

## IGBT Module PSII 24/06\*

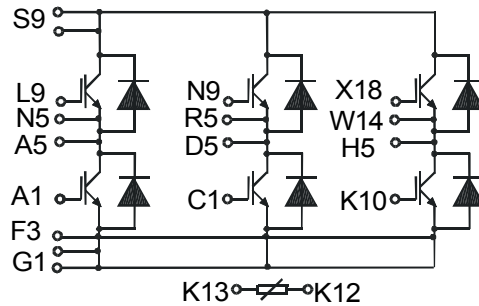
### Sixpack

Preliminary Data Sheet

$$I_{C25} = 19 \text{ A}$$

$$V_{CES} = 600 \text{ V}$$

$$V_{CE(sat)typ.} = 1.9 \text{ V}$$



PSII 24/06\*

\*NTC optional

### IGBTs

Symbol	Conditions	Maximum Ratings	
$V_{CES}$	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	600	V
$V_{GES}$		$\pm 20$	V
$I_{C25}$	$T_C = 25^{\circ}\text{C}$	19	A
$I_{C80}$	$T_C = 80^{\circ}\text{C}$	14	A
$I_{CM}$ $V_{CEK}$	$V_{GE} = \pm 15 \text{ V}; R_G = 82 \Omega; T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100 \mu\text{H}$	20	A
		$V_{CES}$	
$t_{SC}$ (SCSOA)	$V_{CE} = 720 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 82 \Omega; T_{VJ} = 125^{\circ}\text{C}$ non-repetitive	10	$\mu\text{s}$
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	73	W

Symbol	Conditions	Characteristic Values			
		$(T_{VJ} = 25^{\circ}\text{C}, \text{ unless otherwise specified})$			
		min.	typ.	max.	
$V_{CE(sat)}$	$I_C = 10 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.9	2.4	V	
		2.2		V	
$V_{GE(th)}$	$I_C = 0.35 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V	
$I_{CES}$	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.7	0.6 mA 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, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 300 \text{ V}; I_C = 10 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 82 \Omega$		35	ns	
				35	ns
				230	ns
				30	ns
				0.4	mJ
				0.3	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		600	pF	
$Q_{Gon}$	$V_{CE} = 300 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 10 \text{ A}$		39	nC	
$R_{thJC}$ $R_{thJH}$	(per IGBT) with heatsink compound (0.42 K/m.K; 50 $\mu\text{m}$ )		3.4	1.7 K/W 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.

### Diodes

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_C = 25^\circ\text{C}$	21	A
$I_{F80}$	$T_C = 80^\circ\text{C}$	14	A

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

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

### Temperature Sensor NTC

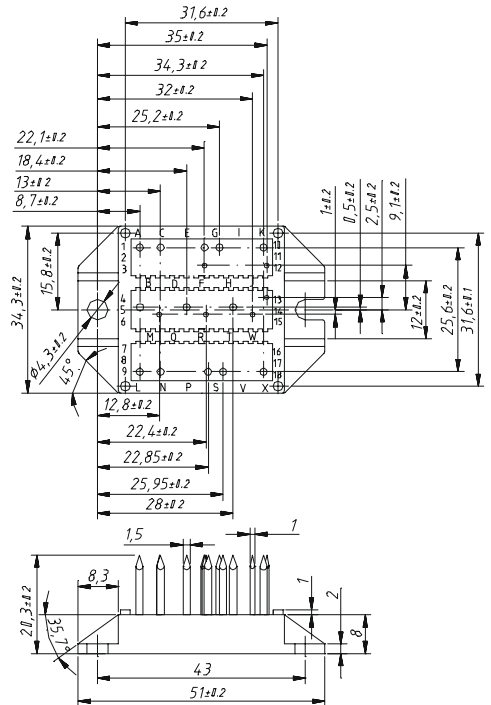
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$R_{25}$	$T = 25^\circ\text{C}$	4.75	5.0	5.25 k $\Omega$
$B_{25/50}$			3375	K

### Component

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$		-40...+150	$^\circ\text{C}$
$T_{stg}$		-40...+125	$^\circ\text{C}$
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}; t = 1\text{ s}$	3600	V~
$M_d$	Mounting torque (M4)	1.5 - 2.0 14 - 18	Nm lb.in.
$a$	Max. allowable acceleration	50	$\text{m/s}^2$

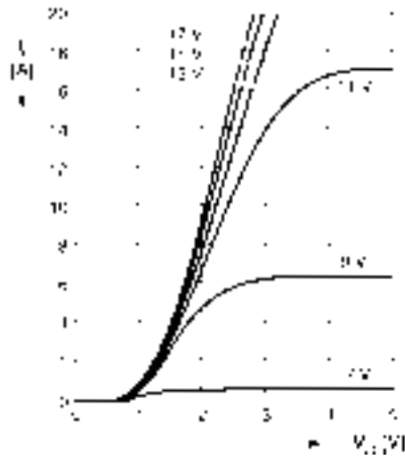
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$d_s$	Creepage distance on surface (Pin to heatsink)	11.2		mm
$d_A$	Strike distance in air (Pin to heatsink)	11.2		mm
Weight		24		g

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

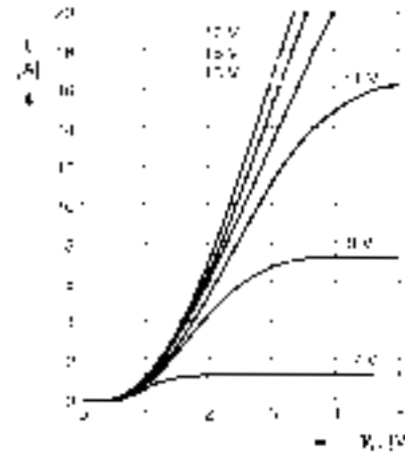


### IGBT

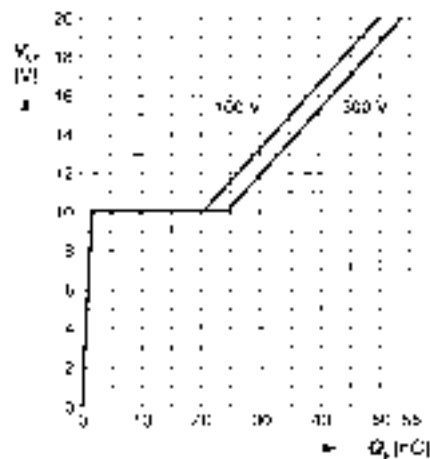
Typ. output characteristics  
 $V_{GS} = 15V$   
 parameter  $t_r = 250 ns, T_c = 25^\circ C$



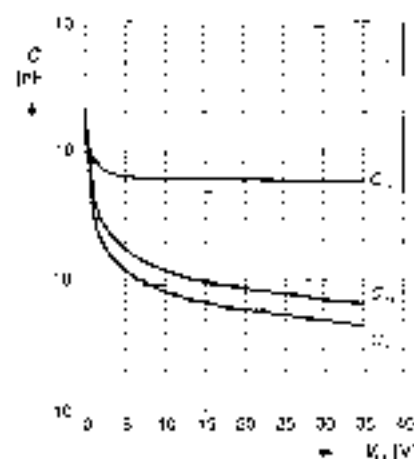
Typ. output characteristics  
 $I_C = 10A$   
 parameter  $t_r = 250 ns, T_c = 175^\circ C$



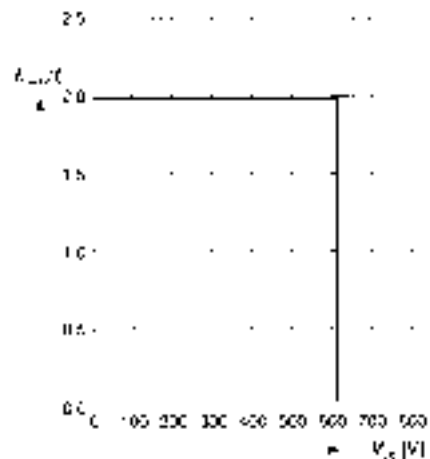
Typ. gate charge  
 $V_{CE} = 100V$   
 parameter  $V_{GS} = 15V$



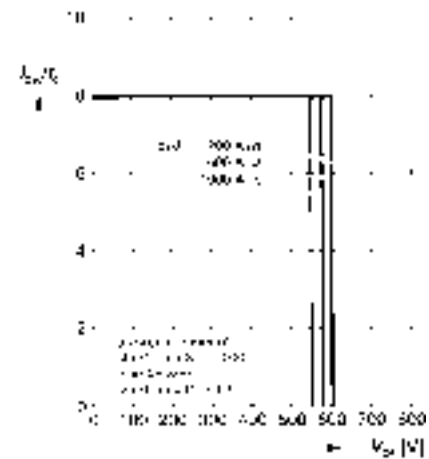
Typ. capacitances  
 $C = 10k\Omega, f = 1MHz$   
 parameter  $V_{GS} = 0V, T_c = 175^\circ C$



Reverse bias safe operating area  
 $V_{GS} = 15V, T_c = 150^\circ C$   
 parameter  $V_{CE} = 15V$

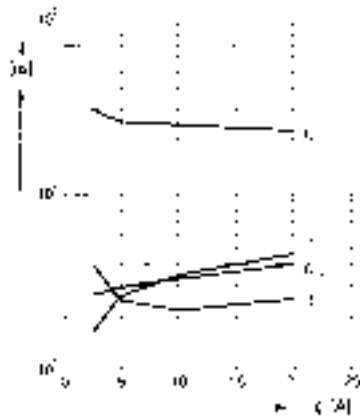


Short circuit safe operating area  
 $I_{CS} = 10A, T_c = 150^\circ C$   
 parameter  $V_{GS} = 15V, t_{SC} = 10 \mu s, T_c = 60^\circ C$

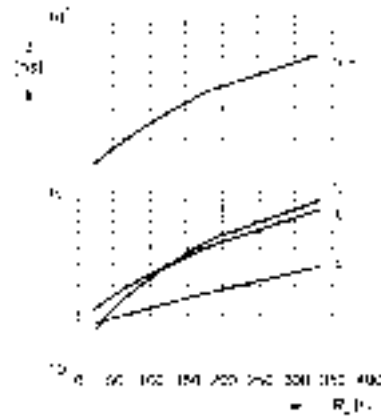


## IGBT

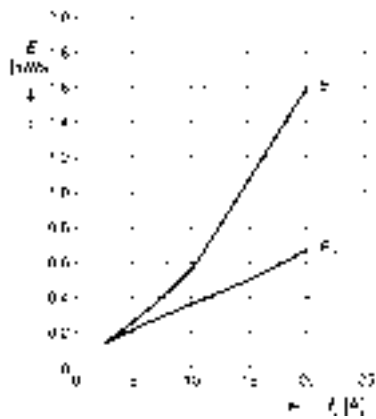
**Typ switching time**  
 E = 100% inductive load, T = 125 °C  
 parameter:  $V_{GE} = 300V$ ,  $V_{CE} = 15V$ ,  $I_{CE} = 100A$



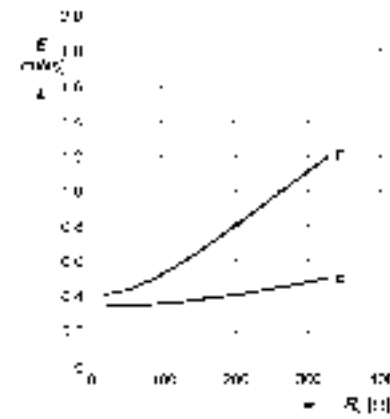
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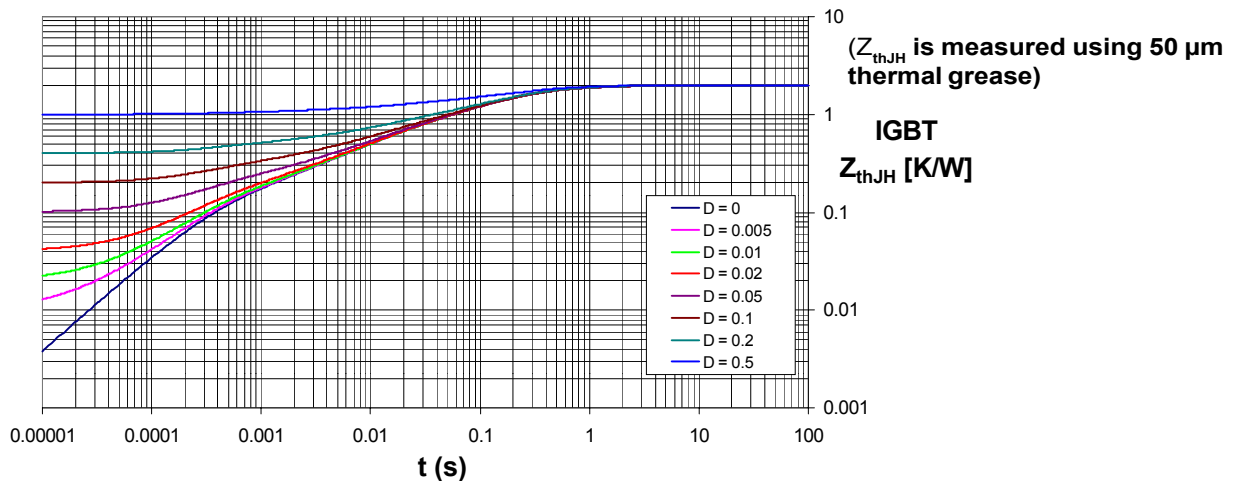
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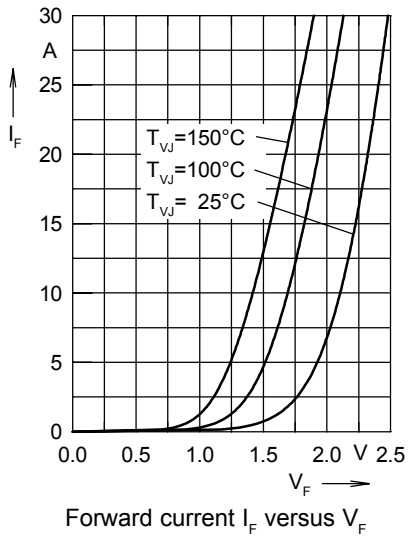
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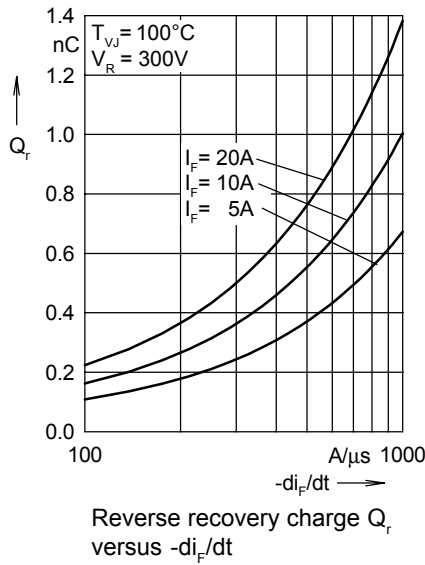
Transient thermal resistance junction to heatsink



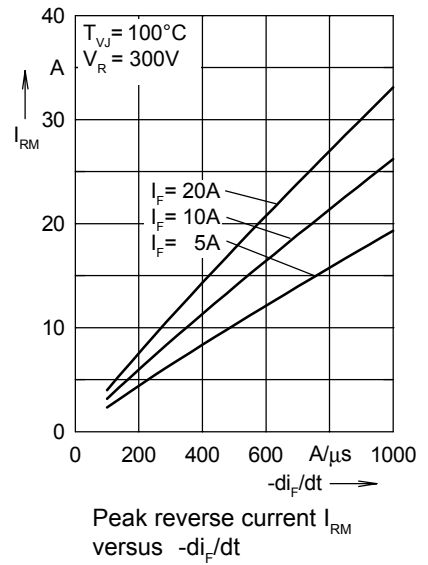
### Diode



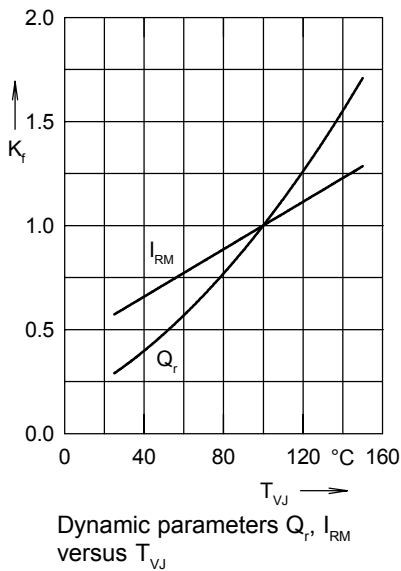
Forward current  $I_F$  versus  $V_F$



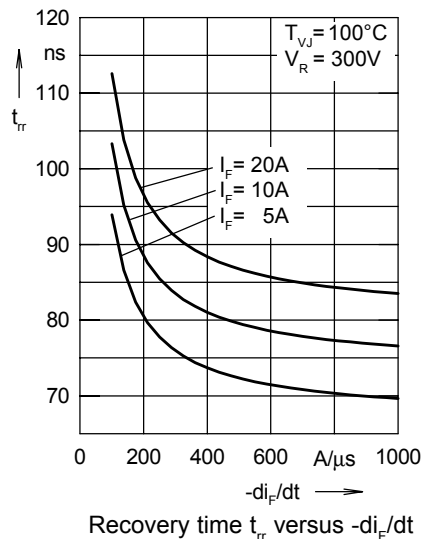
Reverse recovery charge  $Q_r$  versus  $-di_f/dt$



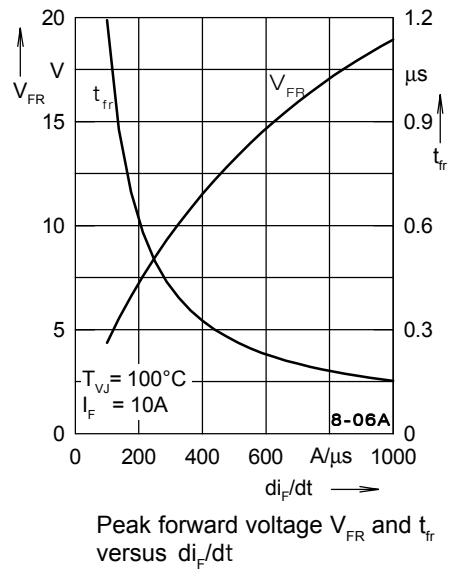
Peak reverse current  $I_{RM}$  versus  $-di_f/dt$



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

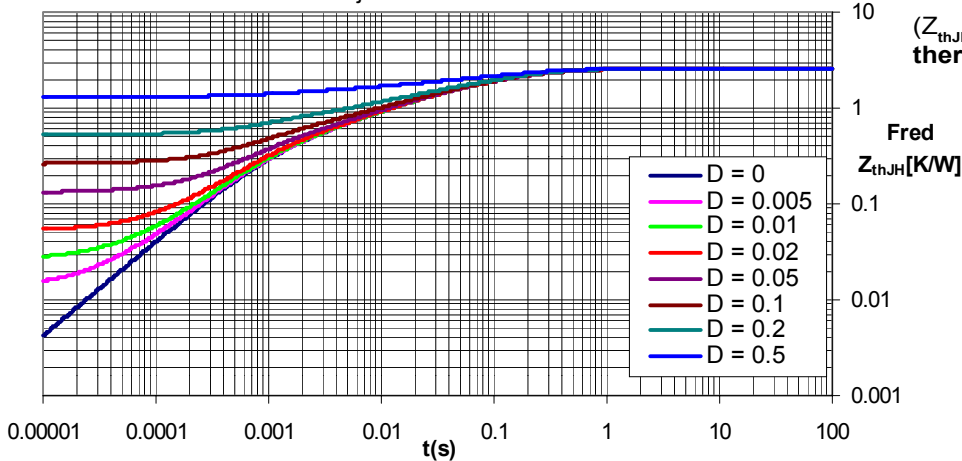


Recovery time  $t_{rr}$  versus  $-di_f/dt$



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

### Transient thermal resistance junction to heatsink



( $Z_{thJH}$  is measured using 50  $\mu\text{m}$  thermal grease)

$F_{red}$   
 $Z_{thJH}$  [K/W]