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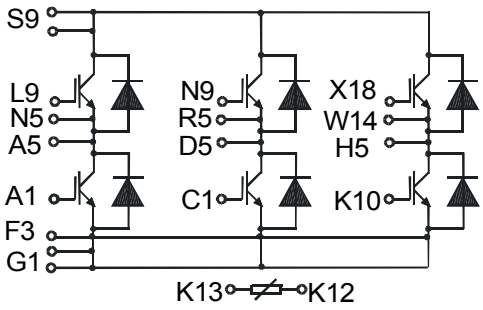
ECO-PAC™ 2

# IGBT Module PSII 24/06*

## Sixpack

Preliminary Data Sheet

$I_{C25}$ = 19 A
$V_{CES}$ = 600 V
$V_{CE(sat)typ.}$ = 1.9 V






**PSII 24/06***

*NTC optional

### IGBTs

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{CES}$ | $T_{VJ}$ = 25°C to 150°C | 600 | V |
| $V_{GES}$ | | ± 20 | V |
| $I_{C25}$ | $T_C$ = 25°C | 19 | A |
| $I_{C80}$ | $T_C$ = 80°C | 14 | A |
| $I_{CM}$ | $V_{GE}$ = ±15 V; $R_G$ = 82 Ω; $T_{VJ}$ = 125°C | 20 | A |
| $V_{CEK}$ | RBSOA, Clamped inductive load; L = 100 µH | $V_{CES}$ | |
| $t_{SC}$ (SCSOA) | $V_{CE}$ = 720 V; $V_{GE}$ = ±15 V; $R_G$ = 82 Ω; $T_{VJ}$ = 125°C non-repetitive | 10 | µs |
| $P_{tot}$ | $T_C$ = 25°C | 73 | W |

| Symbol | Conditions | Characteristic Values ($T_{VJ}$ = 25°C, unless otherwise specified) min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_{CE(sat)}$ | $I_C$ = 10 A; $V_{GE}$ = 15 V; $T_{VJ}$ = 25°C | | 1.9 | 2.4 | V |
| | $T_{VJ}$ = 125°C | | 2.2 | | V |
| $V_{GE(th)}$ | $I_C$ = 0.35 mA; $V_{GE}$ = $V_{CE}$ | 4.5 | | 6.5 | V |
| $I_{CES}$ | $V_{CE}$ = $V_{CES}$; $V_{GE}$ = 0 V; $T_{VJ}$ = 25°C | | | 0.6 | mA |
| | $T_{VJ}$ = 125°C | | 2.7 | | mA |
| $I_{GES}$ | $V_{CE}$ = 0 V; $V_{GE}$ = ± 20 V | | | 100 | nA |
| $t_{d(on)}$ | Inductive load, $T_{VJ}$ = 125°C | | 35 | | ns |
| $t_r$ | $V_{CE}$ = 300 V; $I_C$ = 10 A | | 35 | | ns |
| $t_{d(off)}$ | $V_{GE}$ = ±15 V; $R_G$ = 82 Ω | | 230 | | ns |
| $t_f$ | | | 30 | | ns |
| $E_{on}$ | | | 0.4 | | mJ |
| $E_{off}$ | | | 0.3 | | mJ |
| $C_{ies}$ | $V_{CE}$ = 25 V; $V_{GE}$ = 0 V; f = 1 MHz | | 600 | | pF |
| $Q_{Gon}$ | $V_{CE}$ = 300 V; $V_{GE}$ = 15 V; $I_C$ = 10 A | | 39 | | nC |
| $R_{thJC}$ | (per IGBT) | | | 1.7 | K/W |
| $R_{thJH}$ | with heatsink compound (0.42 K/m.K; 50 µm) | | 3.4 | | K/W |

### Features

- NPT IGBT's
  - positive temperature coefficient of saturation voltage
  - fast switching
- FRED diodes
  - fast reverse recovery
  - low forward voltage
- Industry Standard Package
  - solderable pins for PCB mounting
  - isolated DCB ceramic base plate
- UL registered, E 148688

### Applications

- AC drives
- power supplies with power factor correction

### Advantages

- Easy to mount with two 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.

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## Diodes

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $I_{F25}$ | $T_C$ = 25°C | 21 | A |
| $I_{F80}$ | $T_C$ = 80°C | 14 | A |

| Symbol | Conditions | Characteristic Values min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_F$ | $I_F$ = 10 A; $T_{VJ}$ = 25°C | | 1.9 | 2.1 | V |
| | $T_{VJ}$ = 125°C | | 1.4 | | V |
| $I_{RM}$ | $I_F$ = 10 A; $di_F/dt$ = -400 A/µs; $T_{VJ}$ = 125°C | | 11 | | A |
| $t_{rr}$ | $V_R$ = 300 V; $V_{GE}$ = 0 V | | 80 | | ns |
| $R_{thJC}$ | | | | 3.5 | K/W |
| $R_{thJH}$ | with heatsink compound (0.42 K/m.K; 50 µm) | | 7.0 | | K/W |

Data according to IEC 60747 and refer to a single diode unless otherwise stated.

## Temperature Sensor NTC

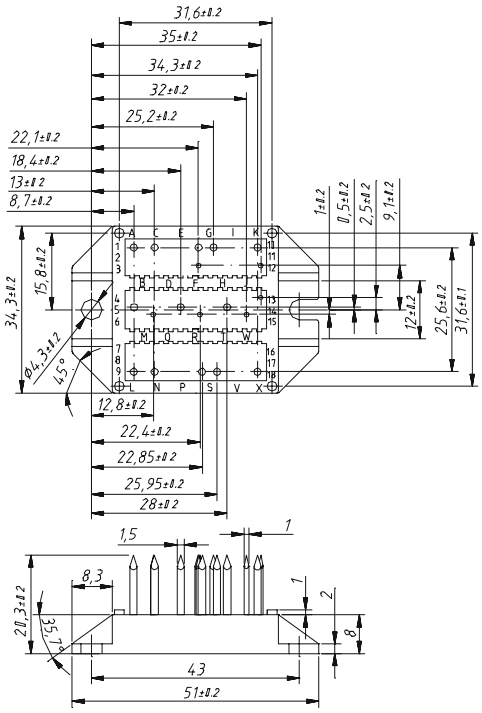
| Symbol | Conditions | Characteristic Values min. | typ. | max. | |
|---|---|---|---|---|---|
| $R_{25}$ | T = 25°C | 4.75 | 5.0 | 5.25 | kΩ |
| $B_{25/50}$ | | | 3375 | | K |

## Component

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $T_{VJ}$ | | -40...+150 | °C |
| $T_{stg}$ | | -40...+125 | °C |
| $V_{ISOL}$ | $I_{ISOL} \leq$ 1 mA; 50/60 Hz; t = 1 s | 3600 | V~ |
| $M_d$ | Mounting torque (M4) | 1.5 - 2.0 | Nm |
| | | 14 - 18 | 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 | | | 24 | | g |

**Package style and outline**
Dimensions in mm (1mm = 0.0394“)

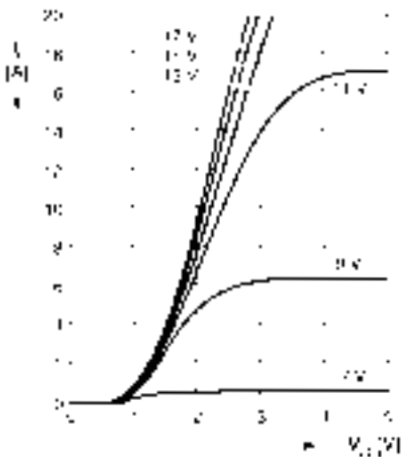



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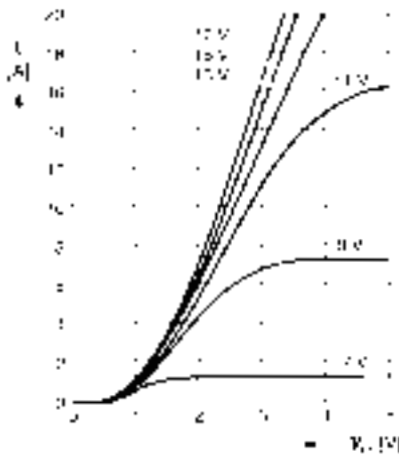
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## IGBT

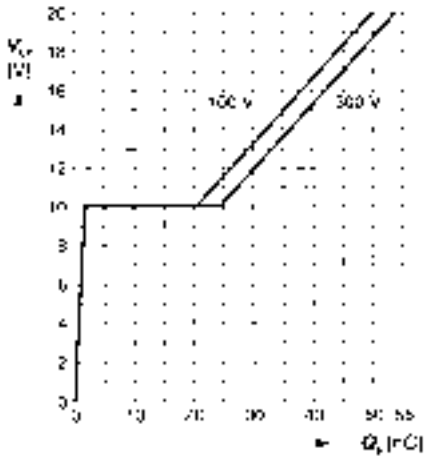
Typ. output characteristics



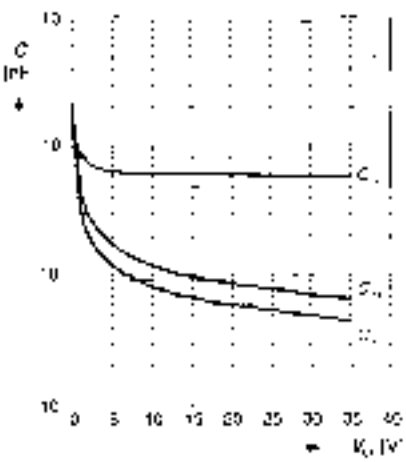
Typ. output characteristics



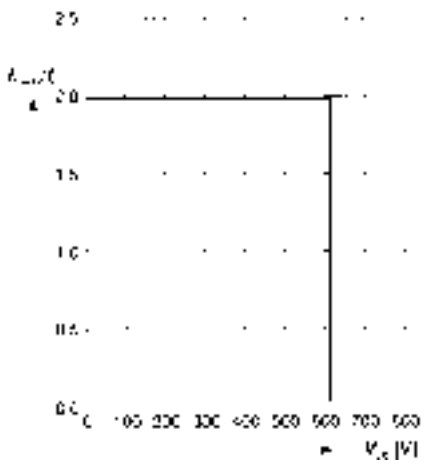
Typ. gate charge



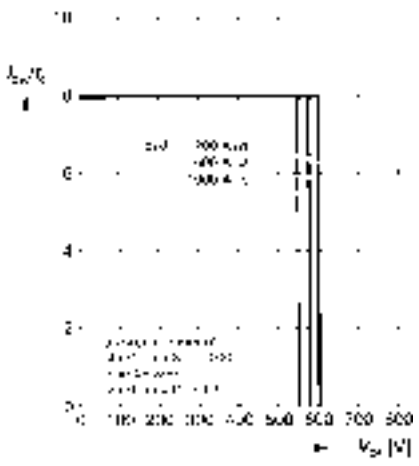
Typ. capacitances



Reverse biased safe operating area



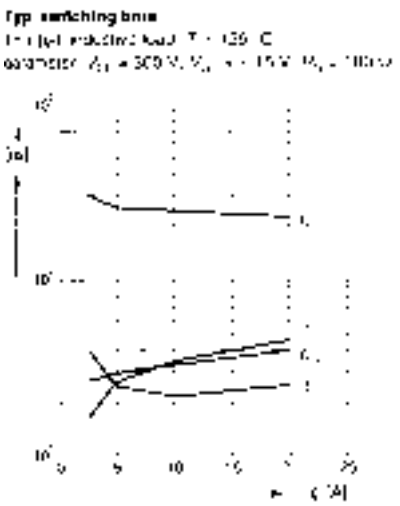
Short circuit safe operating area

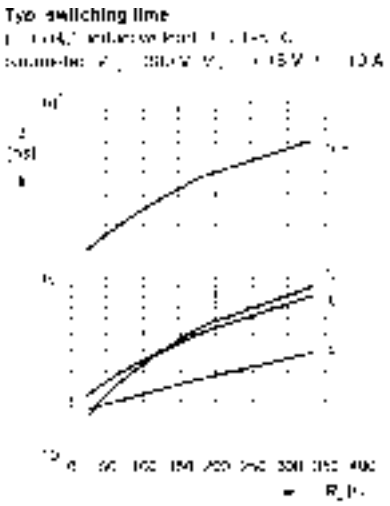


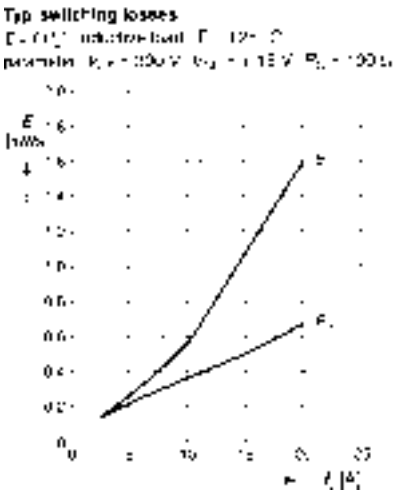
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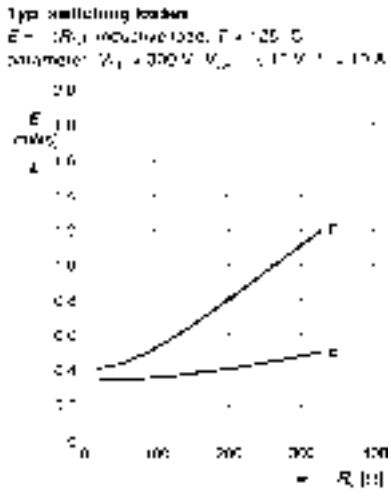
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## IGBT

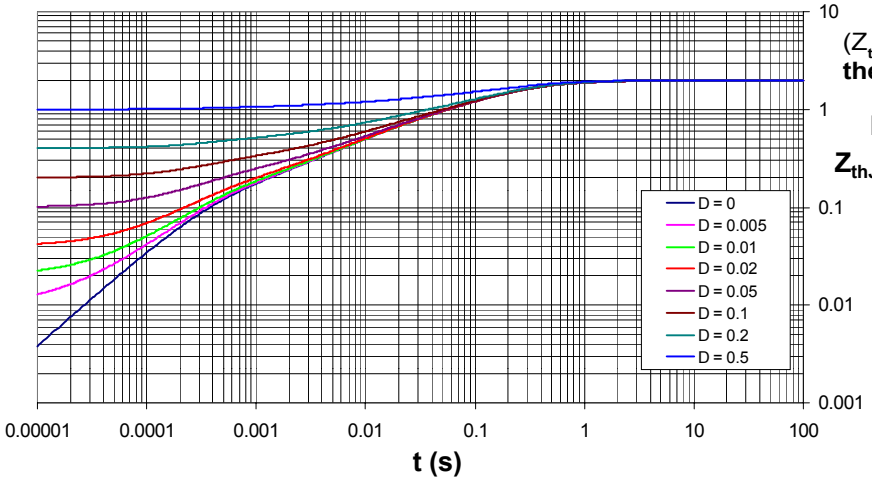








Transient thermal resistance junction to heatsink




($Z_{thJH}$ **is measured using 50 µm thermal grease)**

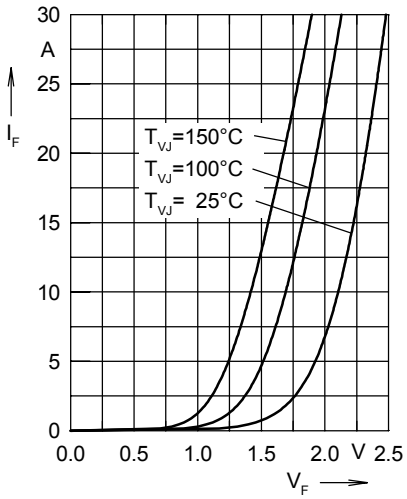
**IGBT**

**$Z_{thJH}$ [K/W]**

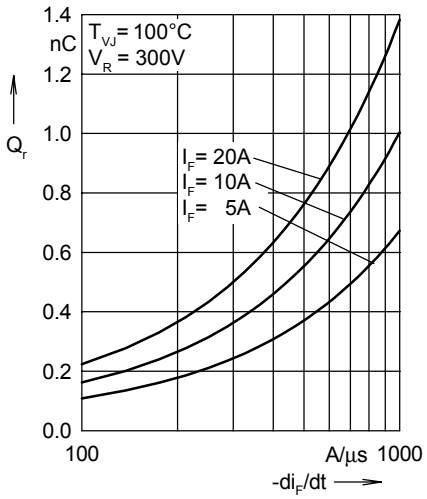
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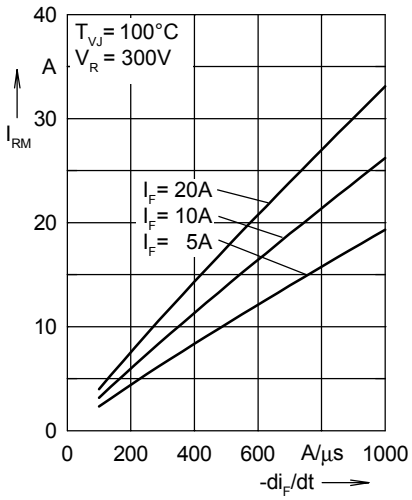
## Diode



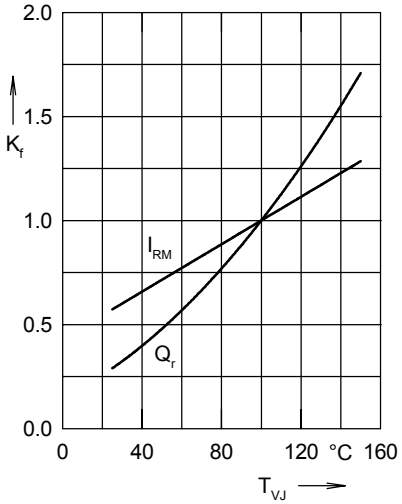

Forward current $I_F$ versus $V_F$



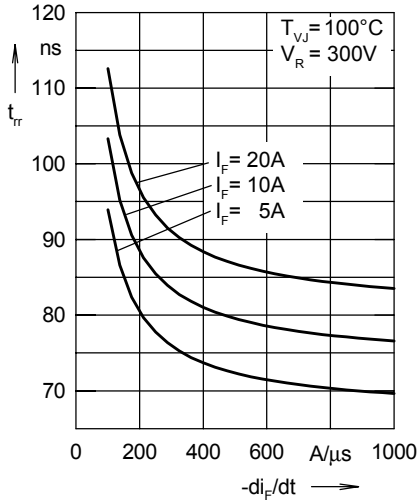

Reverse recovery charge $Q_r$ versus -$di_F$/dt



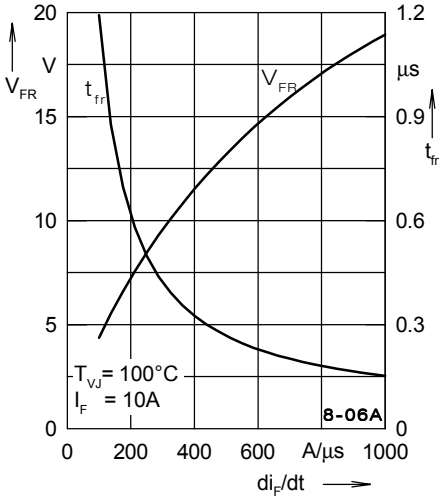

Peak reverse current $I_{RM}$ versus -$di_F$/dt




Dynamic parameters $Q_r$, $I_{RM}$ versus $T_{VJ}$

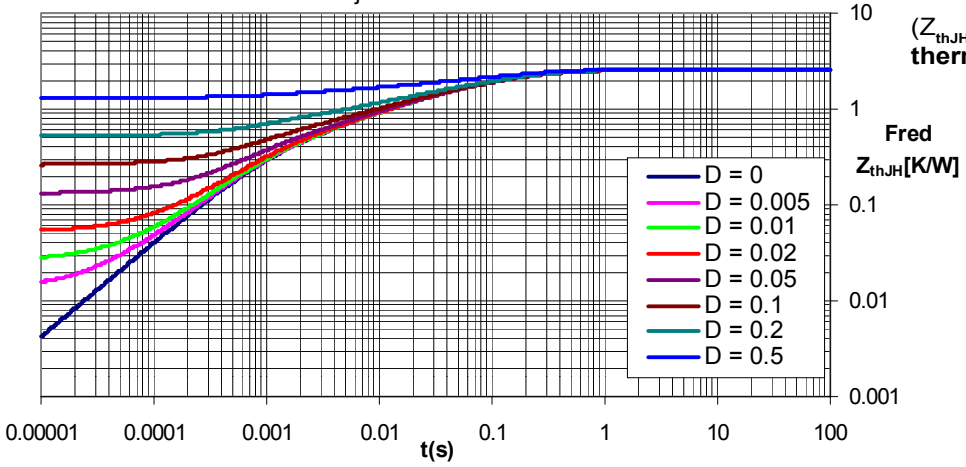



Recovery time $t_{rr}$ versus -$di_F$/dt




Peak forward voltage $V_{FR}$ and $t_{fr}$ versus $di_F$/dt

Transient thermal resistance junction to heatsink




**($Z_{thJH}$ is measured using 50 µm thermal grease)**

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