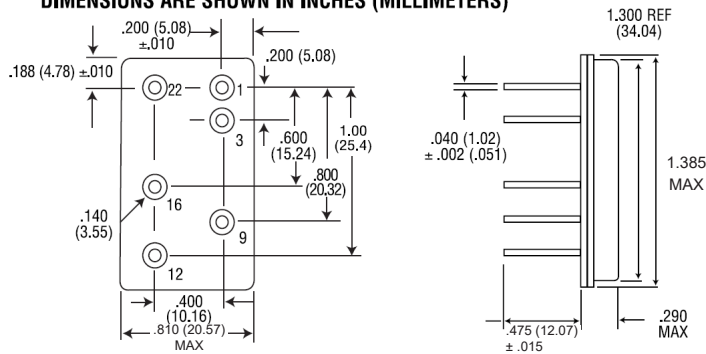
**TIMING DIAGRAM**  
**FIGURE 2**



**MAX OUTPUT CURRENT VS TIME**  
**-55°C TO +100°C CASE**  
**FIGURE 3**

**MECHANICAL SPECIFICATIONS**

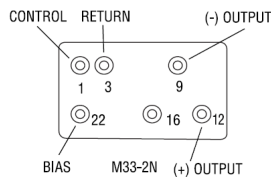
DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)



- Enclosure: 22 Pin DIP, Hermetically Sealed
- Leak Rate:  $1 \times 10^{-6}$  CC/Sec Maximum
- Material: Header: Cold Rolled Steel Nickel Plated  
Pins: Copper Core, Alloy #52 Clad Gold Plated
- Weight: 20 grams maximum

**NOTES:**

1. 100 Amp max for 100 µsec pulse, non-repetitive.
2. 23.5 Amps, 100 msec pulse, 47 Vdc, 2 Ω load, 30 times at 2% duty cycle, 5 seconds between pulses.
3. 17.5 Amp, 100 msec pulse, 35 Vdc, 2 Ω load, 120 times at 1 second intervals, 10% duty cycle.
4. On-state resistance measured at 22A, 300 µsec pulse, 10Hz repetition rate, for test purposes only, not a continuous operating condition.
5. Input transitions are to be less than 1.0 msec duration.
6. Inductive loads should be diode suppressed.
7. For test purposes, input bias voltage shall be 5.0 Vdc.
8. The maximum recommended solder temperature is 220°C for 4 seconds.



**HEADER PINOUTS**  
**(BOTTOM VIEW)**

**ENVIRONMENTAL SPECIFICATIONS.**

	Min	Typ	Max	Units
Temperature Range				
Operating	-55		+125	°C
Storage	-55		+125	°C
Vibration 100g	10		3000	Hz
Constant Acceleration			5000	g
Shock, 0.5 ms			1500	g

# Appendix

**QUALITY CONFORMANCE INSPECTION**  
 All tests are 100% unless otherwise noted.

Inspection	S <sup>2</sup> R Level "W"	S <sup>2</sup> R Level "T"	MIL-PRF-28750 Level "Y"
<b>Destructive Wirebond Pull Test</b> (Sample test) MIL-STD-883 Method 2011	✓	✓	✓
<b>Internal Visual</b> MIL-STD-883 Method 2017	✓	✓	✓
<b>Constant Acceleration</b> MIL-STD-883 Method 2001, 5000 Gs, Y1 axis			✓
<b>Temperature Cycling</b> MIL-STD-883 Method 1010, 10 cycles	✓ Specified temp range	✓ Specified temp range	✓ -55° to +125°C
<b>Load Conditioning</b> 3 hours at rated input and load 90% duty cycle, 1 to 30 operations per second (latching fault indication for drop out)	✓	✓	✓
<b>Pre Burn-In</b> (optional)			✓
<b>Burn-in Test</b> MIL-STD-883 Method 1015, 160 hours at specified temperature and rated load (latching fault indication on failure)		✓ (48 hours of same testing for plastic-packaged relays)	✓
<b>Dielectric Withstanding Voltage</b> MIL-STD-202 Method 301	✓	✓	✓
<b>Insulation Resistance</b> MIL-STD-883 Method 1003	✓	✓	✓
<b>Electrical Characteristics at -55°C</b>		✓	✓
<b>Electrical Characteristics at +25°C</b>	✓	✓	✓
<b>Electrical Characteristics at +125°C</b> (or as specified)		✓	✓
<b>Seal</b> MIL-STD-202 Method 112 (Gross) MIL-STD-883 Method 1014 (Fine)	✓ (N/A for plastic-packaged relays)	✓ (N/A for plastic-packaged relays)	✓
<b>Visual/Mechanical</b> (Sample test)	✓	✓	✓
<b>Solderability</b> (2 Samples) MIL-STD-202 Method 208		✓	✓