

## MICRO-FRC

**IGBT-MOSFET-Silicon Carbide DRIVER**  
**Excellent Plug & Play solution!!**

**"More than 20,000 working in field"**

### Features

- 1W Compact Dual channel driver
- Switching frequency up to 50 KHz
- $\pm 6A$  gate current, +15V/-10V
- Drive up to 1200V IGBT Module
- Electrical Interface
- Fiber Optical also available
- Integrated short-circuit soft shutdown
- Gate clamping
- Less than 1  $\mu s$  delay time
- Less aging effect due to ASIC
- Primary/Sec. under voltage lockout
- Vce monitoring for short circuit current
- Superior EMI-EMC
- Easy tuning with various IGBT module

### Benefits

- On board isolated DC-DC converter - No need of separate SMPS.
- Interface for 3.3V...15 V logic level - Direct compatible with any Controller.
- Common fault feedback signal to interface with controller - Avoid Extra component.
- Field configurable blocking time - Flexibility in your hand, use any make IGBT !!
- Safe isolation to IEC 61800-5-1, IEC-60664-1 & En50178, protection class II
- User Selectable Rg

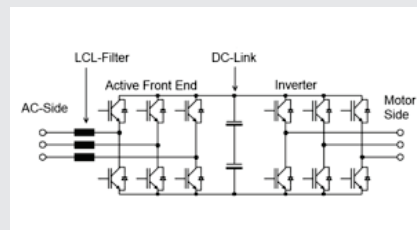
### Application



BALLAST



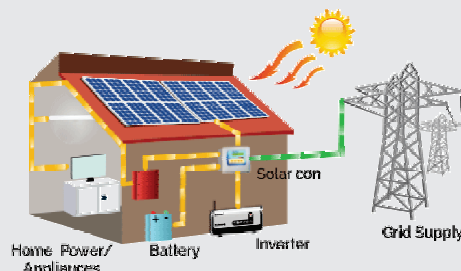
DRIVES



CONVERTER - INVERTER



UPS



SOLAR INVERTER



MEDICAL-X RAY

## Technical Specification

## THE POWER SOLUTIONS

### Recommended Operating condition

Power Supply & Monitoring	MIN	TYP	MAX
1. Supply Voltage Vcc to GND	: 14.5	15	16 V
2. Supply Current Icc (Without Load)	: 80 mA (@49KHz PWM I/P)		
3. Under Voltage Primary, Set Fault	: 11.3	12.0	12.7 V
Clear Fault	: 11.9	12.6	13.3 V
Secondary, Set Fault	: 11.5	12.0	12.5 V
Clear Fault	: 12.1	12.6	13.1 V

### Logical Inputs & Outputs

1. Input Bias Current	: 190 $\mu$ A
2. Interface Logic level	: 3.3 V ..... 15.0 V logic level
3. Turn-on threshold	: 2.6 V
4. Turn off threshold	: 1.3 V
5. SOx output, failure Condition	: 0.7 V Max., I(SOx) < 20 mA total

### Short-Circuit Protection

	: Diode sense method
1. Vce-monitoring threshold	: 9.3 V (Internally Fix)
Trip adjustment D10,D12	: 1W ZENER / UF4007 / MUR1100
2. Factory Set response time	: 4.5 $\mu$ Sec (C5,C6: 150pF)
3. Minimum response time	: 4.5 $\mu$ Sec
4. Available blocking time (R7)	: 49 mSec (User Selectable 100K)
5. Minimum blocking time (R7)	: 9 $\mu$ Sec (0E)

### Timing Characteristic (Input to Output of Driver board under No-Load)

1. Turn-on delay $t_{d(on)}$	: 1 $\mu$ S, Max.
2. Turn-off delay $t_{d(off)}$	: 1.2 $\mu$ S, Max.

For detail timing information of driver core, refer part specific datasheet.

### Protection Available on driver board

1. Primary/Secondary Under voltage monitoring & error feedback.
2. Power supply reverse polarity.
3. Soft Shut down, For IGBT Over Voltage.
4. Vce monitoring for short circuit current.
5. Schmitt trigger at the Input stage, highly susceptible to noise.
6. IGBT Gate clamping.

### Electrical Isolation

Test voltage (50 Hz/1 sec)	
1. Primary to secondary side	: 4.0 KV
2. Secondary to secondary side	: 4.0 KV

This gate driver is suited for HiPot testing. Nevertheless, it is strongly recommended to limit the testing time to 1s slots. Excessive HiPot testing at voltages much higher than 850V<sub>AC(eff)</sub> may lead to insulation degradation. No degradation has been observed over 1 min. testing at 2500V<sub>AC(eff)</sub>. Each driver core production sample shipped has undergone 100% testing at the given value or higher for 1s.

### Output Voltage / Current / Power

1. Turn-on voltage, V <sub>Gth</sub>	: 15.0 V, any load condition
2. Turn-off voltage, V <sub>GLx</sub>	: -9.9 V, No load
3. Turn-off voltage, V <sub>GLx</sub>	: -8.0 V @ 1W
4. Gate Peak Current I <sub>out</sub>	: $\pm$ 6 Amp
5. Internal Gate resistance	: 0.5 $\Omega$
6. External Gate resistance	: Minimum 2.5 $\Omega$ , < 25kHz : Minimum 5 $\Omega$ , > 25kHz
7. Switching frequency F	: 50 KHz
8. Output Power	: 1.0 W, T <sub>amb</sub> < 85 °C : 1.2 W, T <sub>amb</sub> < 70 °C : 0.35W, T <sub>amb</sub> < 105 °C

Part used on Plug & play driver : 2SC0106T2A1-12 from Power Integration

### Environmental

Working temperature	: -40 to 105 °C
Storage temperature	: -40 to 90 °C

### Driving Capability : ANY MAKE

All usual IGBT modules up to 600 A /1200 V or 600A/600V.  
Driving power depends on switching frequency so in case of any doubt during selection process pl. contact us.


### Interfacing with Control Circuit

1. Electrical
- ERROR : Low to High / High to Low (Site selectable)

### LED Indication

Power ON: Green (Normally ON, Off during Power supply fault)  
ERROR : RED (ON during Under Voltage / DESAT/ IGBT Fault)

## ORDERING CODE - 220221009

MICRO FRC	Description	Specify X from Table
	1W, 6A, 50KHz 1200V CLASS IGBT DRIVER	
	14-PIN FRC Electrical Interface	
	Default Gate Resistor: 10E	

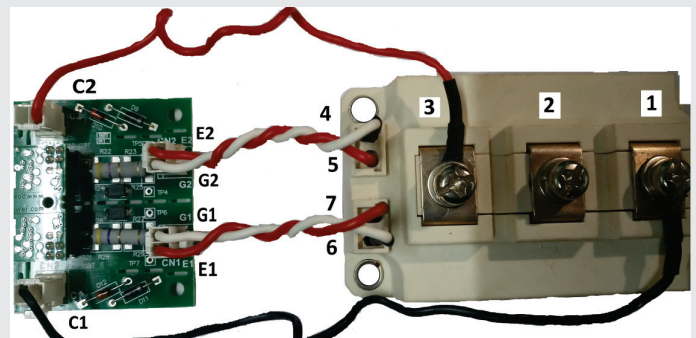
### Interfacing with Control Circuit

#### 14-PIN Input FRC Pin Detail:

1,5,7,13,14	N.C.		
2	PWM B	4	PWMA
3	ERROR		
8,9	+15V	10,11,12	GND



### Driver Secondary Connection with IGBT:-



### MECHANICAL DIMENSION:

