

## MICRO-MASTER-FRC

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

### 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
- Advance active clamping
- Integrated short-circuit soft shutdown

### Advanced version of Micro-FRC model

- Gate clamping
- Individual Rg ON & Rg OFF Resistor
- 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
- In-built Dead-band Control

### Benefits

- On board isolated DC-DC converter - No need of separate SMPS.
- Interface for 13V...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

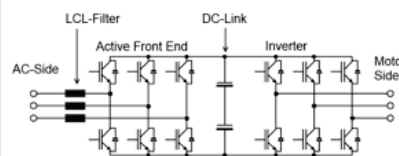
### Application



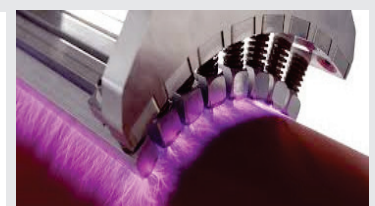
BALLAST



DRIVES



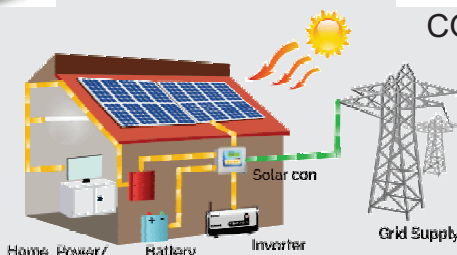
CONVERTER - INVERTER



CORONA TRETAR



UPS



SOLAR INVERTER



MEDICAL-X RAY



INDUCTION EQUIPMENT

### 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)	: 100 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	: 12 V ..... 15.0 V logic level
3. Turn-on threshold	: 12 V
4. Turn off threshold	: 10.7 V
5. SOx output, failure Condition	: 0.7 V Max., I(SOx) < 20 mA total

### Short-Circuit Protection

1. Vce-monitoring threshold	: Diode sense method
Trip adjustment D10,D12	: 9.3 V (Internally Fix)
2. Factory Set response time	: 1W ZENER / UF4007 / MUR1100
3. Minimum response time	: 4.5 $\mu$ Sec (C5,C6: 150pF)
4. Available blocking time (R7)	: 4.5 $\mu$ Sec
5. Minimum blocking time (R7)	: 49 mSec (User Selectable 100K)
	: 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.
3. Dead band Factory Set	: 4.0 $\mu$ 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>Ghx</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>CLx</sub>	: -8.0 V @ 1 W
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 - 220221008

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

### Interfacing with Control Circuit

#### 14-PIN FRC Pin Detail:

1,5,7,13,14	N.C.		
2	PWM B	4	PWM A
3	ERROR	6	EXT RESET
8,9	+15V	10,11,12	GND

**NOTE: EXT RESET must be GND, if not interface with Controller.**

### Interfacing with IGBT

#### J1 Pin Detail:

1	CB- Collector for bottom IGBT switch (High Voltage)
2	NC
3,4	GB- GATE for bottom IGBT Switch
5	EB - Emitter for bottom IGBT Switch

#### J2 Pin Detail:

1	CT- Collector for top IGBT switch (High Voltage)
2	NC
3,4	GT- GATE for top IGBT Switch
5	ET - Emitter for top IGBT Switch

### MECHANICAL DIMENSION:

