

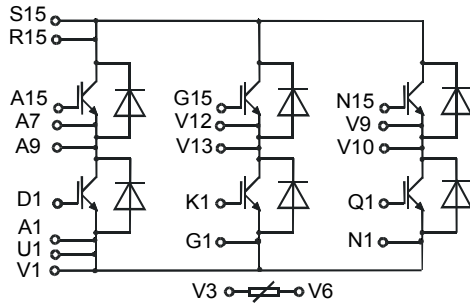
IGBT Module

Short Circuit SOA Capability
Square RBSOA

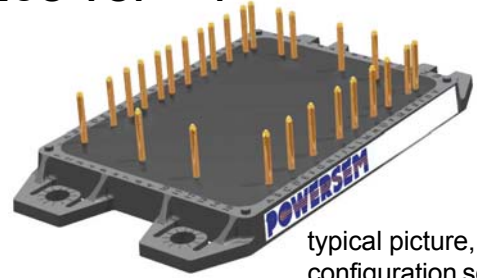
PSII 30/06*

$I_{C80} = 29 \text{ A}$
 $V_{CES} = 600 \text{ V}$
 $V_{CE(sat)typ.} = 2.4 \text{ V}$

Preliminary Data Sheet



ECO-TOP™ 1



typical picture, for pin configuration see outline drawing

IGBTs

| Symbol | Conditions | Maximum Ratings | |
|-----------------------|--|-----------------|---------------|
| V_{CES} | $T_{VJ} = 25^\circ\text{C to } 150^\circ\text{C}$ | 600 | V |
| V_{GES} | | ± 20 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 42.5 | A |
| I_{C80} | $T_C = 80^\circ\text{C}$ | 29 | A |
| I_{CM} V_{CEK} | $V_{GE} = \pm 15 \text{ V}; R_G = 33 \Omega; T_{VJ} = 125^\circ\text{C}$ RBSOA, Clamped inductive load; $L = 100 \mu\text{H}$ | 60 | A |
| | | V_{CES} | |
| t_{SC} (SCSOA) | $V_{CE} = V_{CES}; V_{GE} = \pm 15 \text{ V}; R_G = 33 \Omega; T_{VJ} = 125^\circ\text{C}$ non-repetitive | 10 | μs |
| P_{tot} | $T_C = 25^\circ\text{C}$ | 130 | W |

*NTC optional

| Symbol | Conditions | Characteristic Values ($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified) | | | |
|--|--|--|-------------------------------------|----------------------------------|-----------------|
| | | min. | typ. | max. | |
| $V_{CE(sat)}$ | $I_C = 50 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$ | | 2.4 2.9 | V V | |
| $V_{GE(th)}$ | $I_C = 0.7 \text{ mA}; V_{GE} = V_{CE}$ | 4.5 | | 6.5 V | |
| I_{CES} | $V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$ | | | 0.6 mA 1.7 mA | |
| I_{GES} | $V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$ | | | 100 nA | |
| $t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} | Inductive load, $T_{VJ} = 125^\circ\text{C}$ $V_{CE} = 300 \text{ V}; I_C = 30 \text{ A}$ $V_{GE} = 15/0 \text{ V}; R_G = 33 \Omega$ | | 50 50 270 40 1.4 1.0 | ns ns ns ns mJ mJ | |
| C_{ies} | | $V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$ | | 16 | nF |
| R_{thJC} R_{thJH} | | (per IGBT) with heatsink compound ($0.42 \text{ K/m.K}; 50 \mu\text{m}$) | | 1.92 | 0.96 K/W K/W |

Features

- Package with DCB ceramic base plate
- Isolation voltage 3000 V~
- Planar glass passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering
- UL Release applied

Applications

- AC and DC motor control
- AC servo and robot drives
- Power supplies
- Welding inverters

Advantages

- Easy to mount with four screws
- Space and weight savings
- Improved temperature and power cycling capability
- High power density
- Small and light weight

Caution: These Devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.

Reverse diodes (FRED)

| Symbol | Conditions | Maximum Ratings | |
|-----------|--------------------------|-----------------|---|
| I_{F25} | $T_C = 25^\circ\text{C}$ | 30 | A |
| I_{F80} | $T_C = 80^\circ\text{C}$ | 19 | A |

| Symbol | Conditions | Characteristic Values | | |
|------------|--|-----------------------|------|------|
| | | min. | typ. | max. |
| V_F | $I_F = 30\text{ A}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$ | 2.57 | 2.84 | V |
| | | 1.8 | | V |
| I_{RM} | $I_F = 15\text{ A}; di_F/dt = 400\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 300\text{ V}; V_{GE} = 0\text{ V}$ | 7 | | A |
| t_{tr} | | 50 | | ns |
| R_{thJC} | with heatsink compound (0.42 K/m.K; 50 μm) | | 2.3 | K/W |
| R_{thJH} | | 4.6 | | K/W |

Temperature Sensor NTC

| Symbol | Conditions | Characteristic Values | | |
|-------------|------------------------|-----------------------|------|-----------------|
| | | min. | typ. | max. |
| R_{25} | $T = 25^\circ\text{C}$ | 4.75 | 5.0 | 5.25 k Ω |
| $B_{25/50}$ | | | 3375 | K |

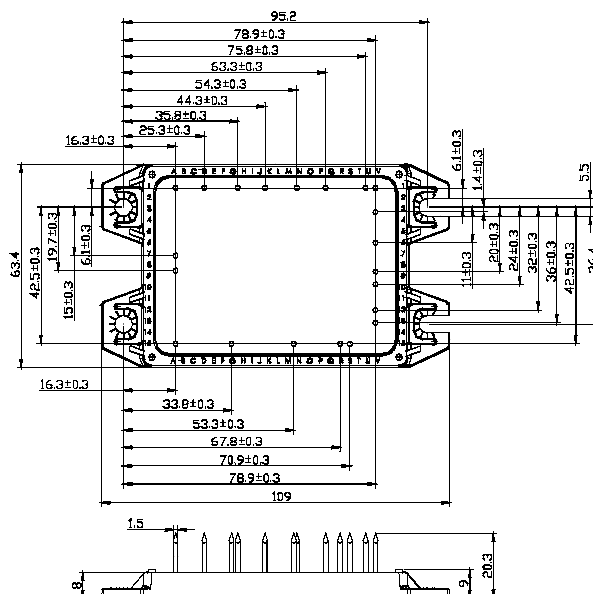
Module

| Symbol | Conditions | Maximum Ratings | |
|------------|--|-----------------|------------------|
| T_{VJ} | | -40...+125 | $^\circ\text{C}$ |
| T_{stg} | | -40...+150 | $^\circ\text{C}$ |
| V_{ISOL} | $I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$ | 3000 | V~ |
| M_d | Mounting torque (M5) | 3 | Nm |
| | | 26 | lb.in. |
| a | Max. allowable acceleration | 50 | m/s^2 |

| Symbol | Conditions | Characteristic Values | | |
|---------------|--|-----------------------|------|------|
| | | min. | typ. | max. |
| d_S | Creepage distance on surface (Pin to heatsink) | 11.2 | | mm |
| d_A | Strike distance in air (Pin to heatsink) | 11.2 | | mm |
| Weight | | 86 | | g |

Package style and outline

Dimensions in mm (1mm = 0.0394")



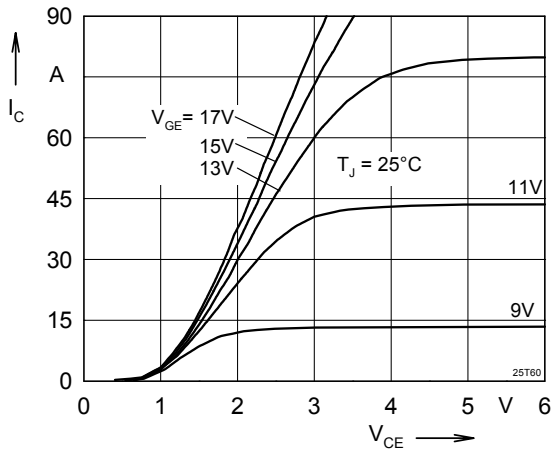


Fig. 1 Typ. output characteristics

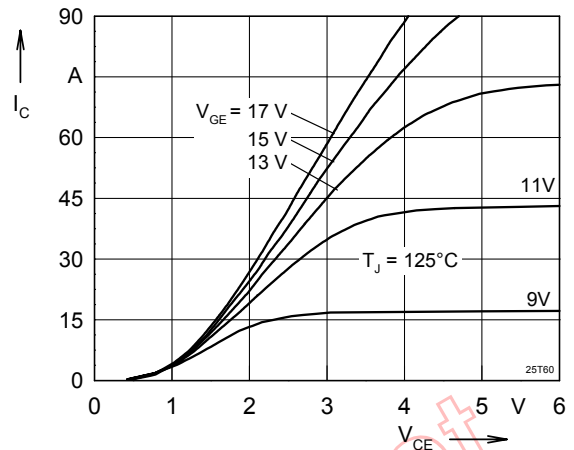


Fig. 2 Typ. output characteristics

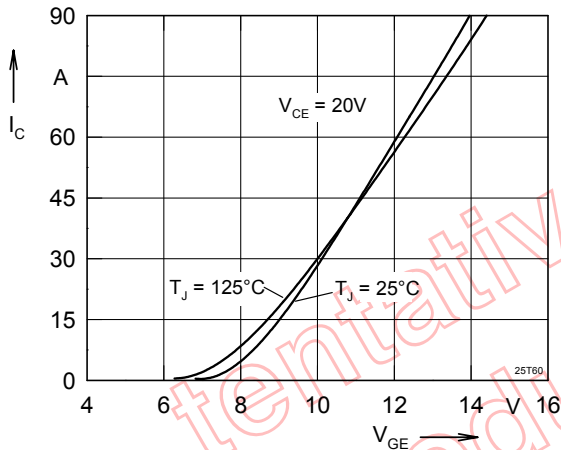


Fig. 3 Typ. transfer characteristics

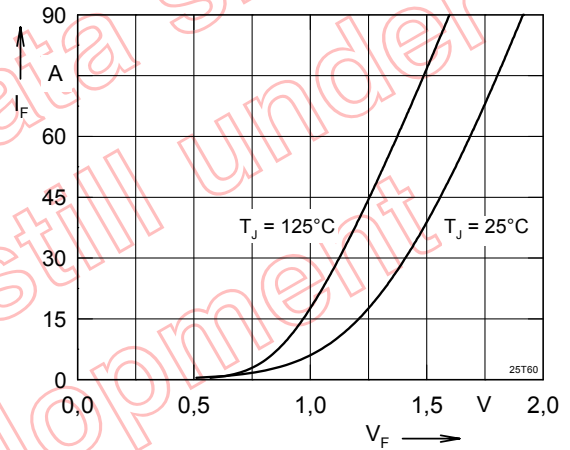


Fig. 4 Typ. forward characteristics of free wheeling diode

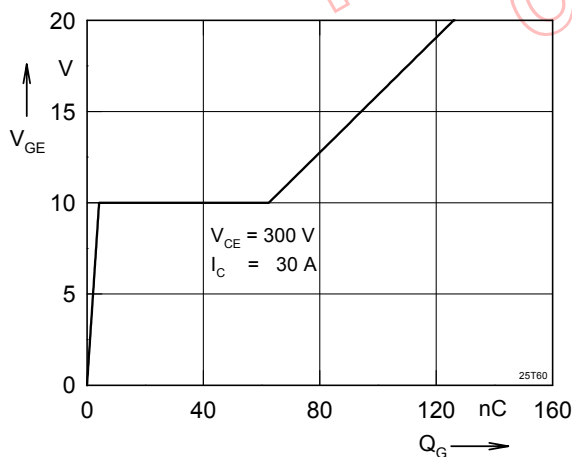


Fig. 5 Typ. turn on gate charge

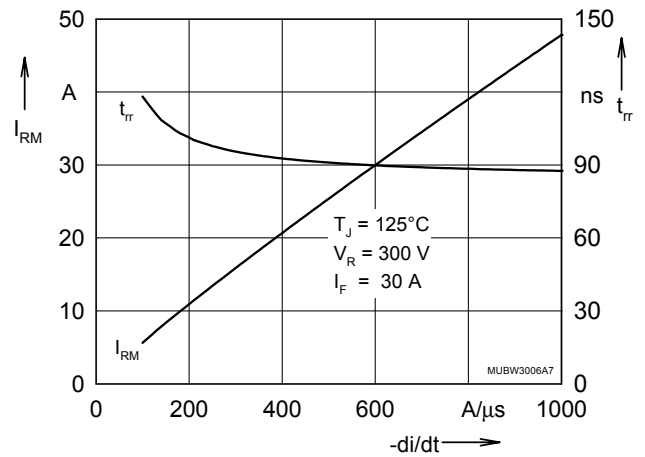


Fig. 6 Typ. turn off characteristics of free wheeling diode

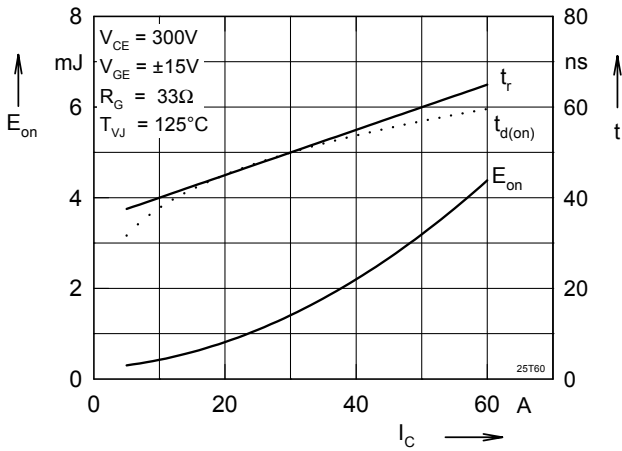


Fig. 7 Typ. turn on energy and switching

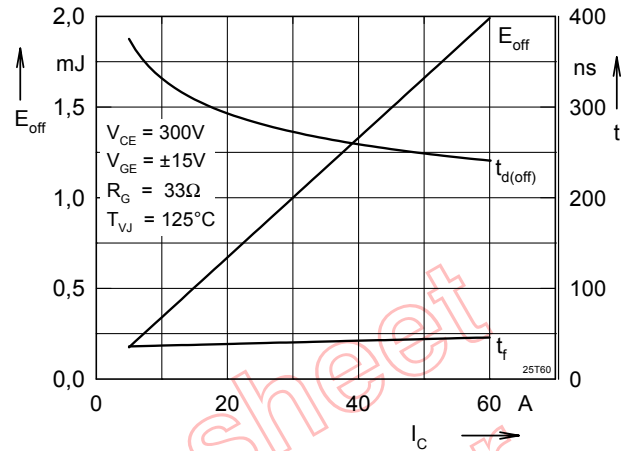


Fig. 8 Typ. turn off energy and switching times versus collector current times versus collector current

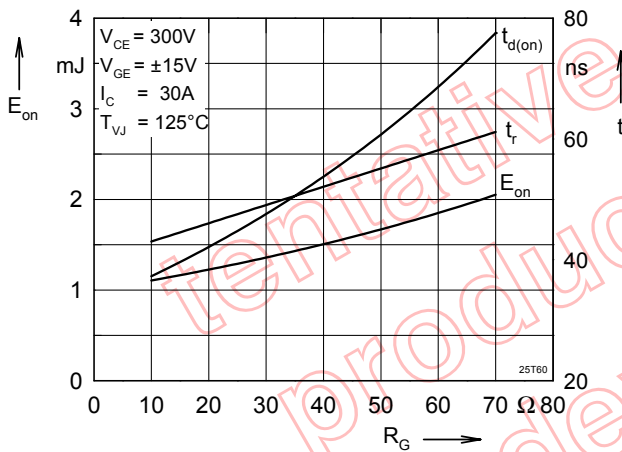


Fig. 9 Typ. turn on energy and switching

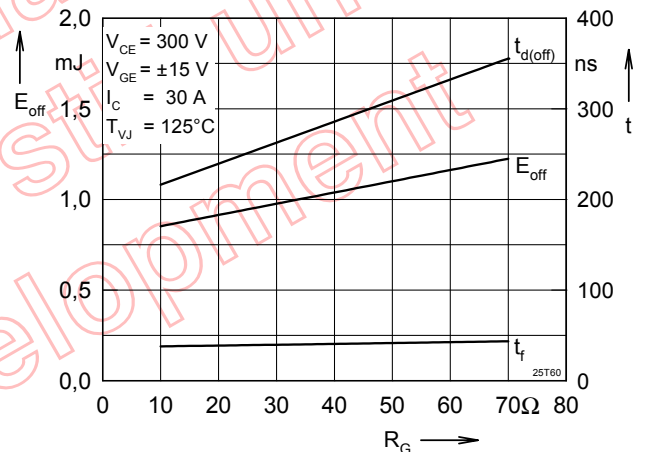


Fig. 10 Typ. turn off energy and switching times versus gate resistor times versus gate resistor

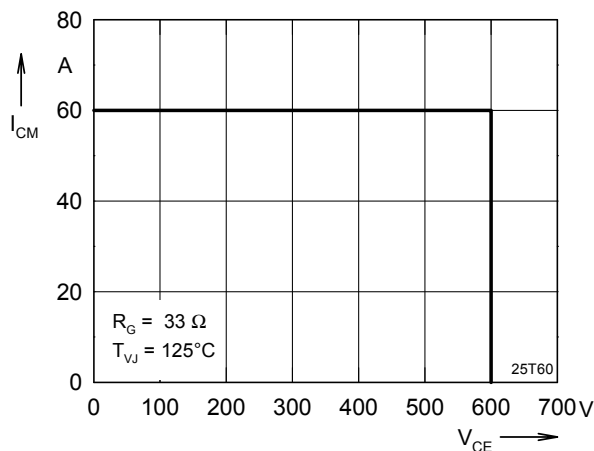


Fig. 11 Reverse biased safe operating area

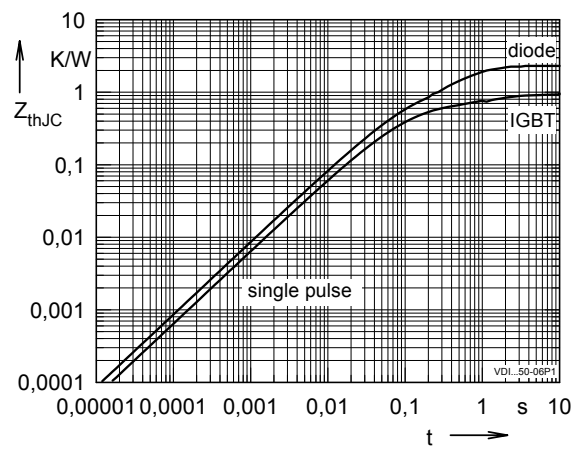


Fig. 12 Typ. transient thermal impedance RBSOA