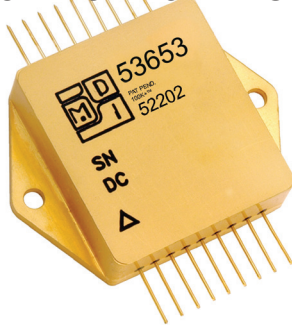


# 53653/54 ACTIVE DIODE "OR" HYBRID MODULE

## PROTON RAD HARD 100K+<sup>®</sup> TECHNOLOGY

### LOW VOLTAGE INPUT



#### Series Features

- Rad Hard: TID > 100kRad(Si)
- 2:1 margin: Operates beyond 200kRad TID
- No SEE:LET > 82MeV\*cm<sup>2</sup>/mg
- Proton Resistant: No optocouplers used
- Replaces conventional "OR"ing rectifiers
- Combines and forms an ultra-low-loss logic "OR" function for two converter outputs into a single, redundant power source
- Automatically selects the higher of two input voltages
- Offers the inherent reliability improvement of dual redundant power sources
- Compact, board or chassis mountable, very low volt drop high efficiency design
- Self powering directly from converter output or may be powered by optional Vbias supply
- Operates with inputs as low as 1 volt
- Auto selects prime or redundant input based on higher voltage input

#### Benefits 53653/54

- Maximizes system efficiency
- Eliminates need for upward adjust of input DC
- Available for negative going inputs (Model 53654)
- Increases system reliability
- Manages redundant power sources

#### Specifications 53653/54

##### CASE TEMPERATURE RANGE:

- Storage: -65°C to 150°C
- Operating: -55°C to 85°C (S)
- Operating: -55°C to 125°C (SE)

WEIGHT: 45 grams maximum

## Series 53653/54

MODEL	INPUT VOLTAGE RANGE
53653-3.3	1 to 4
53653-5.0	1 to 7
53654-3.3	-1 to -4
53654-5.0	-1 to -7

53653 Active Diode "OR"	53653-3.3*			53653-5.0*				
Parameter	Min	Typ	Max	Min	Typ	Max	Units	Notes
Conduction Current	—	—	15.6	—	—	15.6	Amperes	1
On Resistance, 25°C	—	9	12	—	9	12	milliohms	
On Resistance, -55°C	—	8	10	—	8	10	milliohms	
On Resistance, 125°C	—	14	18	—	14	18	milliohms	
Supply Voltage	1	3.3	4	1	5	7	Volts DC	2
Bias Supply Voltage	3.2	3.3	3.5	4.5	5	5.5	Volts DC	
Quiescent Current	—	30	—	—	20	—	milliamperes	
Input Select Offset Voltage	—	25	—	—	25	—	millivolts DC	
Isolation to Case	—	—	500	—	—	500	Volts DC	3

#### Notes:

- 1 Per channel forward direction. Maximum indicated achieves 0.6 power derating factor for internal components.
  - 2 When the bias supply is not connected, the unit will self power from the input source. Thus, the input source must be within the bias supply voltage range. When the bias supply voltage is connected and within range, the supply voltage may range within the maximums and minimums shown.
  - 3 Except pin 10; case ground
- \* Also available as model 53654 for negative going inputs (-3.3V and -5V inputs)

#### 53653/54 Active Diode "OR" Theory of Operation

The 53653 Active Diode "OR" is used to replace conventional "OR"ing rectifiers when redundant low voltage inputs are combined to achieve a single output. System reliability is enhanced as the 53653 combines and forms an ultra low-loss logic "OR" function for two converter outputs into a single, redundant power source for critical loads by selecting the higher of the two input voltages.

Designed to complement the low voltage outputs of MDI's Proton RadHard 100K+<sup>®</sup> DC-DC converters, the 53653 Active Diode "OR" offers satellite and space vehicle designers the inherent higher reliability of redundant power sources with the advantages of a rad hard, compact, board or chassis mountable, very low volt drop high efficiency device.

Within the 53653 Active Diode "OR", two sets of paralleled FETs replace conventional diodes, resulting in an order of magnitude lower series voltage drop. An internal comparator determines which of the two input voltages is higher, and selects the desired set of FET switches. The prime or redundant converter is thereby automatically connected to carry the load.

In the past, power system designers specified output voltages higher than their desired outputs by the magnitude of a diode drop. With the 53653 Active Diode "OR" ultra low-loss dual FET design, this is no longer necessary.

The 53653 Active Diode "OR" is self-powered from the input voltage for nominal 3.3 VDC and 5 VDC inputs. When supplied with an external 3.3 or 5 VDC bias supply, the part can be used to select power inputs as low as 1 VDC nominal.

Model 53654, an identical model but in reverse polarity, may be selected when system voltages are negative going with respect to power return (-3.3 and -5 volt inputs).

The 53653 Active Diode "OR" is implemented with MDI's 100K+<sup>®</sup> technology, making it especially suitable for space applications.

Specifications subject to change.

#### GRADE LEVELS:

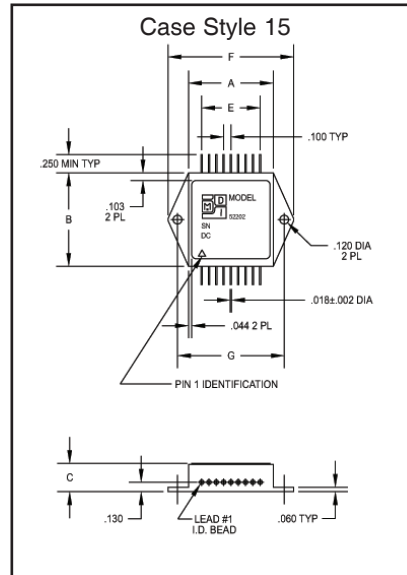
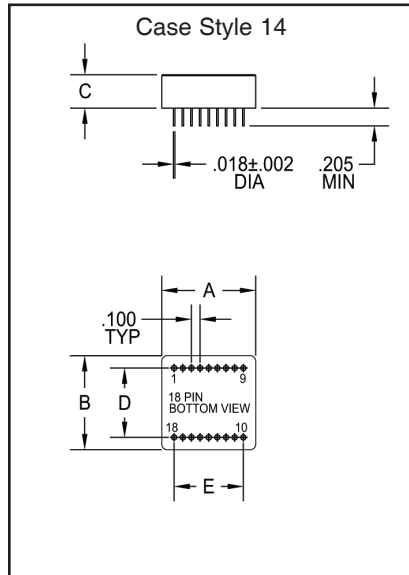
Please specify grade level for your application. EU grade units will be shipped if no option is specified.

- EU Engineering Units
- S 100K+<sup>®</sup> +85°C Space
- SE 100K+<sup>®</sup> +125°C Space



# 53653/54

## ACTIVE DIODE "OR" HYBRID MODULE



Model No.	Case Style	Pin Count	Mounting
53653 D	14	18	Seam Weld Flangeless PCB Mount
53653 TF	15	18	Seam Weld Chassis Mount with Flange

### Case Dimensions

Units: inches | millimeters

TOLERANCES: Drawings in Inches All dimensions  $\pm 0.01$  except F = max, C =  $+0.01/-0.020$   
For Custom Packages, Contact Factory

Case Style	A								B				
14 D	1.090	27.686	1.090	27.686	0.380	9.652	0.800	20.320	0.800	20.320	—   —	—   —	
15 TF	1.160	29.464	1.283	32.588	0.380	9.652	—   —	0.800	20.320	1.754	44.552	1.460	37.084

### Pin Out Chart

Pin 1	Input Source A	Pin 7	Input Source B	Pin 13	N/C
Pin 2	Input Source A	Pin 8	Input Source B	Pin 14	N/C
Pin 3	Input Source A	Pin 9	Input Source B	Pin 15	N/C
Pin 4	Output	Pin 10	Case	Pin 16	Test Point - Checks optional bias input
Pin 5	Output	Pin 11	Circuit Ground	Pin 17	N/C
Pin 6	Output	Pin 12	N/C	Pin 18	Optional Bias Input

