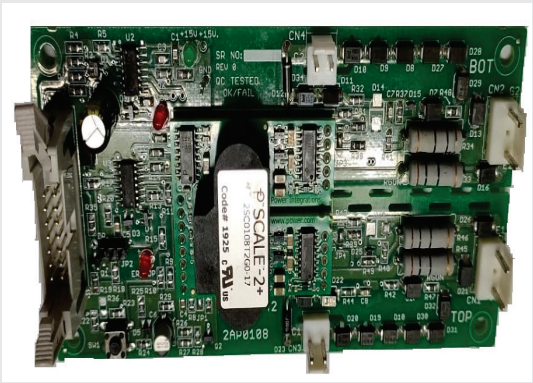
# RAM ENTERPRISE

**THE POWER SOLUTIONS**



# MICRO-FRC-17

**IGBT-MOSFET-Silicon Carbide DRIVER**

**Excellent Plug & Play solution!!**

## Features

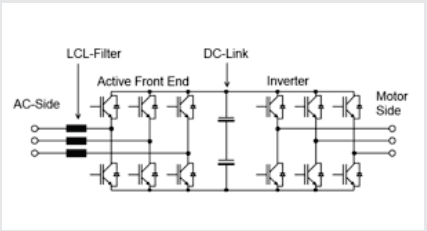
- 1W Compact Dual channel driver
- Switching frequency up to 50 KHz
- ±8A gate current, +15V/-8V
- Drive up to 1700V IGBT Module
- Electrical Interface
- Fiber Optical (optional)
- Integrated short-circuit soft shutdown
- Gate clamping
- Less than 1 uS delay time
- Less aging effect due to ASIC
- Primary/Sec. 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 13V...15 V logic level.
- 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

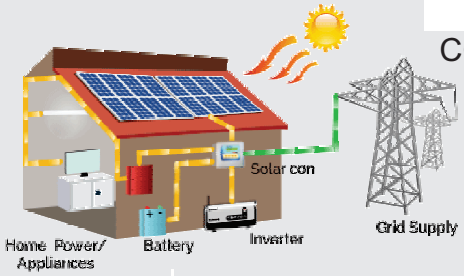
## Application


DRIVES




CONVERTER - INVERTER

UPS




SOLAR INVERTER

MEDICAL-X RAY

**Recommended Operating condition**

| Power Supply & Monitoring | MIN | TYP | MAX | |
|---|---|---|---|---|
| 1. Supply Voltage Vcc to GND | : 14.5 | 15 | 15.5 | V |
| 2. Supply Current Icc (Without Load): | 60 mA (@49KHz PWM I/P) | | | |
| 3. Under Voltage Primary, Set Fault | : 11.3 | 12.3 | 12.7 | V |
| Clear Fault | : 11.9 | 13.1 | 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 µA |
| 2. Interface Logic level | : 13.0 V ..... 15.0 V logic level |
| 3. Turn-on threshold | : 13.0 V(TYP) |
| 4. Turn off threshold | : 10.7 V(TYP) |
| 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 (Factory set) |
| 2. Factory Set response time | : 2.5 µSec (R37,R49 : 18K Ω) |
| 3. Minimum response time | : 2.5 µSec |
| 4. Available blocking time (R7) | : 49 mSec ( 100K) Factory set |
| 5. Minimum blocking time (R7) | : 9 µSec (0E) |

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

| | |
|---|---|
| 1. Turn-on delay $t_{d(on)}$ | : 1 uS, Max. |
| 2. Turn-off delay $t_{d(off)}$ | : 900 nS, 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 immune 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 $850V_{AC(eff)}$ may lead to insulation degradation. No degradation has been observed over 1 min. testing at $2500V_{AC(eff)}$ 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, $V_{GHx}$ | : 15.0 V, any load condition |
| 2. Turn-off voltage, $V_{GLx}$ | : -8 V, No load |
| 3. Turn-off voltage, $V_{GLx}$ | : -8.0 V @ 1 W |
| 4. Gate Peak Current $I_{out}$ | : ±8 Amp |
| 5. Internal Gate resistance | : 0.5 Ω |
| 6. External Gate resistance | : Minimum 2 Ω, <25kHz |
| | : Minimum 2 Ω, >25kHz |
| 7. Switching frequency F | : 50 Khz |
| 8. Output Power | : 1.2 W, $T_{amb}$ <70 °C |
| | : 1.0 W , $T_{amb}$ <85 °C |
| | : 0.50 W, $T_{amb}$ <105 °C |

Part used on Plug & play driver : 2SC0108T2XX -XX from Power Integration
(for more detail, kindly check part specific datasheet from PI)

**Environmental**

| | |
|---|---|
| Working temperature | : -40 to 85 °C |
| Storage temperature | : -40 to 50 °C |

**Driving Capability : ANY MAKE**

All usual IGBT modules up to 600 A /1200 V or 450A/1700V. 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 :High (Normal) to Low (Error) (JP1 SHORT - (1-2))
High (Error) to Low (Normal) (JP1 SHORT - (2-3))
Open collector output (Optional)
EXTRST : 5 Sec high to low Pulse/ Do ground if function not used in circuit.

**LED Indication**

Power ON: Green (Normally ON, Off during Power supply fault)
ERROR : RED (ON during Under Voltage / DESAT/ IGBT Fault)
ER_TOP For TOP IGBT, ER_BOT For BOTTOM IGBT.

## ORDERING CODE - 220221042

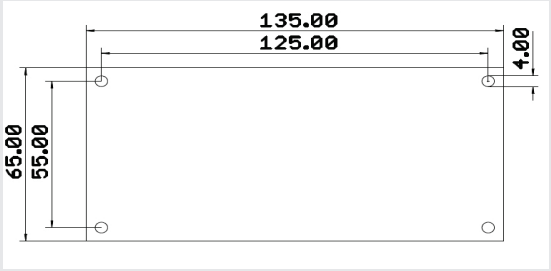
| MICRO-FRC-17 | Description Specify X from Table |
|---|---|
| 220221042 | 1W, 8A, 50KHz 1700V CLASS IGBT DRIVER<br>14-PIN FRC Electrical Interface |
| | Default Gate Resistor: 10E Rgon & Rgoff |

**Interfacing with Control Circuit**

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

| | | | |
|---|---|---|---|
| 2 | IN_BOT | 8,9 | +15V |
| 4 | IN_TOP | 10,11,12 | GND |
| 3 | ERROR | 1,5,7,13,14 | N.C |
| 6 | EXTERNAL RESET | | |

**MECHANICAL DIMENSION:**




**ALL DIMENSIONS ARE IN MM**

**Driver Secondary Connection with IGBT:-**

**COMING SOON..**