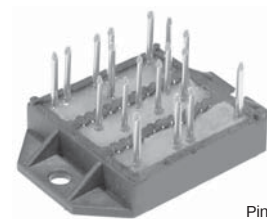
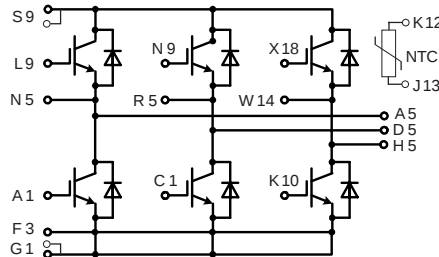


IGBT Module

Sixpack in ECO-PAC 2

$$\begin{aligned} I_{C25} &= 19 \text{ A} \\ V_{CES} &= 600 \text{ V} \\ V_{CE(sat)typ.} &= 1.9 \text{ V} \end{aligned}$$

Preliminary data



Pin arrangement see outlines

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}	$T_C = 25^{\circ}\text{C}$	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 V_{CES}	A
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	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	73	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

Typical Applications

- AC drives
- power supplies with power factor correction

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, 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 2.2	V 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 35 230 30	ns ns ns ns
			0.4	mJ
			0.3	mJ
C_{ies}			600	pF
Q_{gon}			39	nC
R_{thJC} R_{thJH}	(per IGBT) with heatsink compound (0.42 K/m.K; 50 μm)		3.4	1.7 K/W K/W

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IXYS Semiconductor GmbH
Edisonstr. 15, D-68623 Lampertheim
Phone: +49-6206-503-0, Fax: +49-6206-503627

www.ixys.net

IXYS Corporation
3540 Bassett Street, Santa Clara CA 95054
Phone: (408) 982-0700, Fax: 408-496-0670

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 1.4	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 80	A ns
R_{thJC} R_{thJH}	with heatsink compound (0.42 K/m.K; 50 μm)		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

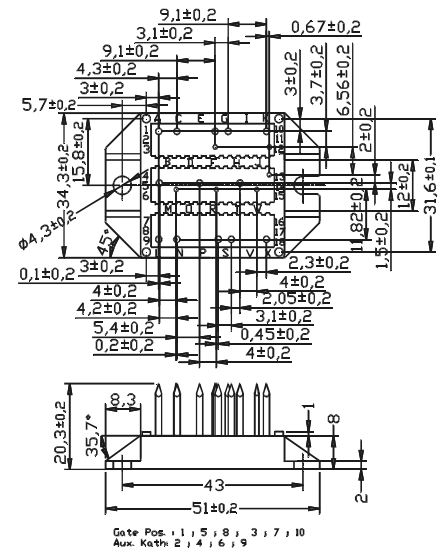
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R_{25}	$T = 25^\circ\text{C}$	4.75	5.0	5.25 k Ω
$B_{25/50}$			3375	K

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	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

Dimensions in mm (1 mm = 0.0394")

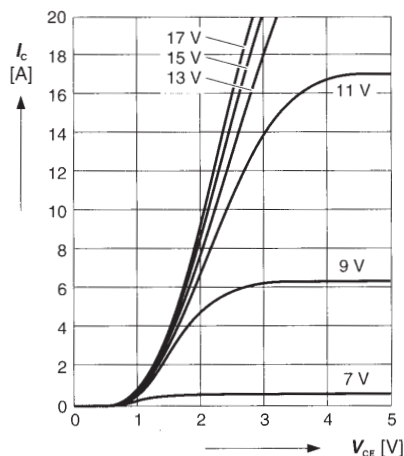


IGBT

Typ. output characteristics

$$I_C = f(V_{CE})$$

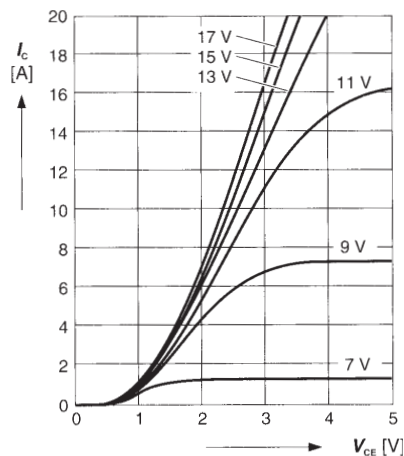
parameter: $t_b = 250 \mu s$; $T_j = 25^\circ C$



Typ. output characteristics

$$I_C = f(V_{CE})$$

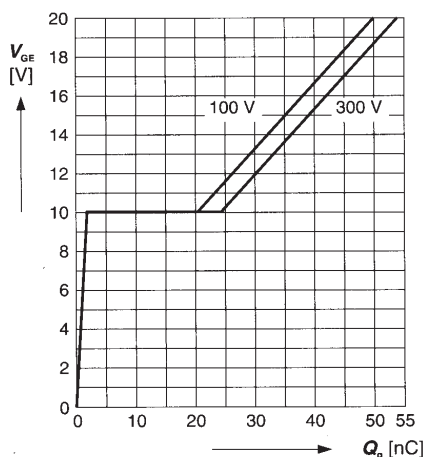
parameter: $t_b = 250 \mu s$; $T_j = 125^\circ C$



Typ. gate charge

$$V_{GE} = f(Q_g)$$

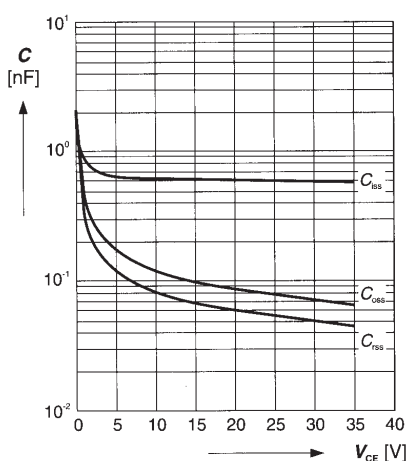
parameter: $I_{C puls} = 10 A$



Typ. capacitances

$$C = f(V_{CE})$$

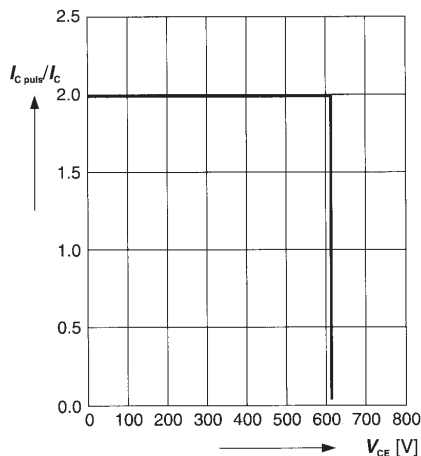
parameter: $V_{GE} = 0 V$; $f = 1 MHz$



Reverse biased safe operating area

$$I_{C puls} = f(V_{CE}), T_j = 150^\circ C$$

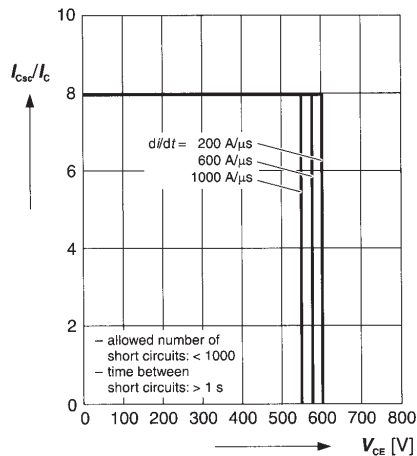
parameter: $V_{GE} = 15 V$



Short circuit safe operating area

$$I_{Csc} = f(V_{CE}), T_j = 150^\circ C$$

parameter: $V_{GE} = \pm 15 V$; $t_{sc} \leq 10 \mu s$; $L < 60 nH$



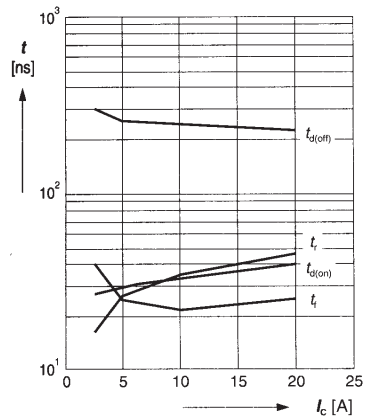
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IGBT

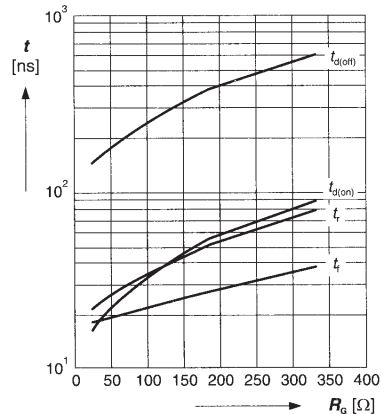
Typ. switching time

 $t = f(I_C)$, inductive load, $T_j = 125^\circ\text{C}$

parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 100\ \Omega$


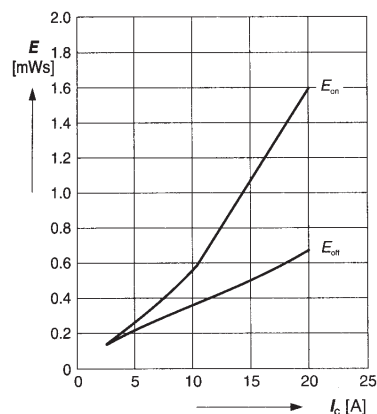
Typ. switching time

 $t = f(R_G)$, inductive load, $T_j = 125^\circ\text{C}$

parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $I_C = 10\text{ A}$


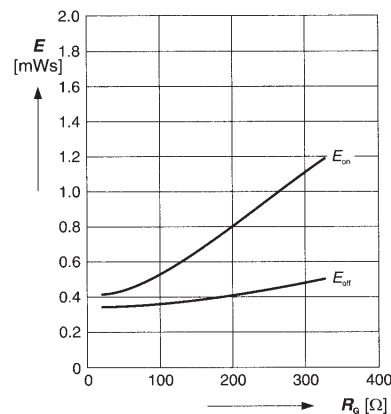
Typ. switching losses

 $E = f(I_C)$, inductive load, $T_j = 125^\circ\text{C}$

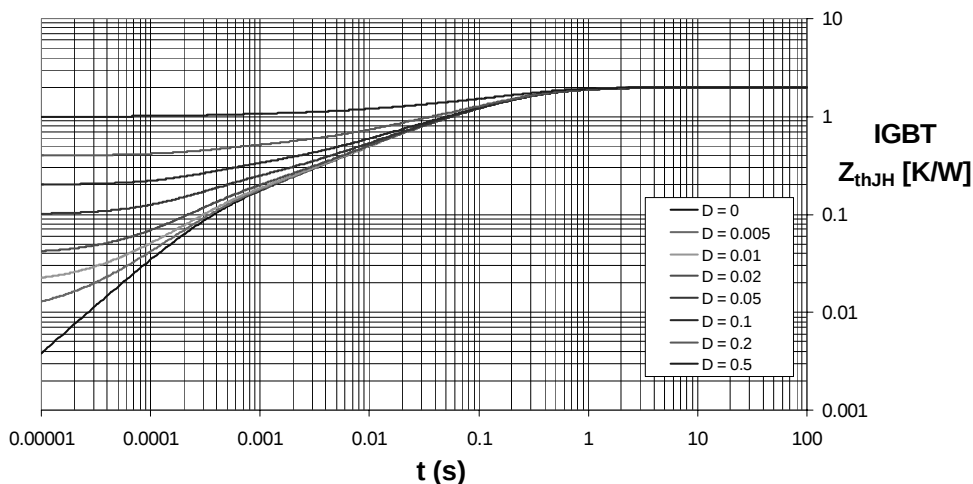
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 100\ \Omega$


Typ. switching losses

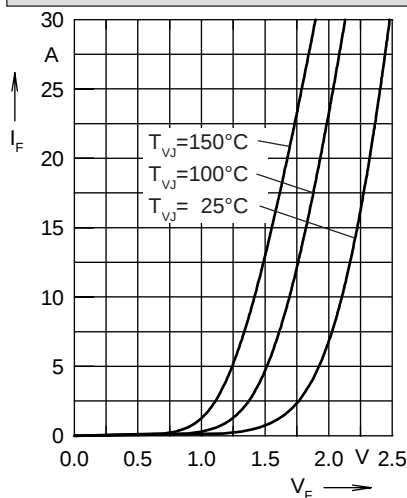
 $E = f(R_G)$, inductive load, $T_j = 125^\circ\text{C}$

parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $I_C = 10\text{ A}$


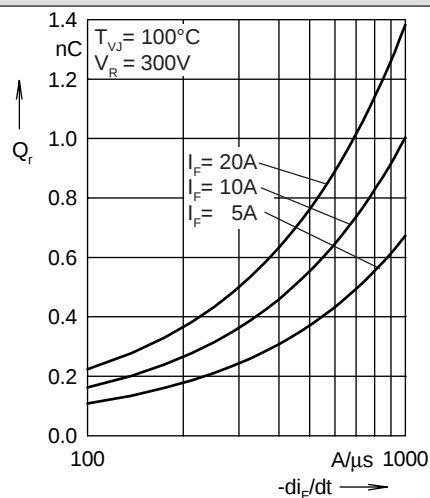
Transient thermal resistance junction to heatsink



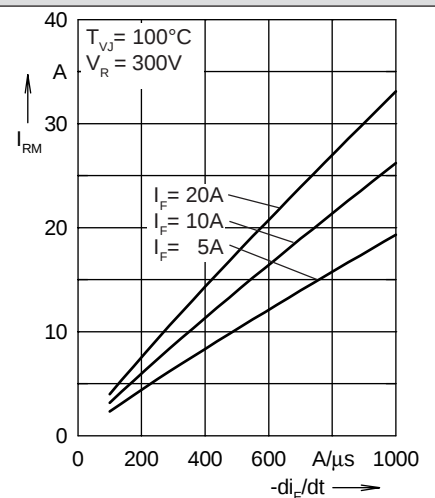
Diode



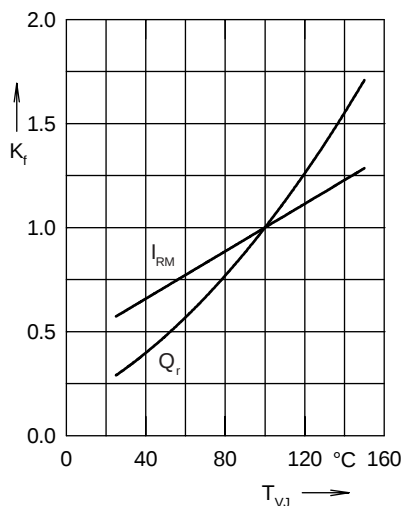
Forward current I_F versus V_F



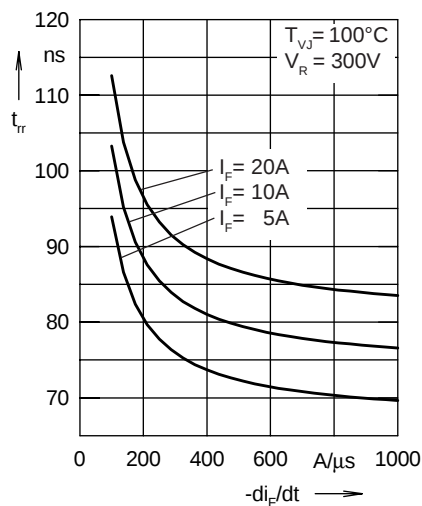
Reverse recovery charge Q_r versus $-di_F/dt$



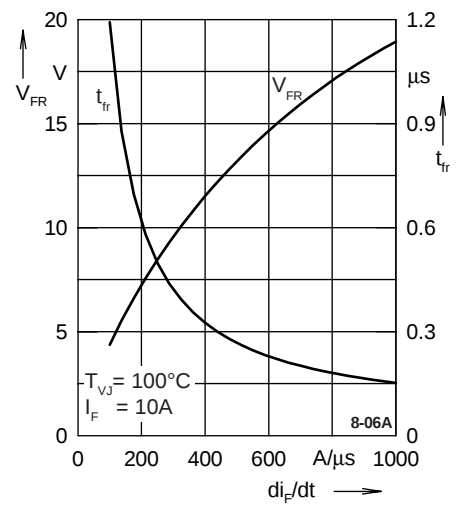
Peak reverse current I_{RM} versus $-di_F/dt$



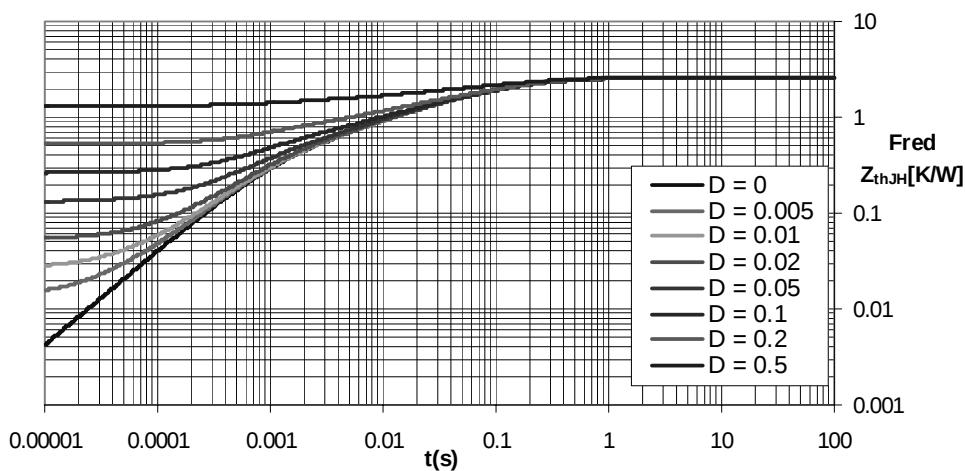
Dynamic parameters Q_r , I_{RM} versus T_{VJ}



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



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



Transient thermal resistance junction to heatsink

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