

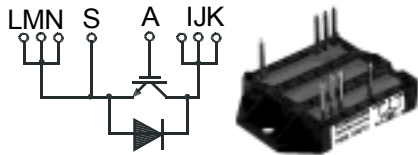
### IGBT Module

Short Circuit SOA Capability  
Square RBSOA

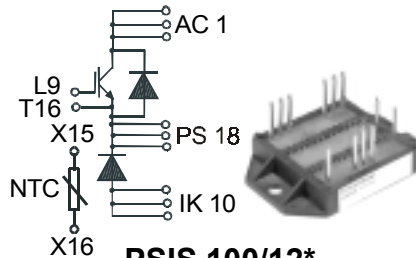
Preliminary Data Sheet

PSIG 100/12  
PSIS 100/12\*  
PSSI 100/12\*

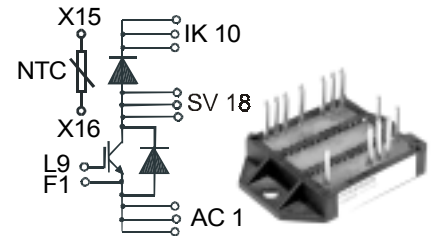
$I_{C25} = 138 \text{ A}$   
 $V_{CES} = 1200 \text{ V}$   
 $V_{CE(sat)typ.} = 2.8 \text{ V}$



PSIG 100/12



PSIS 100/12\*



PSSI 100/12\*

### IGBTs

\*NTC optional

| Symbol                | Conditions   | Maximum Ratings  |
|-----------------------|--|--|
| $V_{CES}$             | $T_{VJ} = 25^\circ\text{C to } 150^\circ\text{C}$  | 1200 V   |
| $V_{GES}$             |  | $\pm 20$ V   |
| $I_{C25}$             | $T_C = 25^\circ\text{C}$   | 138 A  |
| $I_{C80}$             | $T_C = 80^\circ\text{C}$   | 94 A   |
| $I_{CM}$<br>$V_{CEK}$ | $V_{GE} = \pm 15 \text{ V}; R_G = 15 \Omega; T_{VJ} = 125^\circ\text{C}$<br>RBSOA, Clamped inductive load; $L = 100 \mu\text{H}$ | 150 A  |
| $t_{SC}$<br>(SCSOA)   |  | $V_{CE} = V_{CES}; V_{GE} = \pm 15 \text{ V}; R_G = 15 \Omega; T_{VJ} = 125^\circ\text{C}$<br>non-repetitive |
| $P_{tot}$             | $T_C = 25^\circ\text{C}$   | 568 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 registered, E 148688

### Applications

- AC and DC motor control
- AC servo and robot drives
- power supplies
- welding inverters

### Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling capability

| Symbol   | Conditions   | Characteristic Values<br>( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified) |      |                 |    |
|--|--|--|------|-----------------|----|
|  |  | min.   | typ. | max.            |    |
| $V_{CE(sat)}$  | $I_C = 125 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$                                    | 2.8  | 3.4  | V               |    |
| $V_{GE(th)}$   | $I_C = 3 \text{ mA}; V_{GE} = V_{CE}$  | 4.5  |      | 6.5 V           |    |
| $I_{CES}$  | $V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$  |  | 5    | 16 mA           |    |
| $I_{GES}$  | $V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$  |  |      | 320 nA          |    |
| $t_{d(on)}$<br>$t_r$<br>$t_{d(off)}$<br>$t_f$<br>$E_{on}$<br>$E_{off}$ | Inductive load, $T_{VJ} = 125^\circ\text{C}$<br>$V_{CE} = 600 \text{ V}; I_C = 75 \text{ A}$<br>$V_{GE} = 15/0 \text{ V}; R_G = 15 \Omega$ |  | 100  | ns              |    |
|  |  |  |      | 50              | ns |
|  |  |  |      | 650             | ns |
|  |  |  |      | 50              | ns |
|  |  |  |      | 12.1            | mJ |
|  |  |  |      | 10.5            | mJ |
| $C_{ies}$  | $V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$   |  | 5.5  | nF              |    |
| $R_{thJC}$<br>$R_{thJH}$   | (per IGBT)<br>with heatsink compound (0.42 K/m.K; 50 $\mu\text{m}$ )   |  | 0.44 | 0.22 K/W<br>K/W |    |

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

### Reverse diodes (FRED)

| Symbol    | Conditions               | Maximum Ratings |   |
|-----------|--------------------------|-----------------|---|
| $I_{F25}$ | $T_C = 25^\circ\text{C}$ | 154             | A |
| $I_{F80}$ | $T_C = 80^\circ\text{C}$ | 97              | A |

| Symbol                   | Conditions   | Characteristic Values |      |      |
|--------------------------|--|-----------------------|------|------|
|                          |  | min.                  | typ. | max. |
| $V_F$                    | $I_F = 75\text{ A}; T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = 125^\circ\text{C}$   | 2.2                   | 2.5  | V    |
|                          |  | 1.6                   |      | V    |
| $I_{RM}$<br>$t_{rr}$     | $I_F = 75\text{ A}; di_F/dt = 750\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$<br>$V_R = 600\text{ V}; V_{GE} = 0\text{ V}$ | 79                    |      | A    |
|                          |  | 220                   |      | ns   |
| $R_{thJC}$<br>$R_{thJH}$ | with heatsink compound (0.42 K/m.K; 50 $\mu\text{m}$ )   | 0.9                   | 0.45 | K/W  |
|                          |  |                       |      | 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 $\Omega$ |
| $B_{25/50}$ |                        |                       | 3375 | K               |

### Module

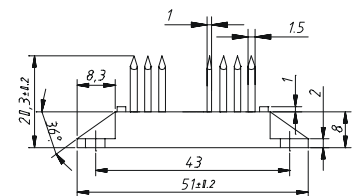
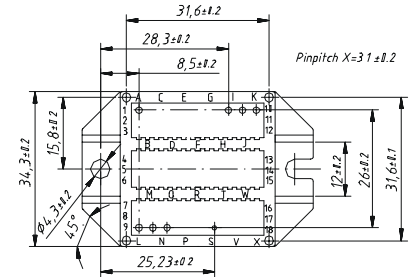
| Symbol     | Conditions                                   | Maximum Ratings |                  |
|------------|--|-----------------|------------------|
| $T_{VJ}$   |  | -40...+150      | $^\circ\text{C}$ |
| $T_{stg}$  |  | -40...+150      | $^\circ\text{C}$ |
| $V_{ISOL}$ | $I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$ | 3000            | V~               |
| $M_d$      | Mounting torque (M4)                         | 1.5 - 2.0       | Nm               |
|            |  | 14 - 18         | lb.in.           |
| $a$        | Max. allowable acceleration                  | 50              | $\text{m/s}^2$   |

| 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 |  | 24                    |      | g    |

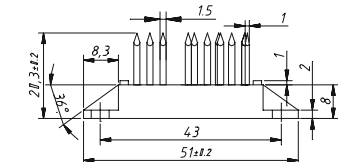
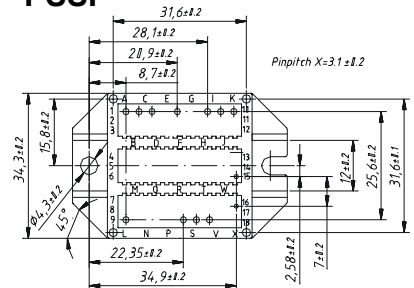
### Package style and outline

Dimensions in mm (1mm = 0.0394")

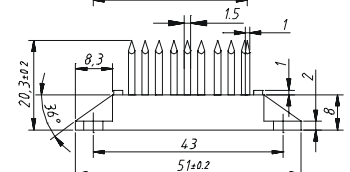
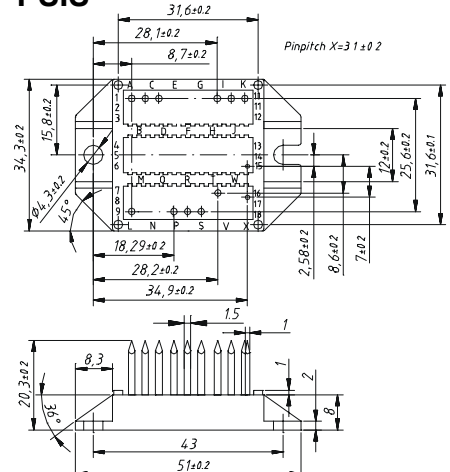
#### PSIG



#### PSSI



#### PSIS



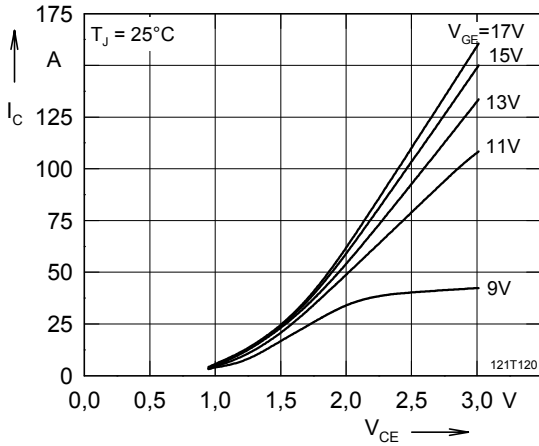


Fig. 1 Typ. output characteristics

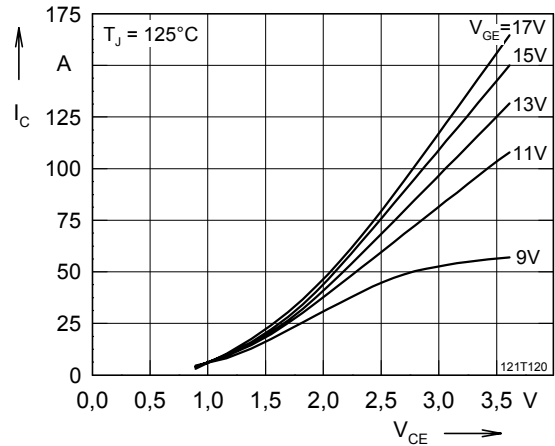


Fig. 2 Typ. output characteristics

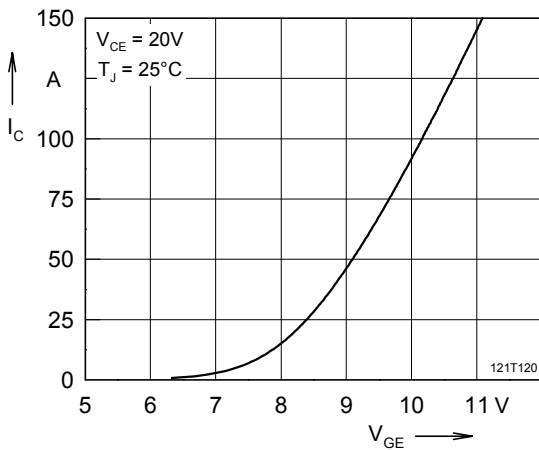


Fig. 3 Typ. transfer characteristics

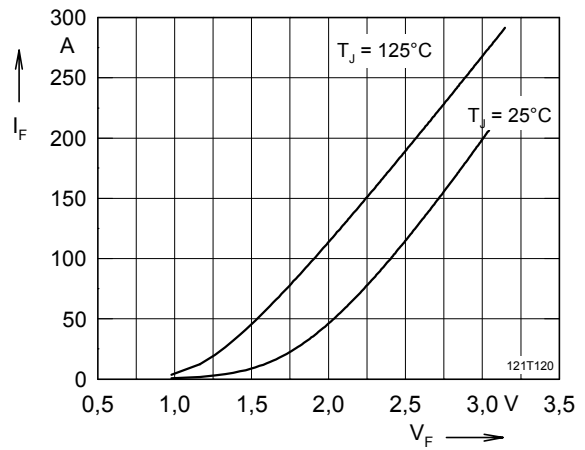


Fig. 4 Typ. forward characteristics of free wheeling diode

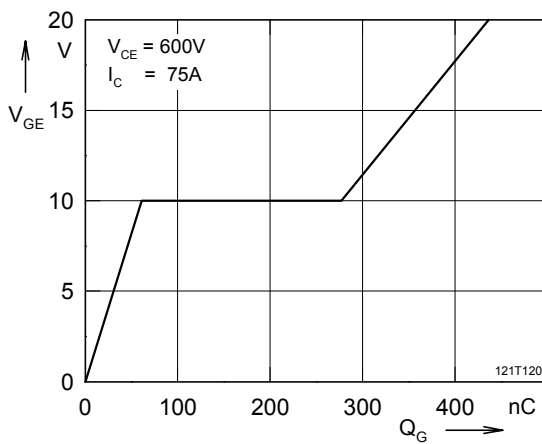


Fig. 5 Typ. turn on gate charge

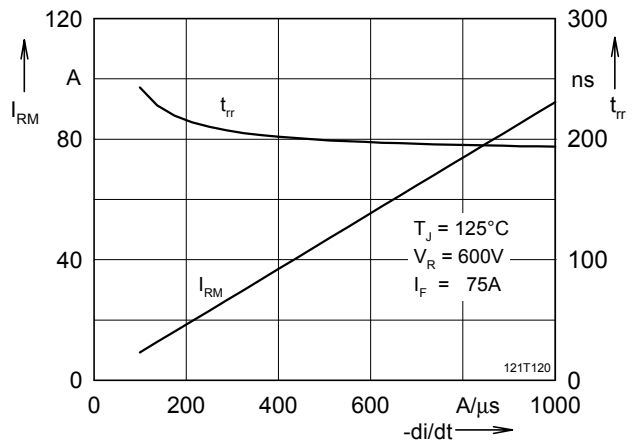


Fig. 6 Typ. turn off characteristics of free wheeling diode

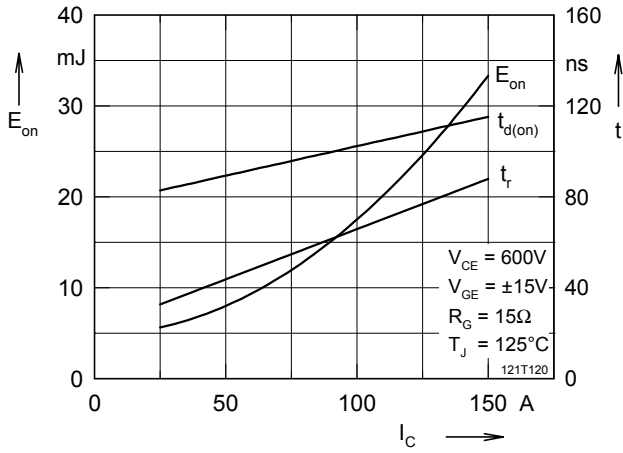


Fig. 7 Typ. turn on energy and switching times versus collector current

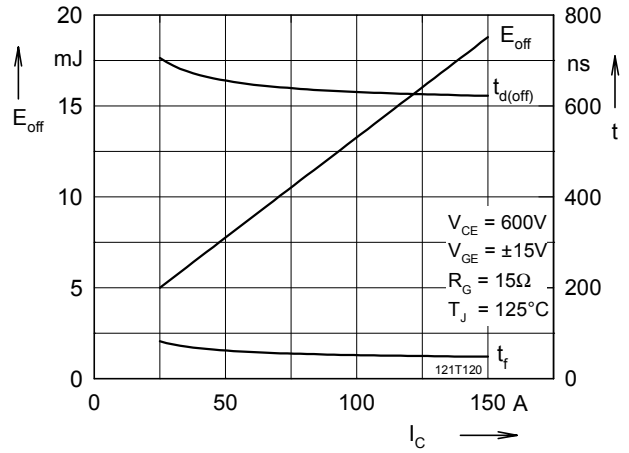


Fig. 8 Typ. turn off energy and switching times versus collector current

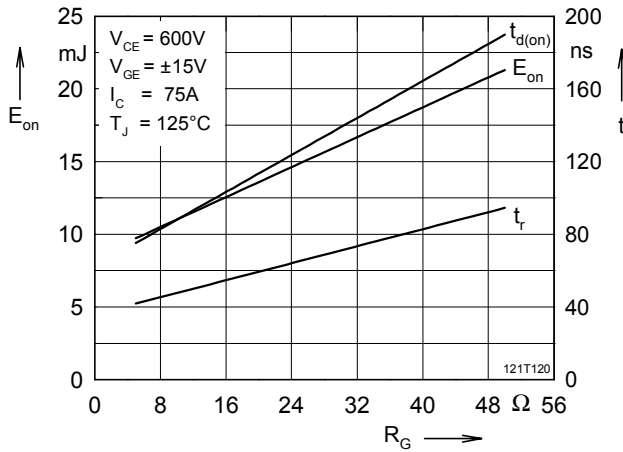


Fig. 9 Typ. turn on energy and switching times versus gate resistor

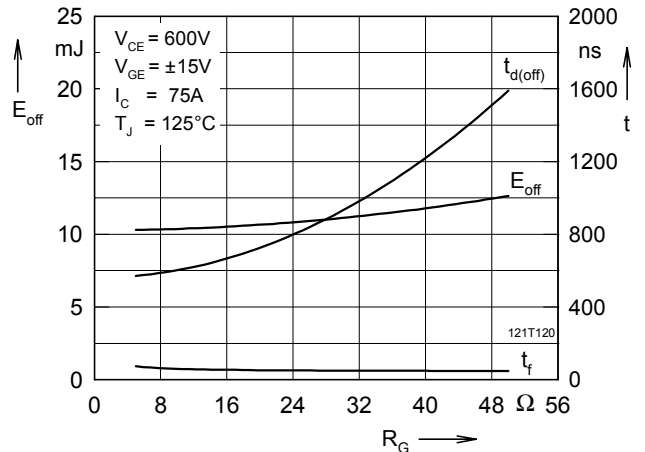


Fig. 10 Typ. turn off energy and switching times versus gate resistor

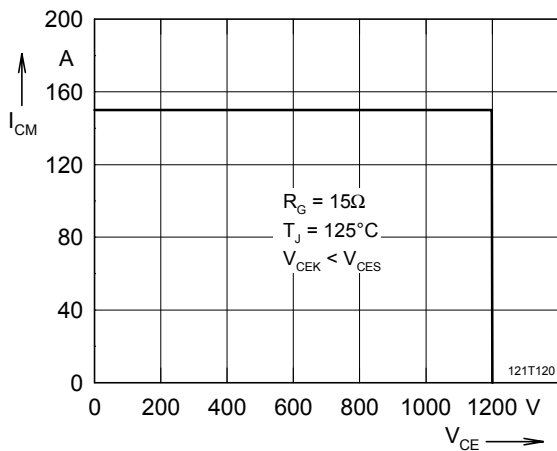


Fig. 11 Reverse biased safe operating area RBSOA

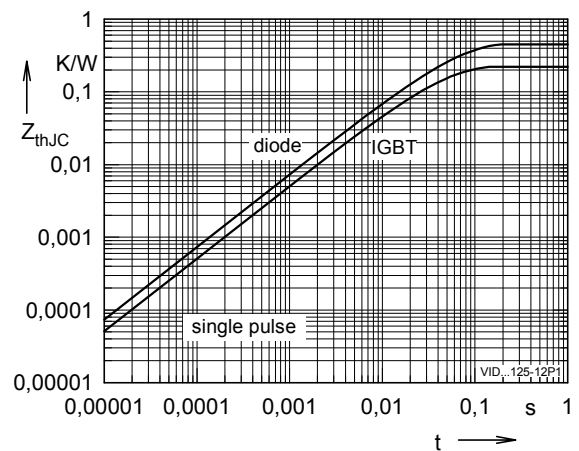


Fig. 12 Typ. transient thermal impedance