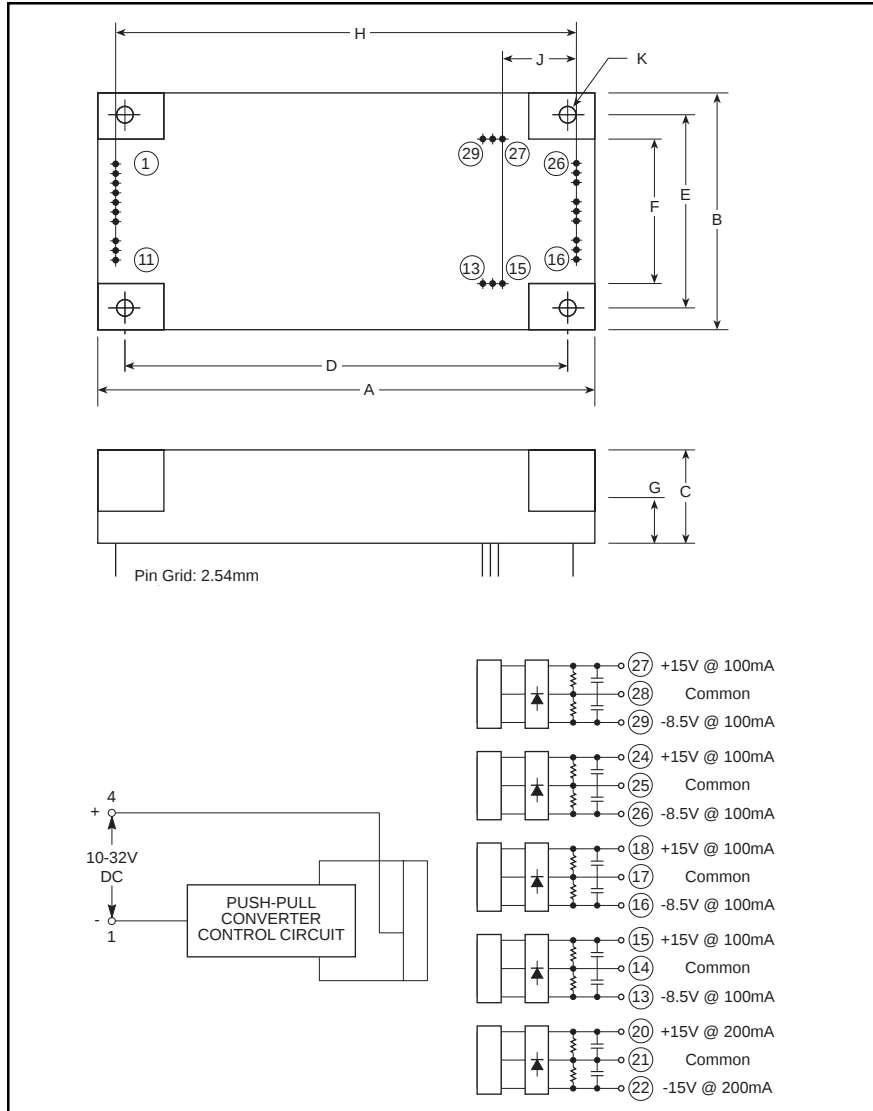


Isolated DC-to-DC Converter



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.62	92.0
B	2.05	52.0
C	0.57	14.5
D	3.27	83.0
E	1.77	45.0

Dimensions	Inches	Millimeters
F	1.40	35.56
G	0.2	5.0
H	3.35	85.0
J	0.5	12.7
K	0.14 Dia.	3.5 Dia.



Description:

M57994-01 is a 7 Watt isolated DC to DC converter designed to provide power for Powerex hybrid IGBT gate drivers. When supplied with an input voltage of 10V to 32V DC the M57994-01 will produce four isolated +15V/-8.5V outputs suitable for use with Powerex M57957L, M57958L, M57959L, M57962L hybrid IGBT gate drivers. In addition, the M57994-01 also provides an isolated +15V/-15V auxiliary output to power system control circuits. The isolation between the primary and secondary outputs has been optimized to provide the high dv/dt noise immunity needed in IGBT power circuits.

Features:

- ☐ Wide Input Voltage Range: 10V to 32 V DC
- ☐ Five Isolated Outputs: 4 x +15V/-8.5V @ 100mA
1 x +15V/-15V @ 200mA
- ☐ Primary-to-Secondary Isolation Voltage: 2500 V_{rms}
- ☐ Secondary-to-Secondary Isolation Voltage: 1500 V_{rms}
- ☐ Compact, Low Profile Design

Applications:

- ☐ Isolated power supply for Powerex hybrid IGBT gate drivers in general purpose inverters, AC servo, UPS and similar applications.

Ordering Information:

M57994-01

M57994-01
Isolated
DC-to-DC Converter

Absolute Maximum Ratings, $T_a = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	M57994-01	Units
Input Voltage	V_I		32	Volts
Load Current	I_L	Terminals (28)-(27), (25)-(24), (28)-(29), (25)-(26), (17)-(18), (17)-(16), (14)-(15), (14)-(13)	100*	mA
		Terminals (21)-(20), (21)-(22)	200*	mA
Operating Temperature	T_{opr}	There Should be	-10 ~ +70	$^\circ\text{C}$
Storage Temperature	T_{stg}	No Condensation	-20 ~ +85	$^\circ\text{C}$
Output Power	P_O	Total All Outputs	7*	Watts
Primary-to-Secondary Isolation	$V_{iso} 1$	AC for 1 Minute	2500	V_{rms}
Secondary-to-Secondary Isolation	$V_{iso} 2$	AC for 1 Minute	1500	V_{rms}

* Refer to output power derating curve, Figure 3.

Electrical Characteristics, $V_I = 12\text{V}$, $T_a = 25^\circ\text{C}$ unless otherwise specified

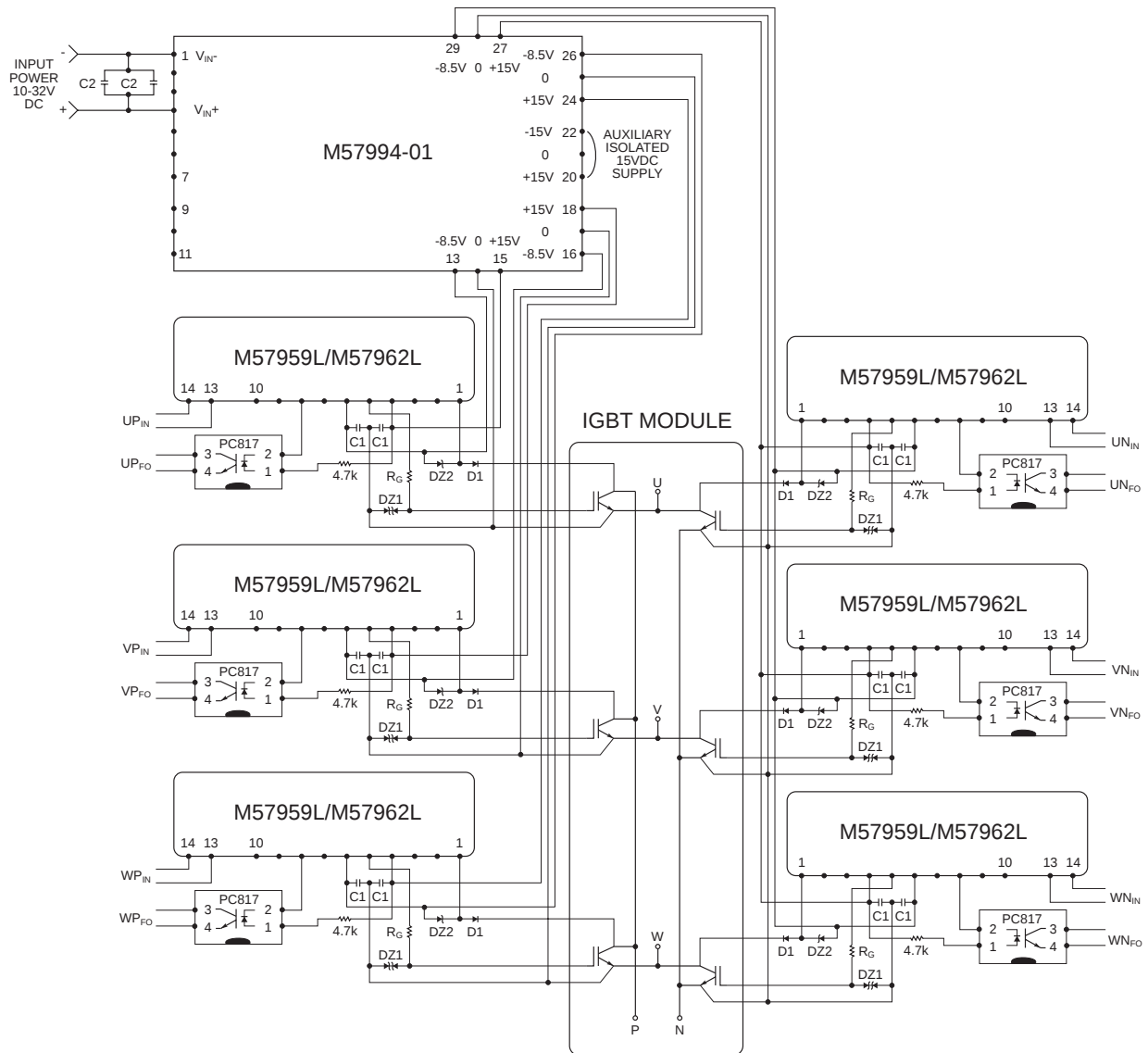
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Voltage	V_I	Recommended Range	10	12/24	32	Volts
Output Voltage	Gate Drive	Between Pins (28)-(27), (25)-(24), (17)-(18), (14)-(15)	$I_L = 0\text{mA}$	—	—	Volts
			$I_L = 10\sim 100\text{mA}$	13.5	15.0	
		Between Pins (28)-(29), (25)-(26), (17)-(16), (14)-(13)	$I_L = 0\text{mA}$	-11.0	—	
			$I_L = 10\sim 100\text{mA}$	-10.0	-8.5	
	Auxiliary	Between Pins (21)-(20)	$I_L = 0\text{mA}$	—	—	Volts
			$I_L = 10\sim 200\text{mA}$	13.5	15.0	
		Between Pins (21)-(22)	$I_L = 0\text{mA}$	-18.0	—	
			$I_L = 10\sim 200\text{mA}$	-16.5	-15.0	
Input Regulation	Gate Drive	Between Pins (28)-(27), (25)-(24), (17)-(18), (14)-(15)	$V_I = 10\sim 32\text{V}$	—	50	mV
		Between Pins (28)-(29), (25)-(26), (17)-(16), (14)-(13)	$I_L = 100\text{mA}$	—	50	
	Auxiliary	Between Pins (21)-(20)	$V_I = 10\sim 32\text{V}$	—	50	
		Between Pins (21)-(22)	$I_L = 200\text{mA}$	—	50	
Load Regulation	Gate Drive	Between Pins (28)-(27), (25)-(24), (17)-(18), (14)-(15)	$V_I = 12\text{V}$	800	—	mV
		Between Pins (28)-(29), (25)-(26), (17)-(16), (14)-(13)	$I_L = 10\sim 100\text{mA}$	600	—	
	Auxiliary	Between Pins (21)-(20)	$V_I = 12\text{V}$	700	—	
		Between Pins (21)-(22)	$I_L = 10\sim 200\text{mA}$	700	—	
Efficiency	η	Total Output 7W	59	—	—	%

M57994-01

Isolated

DC-to-DC Converter

Figure 1: Typical Application Circuit – Fully Isolated Gate Drive for Three Phase Inverter



Notes:

- DZ1: 16V-18V, DZ2: 30V
- D1: $V_{rrm} = V_{ces}$ (IGBT), Fast Recovery (100ns)
- C1: 10~100uF (depending on wiring layout and IGBT), Low ESR Type, C2: 330uF 50V Typical
- UP_{IN}, VP_{IN}, WP_{IN}, UN_{IN}, VN_{IN}, WN_{IN} are isolated on/off control inputs. +5V on pin 14, Gnd on pin 13 turns IGBT on.
- UP_{FO}, VP_{FO}, WP_{FO}, UN_{FO}, VN_{FO}, WN_{FO} are fault signals indicating that the short circuit protection was activated.

Caution:

- M57994-01 does not have output over current protection - Permanent damage may occur if maximum output current ratings are exceeded.
- Input decoupling capacitors (C2) must be selected with sufficient ripple current capability for full load condition. Experimental verification is recommended.
- The M57994-01 is intended for bridge circuit operation based on input line voltages up to 240VAC.

M57994-01
Isolated
DC-to-DC Converter

Figure 2: Typical Application Circuit – Fully Isolated Gate Drive for H-Bridge Power Stage

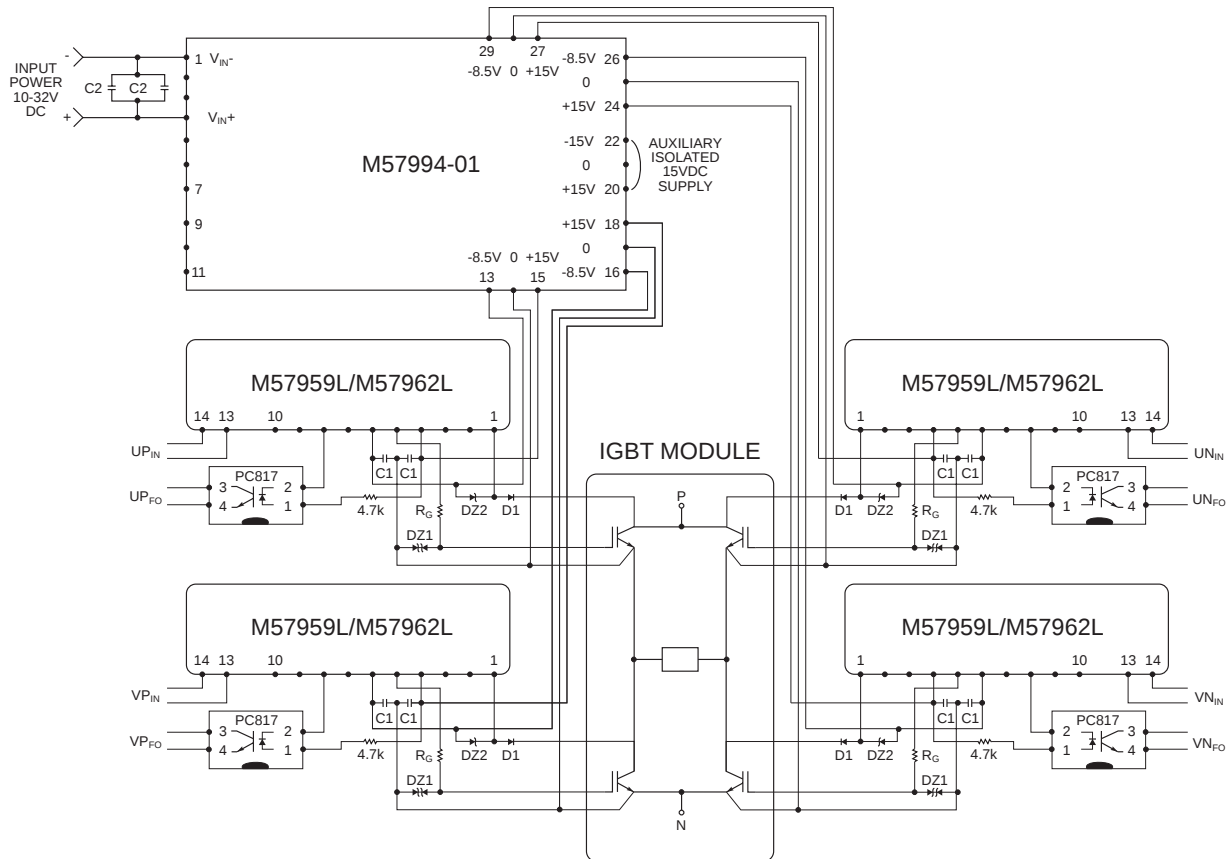


Figure 3: Output Power Derating

