

HYBRID SOLID STATE RELAY

PROTON RAD HARD 100K+[®] TECHNOLOGY

SINGLE CHANNEL



150V AND 250V

Series Features

- Rad Hard: TID > 100kRad(Si)
- 2:1 margin: Operates beyond 200kRad TID
- No SEE:LET > 82MeV*cm²/mg
- Proton Resistant: No optocouplers used
- User programmable rise time to customize inrush current response
- Dual logic level command input, 3.3 or 5 volts
- Large internal FET heatsink integrates thermal turn-on pulse for low stress operation
- 100K+™ patented design for reliable operation in satellite environments

Specifications *3647

SPST NO, Single Channel

Switch Input Voltage Range:

Static Characteristics - Table 1

Dynamic Response - Table 2

Radiation Life - Table 3

Isolation: 500 VDC

All active pins to case

Command inputs to switch

Bias supply to switch

Bias Input Voltage: 5 VDC (4.6 VDC - 5.4 VDC)

Bias Input Current 30 mA typical

3.3 VDC bias input optional

Command Buffer input current 1 mA typical at 5 VDC

Command Buffer trip point 1.5 VDC (OFF 1V max, ON 2V min)

Power dissipation: 4 W max continuous steady state

Case Temperature Range:

Storage: -65°C to 150°C

Operating: -55°C to 85°C (R or S grades)

Operating: -55°C to 125°C (RE or SE grades)

WEIGHT: 45 grams typical

SERIES *3647

The *3647 Solid State Relay (SSR) FET switch is driven by a magnetically isolated low level command. The SSR is available with different FET ratings which suit all popular satellite bus voltages. Nominal current and voltage ratings are also shown in Table 1.

Solid State Relays frequently drive loads with capacitive inputs, such as DC-DC converters. In these applications, an uncontrolled rise time can lead to high inrush currents. The MDI *3647 series has a programmable rise time, allowing user control of inrush current. The output rise time may be externally adjusted by the user from 50 to 400 μSecs via connection of a small capacitor, ranging up to 2000pF.

The MDI *3647 relay FET is mounted on an intrinsic thermal mass, which integrates the effect of the power dissipated during the turn on interval, reducing transient junction temperature rise and stress.

The bias power input requires approximately 30 mA at 5 VDC. This drives a 400 kHz. RF oscillator that supplies drive power to the relay FET. The bias input may also function as a control ON/OFF command input and is available at a nominal 3.3 VDC level.

A dual input logic compatible buffer is also provided so that a low current CMOS signal (less than 1 mA) can drive the input command at either 3.3V or 5V logic levels.

TABLE 1: SSR Ratings and Static Characteristics

Model Number	Application Bus Voltage	Max. Recommended Input Voltage Vdc	Max. Rated Input Voltage Vdc	Peak Current A	Steady State Current A	On Resistance Ohms	Leakage current at max rated Input Voltage μA	Leakage Current at Application Bus Voltage μA
93647	100	120	250	7	1.5	0.75	20	10
83647	70	120	250	7	1.5	0.75	20	10
73647	50	75	150	15	4	0.15	200	100
53647	28	75	150	15	4	0.15	200	100

*Application Bus Voltage in the commonly available satellite bus voltage ranges. These ratings harmonize with the input voltage ranges for MDI 5000, 7000, 8000 and 9000 series converters.

- Maximum Recommended Input Voltage is the maximum factory recommendation considering single event radiation effects
- Maximum Rated Input Voltage is the maximum Vds rating of the FET switch
- Peak Current - Maximum transient current
- Steady State Current - Maximum continuous steady state current
- On Resistance - Typical in ohms, 25C. Increases linearly to 2X at 125C.
- Leakage Current at Max Rated Input Voltage OFF State - Typical values
- Leakage Current at Application Bus Voltage OFF State - Typical values

TABLE 2: SSR Dynamic Response, Pre-Radiation, 25°C, nominal values

Model Number	Turn On Delay μSec	Turn Off Delay μSec	Rise Time no Cext μSec	Rise Time Cext 2000pF μSec	Fall Time μSec
93647	200	50	50	400	50
83647	200	50	50	400	35
73647	300	50	50	400	25
53647	450	50	50	400	25

TABLE 3: SSR Dynamic Response, Post 100K Radiation, 25°C, nominal values

Model Number	Turn On Delay μSec	Turn Off Delay μSec	Rise Time no Cext μSec	Rise Time Cext 2000pF μSec	Fall Time μSec
93647	600	100	75	1000	50
83647	600	100	75	1000	35
73647	750	100	75	1000	25
53647	1100	100	75	1000	25

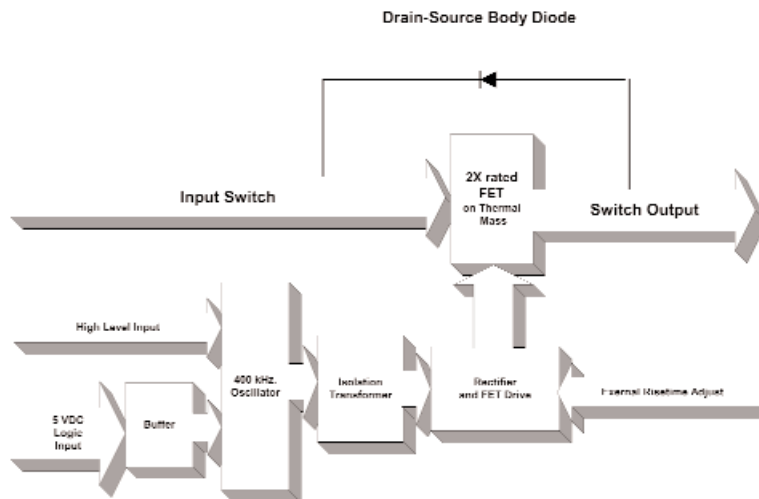
Specifications subject to change.



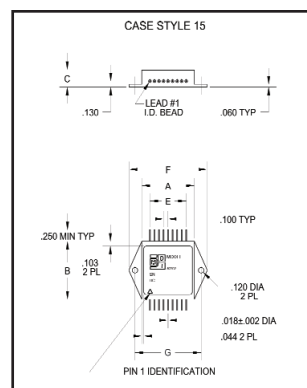
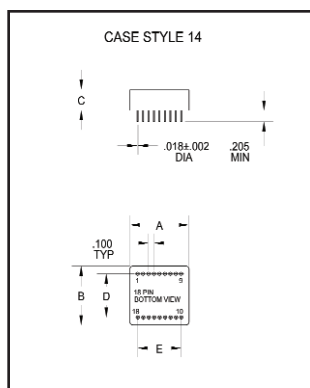
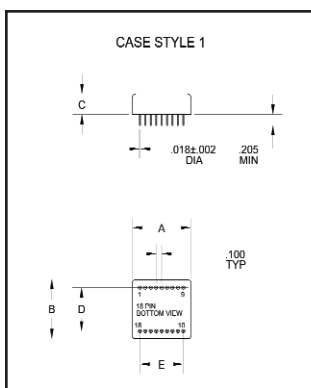
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*3647

HYBRID SOLID STATE RELAY



Model No.	Case Style	Pin Count	Mounting
*3647	1	18	Solder Sealed Flangeless PCB Mount
*3647	D	14	Seam Weld Flangeless PCB Mount
*3647	TF	15	Seam Weld Chassis Mount with Flange



Case Dimensions

Units: inches | millimeters

Case Style	A	B	C	D	E	F	G
1	1.080 27.432	1.080 27.432	0.380 9.652	0.800 20.320	0.800 20.320	— —	— —
14 D	1.090 27.686	1.090 27.686	0.380 0.380	0.800 20.320	0.800 20.320	— —	— —
15 TF	1.160 29.464	1.293 32.588	0.380 9.652	— —	0.800 20.320	1.754 44.552	1.460 37.084

Pin Out Chart

Pin 1	N/C	Pin 6	N/C	Pin 10	N/C	Pin 15	Switch output
Pin 2	N/C	Pin 7	Buffered CMD input +	Pin 11	N/C	Pin 16	Cext rise time capacitor
Pin 3	N/C	Pin 8	CMD input common,	Pin 12	N/C	Pin 17	Switch Input +
Pin 4	Case		Bias input return	Pin 13	N/C	Pin 18	Switch Input +
Pin 5	N/C	Pin 9	Bias input and command supply +	Pin 14	Switch output		

GRADE LEVELS:

Please specify grade level for your application. EU grade units will be shipped if no option is specified.

EU	Engineering Units	S	100K+ [®] +85°C Space
R	100K+ [®] +85°C Military/Aerospace	SE	100K+ [®] +125°C Space
RE	100K+ [®] +125°C Military/Aerospace		

