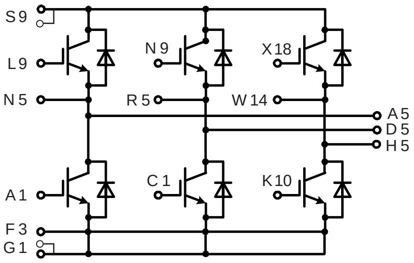
IXYS

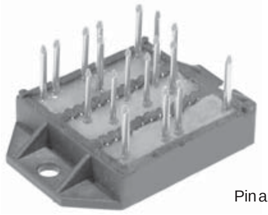
**VWI 35-06P1**

# IGBT Module

Sixpack in ECO-PAC 2

$I_{C25}$ = 31 A
$V_{CES}$ = 600 V
$V_{CE(sat)\,typ.}$ = 1.9 V





Pin arangement see outlines

### 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

## IGBTs

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{CES}$ | $T_{VJ}$ = 25°C to 150°C | 600 | V |
| $V_{GES}$ | | ± 20 | V |
| $I_{C25}$<br>$I_{C80}$ | $T_C$ = 25°C<br>$T_C$ = 80°C | 31<br>21 | A<br>A |
| $I_{CM}$<br>$V_{CEK}$ | $V_{GE}$ = ±15 V; $R_G$ = 47 Ω; $T_{VJ}$ = 125°C<br>RBSOA, Clamped inductive load; L = 100 µH | 40<br>$V_{CES}$ | A |
| $t_{SC}$<br>**(SCSOA)** | $V_{CE}$ = 600 V; $V_{GE}$ = ±15 V; $R_G$ = 47 Ω; $T_{VJ}$ = 125°C<br>non-repetitive | 10 | µs |
| $P_{tot}$ | $T_C$ = 25°C | 100 | W |

| Symbol | Conditions | Characteristic Values<br>($T_{VJ}$ = 25°C, unless otherwise specified)<br>min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_{CE(sat)}$ | $I_C$ = 20 A; $V_{GE}$ = 15 V; $T_{VJ}$ = 25°C<br>$T_{VJ}$ = 125°C | | 1.9<br>2.2 | 2.4 | V<br>V |
| $V_{GE(th)}$ | $I_C$ = 0.5 mA; $V_{GE}$ = $V_{CE}$ | 4.5 | | 6.5 | V |
| $I_{CES}$ | $V_{CE}$ = $V_{CES}$; $V_{GE}$ = 0 V; $T_{VJ}$ = 25°C<br>$T_{VJ}$ = 125°C | | <br>0.7 | 0.6 | mA<br>mA |
| $I_{GES}$ | $V_{CE}$ = 0 V; $V_{GE}$ = ± 20 V | | | 100 | 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°C<br>$V_{CE}$ = 300 V; $I_C$ = 10 A<br>$V_{GE}$ = ±15 V; $R_G$ = 82 Ω | | 50<br>55<br>300<br>30<br>0.9<br>0.7 | | ns<br>ns<br>ns<br>ns<br>mJ<br>mJ |
| $C_{ies}$<br>$Q_{Gon}$ | $V_{CE}$ = 25 V; $V_{GE}$ = 0 V; f = 1 MHz<br>$V_{CE}$ = 300 V; $V_{GE}$ = 15 V; $I_C$ = 20 A | | 1100<br>65 | | pF<br>nC |
| $R_{thJC}$<br>$R_{thJH}$ | (per IGBT)<br>with heatsink compound (0.42 K/m.K; 50 µm) | | <br>2.5 | 1.3 | K/W<br>K/W |

IXYS reserves the right to change limits, test conditions and dimensions.

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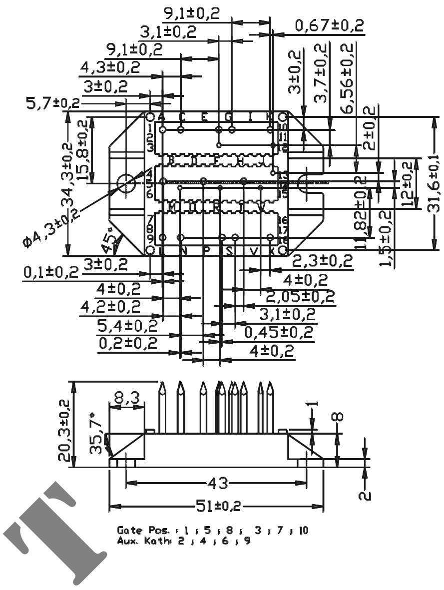
## Diodes

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $I_{F25}$ | $T_C$ = 25°C | 35 | A |
| $I_{F80}$ | $T_C$ = 80°C | 22 | A |

| Symbol | Conditions | Characteristic Values min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_F$ | $I_F$ = 20 A; $T_{VJ}$ = 25°C | | 1.9 | 2.1 | V |
| | $T_{VJ}$ = 125°C | | 1.4 | | V |
| $I_{RM}$ | $I_F$ = 15 A; $di_F/dt$ = -400 A/µs; $T_{VJ}$ = 125°C | | 13 | | A |
| $t_{rr}$ | $V_R$ = 300 V; $V_{GE}$ = 0 V | | 90 | | ns |
| $R_{thJC}$ | | | | 2.3 | K/W |
| $R_{thJH}$ | with heatsink compound (0.42 K/m.K; 50 µm) | | 4.6 | | K/W |

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

**Dimensions in mm (1 mm = 0.0394")**



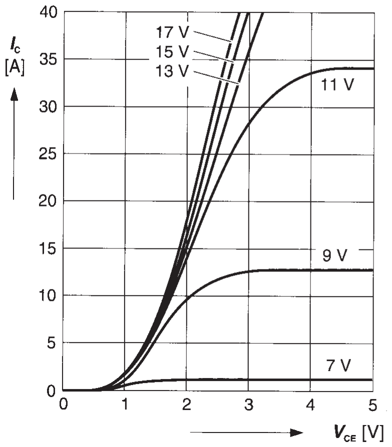
## Component

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $T_{VJ}$ | | -40...+150 | °C |
| $T_{stg}$ | | -40...+125 | °C |
| $V_{ISOL}$ | $I_{ISOL}$ ≤ 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/s² |

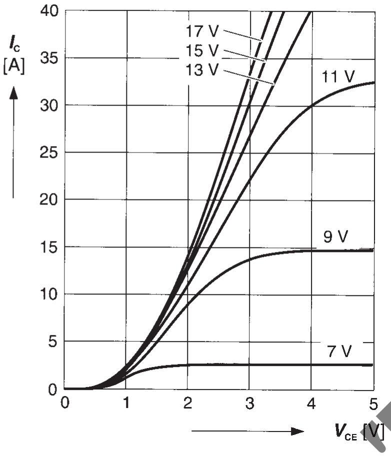
| Symbol | Conditions | Characteristic Values min. | typ. | max. | |
|---|---|---|---|---|---|
| $d_S$ | Creepage distance on surface (Pin to heatsink) | 11.2 | | | mm |
| $d_A$ | Strike distance in air (Pin to heatsink) | 11.2 | | | mm |
| **Weight** | | | 24 | | g |

## IGBT

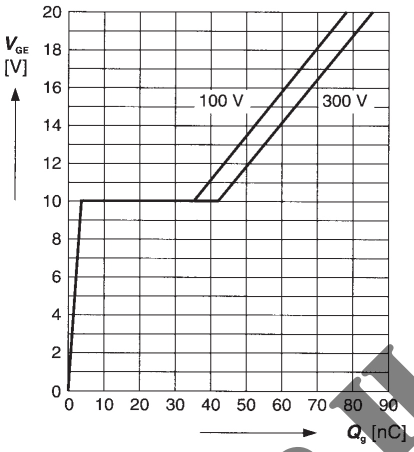
**Typ. output characteristics**
$I_C = f\ (V_{CE})$
parameter: $t_p$ = 250 µs; $T_j$ = 25 °C



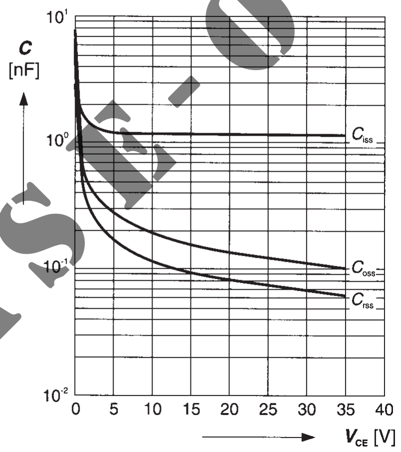
**Typ. output characteristics**
$I_C = f\ (V_{CE})$
parameter: $t_p$ = 250 µs; $T_j$ = 125 °C



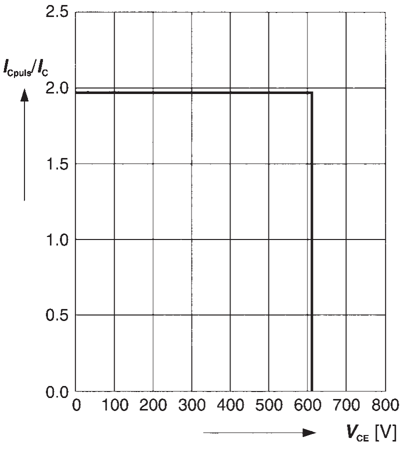
**Typ. gate charge**
$V_{GE} = f\ (Q_g)$
parameter: $I_{C\ puls}$ = 20 A



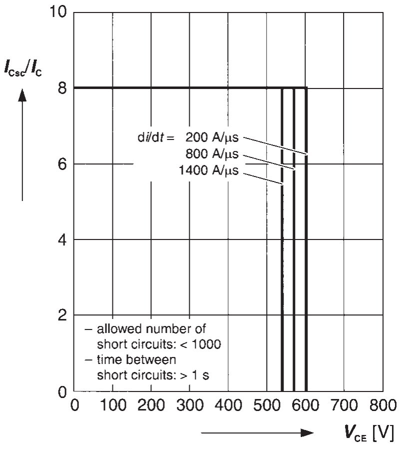
**Typ. capacitances**
$C = f\ (V_{CE})$
parameter: $V_{GE}$ = 0 V ; $f$ = 1 MHz



**Reverse biased safe operating area**
$I_{C\ puls} = f\ (V_{CE})$, $T_j$ = 150 °C
parameter: $V_{GE}$ = 15 V



**Short circuit safe operating area**
$I_{Csc} = f\ (V_{CE})$, $T_j$ = 150 °C
parameter: $V_{GE}$ = ± 15 V ; $t_{sc}$ ≤ 10 µs; $L$ < 50 nH



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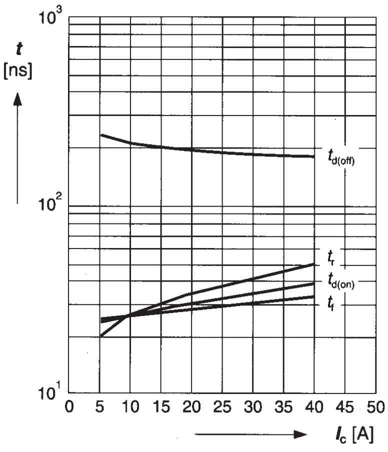
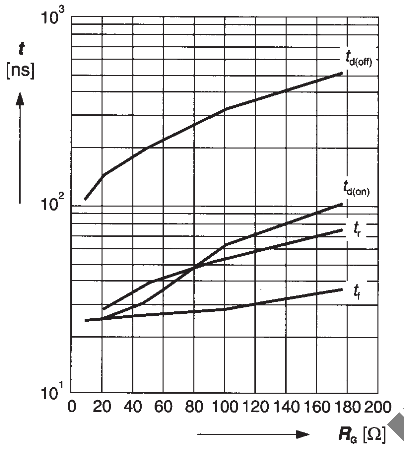
## IGBT

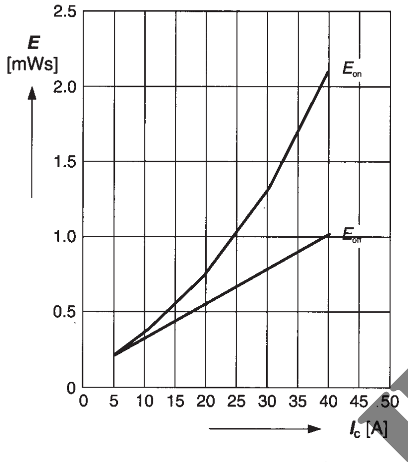
**Typ. switching time**
$t = f(I_C)$, inductive load, $T_j$ = 125 °C
parameter: $V_{CE}$ = 300 V; $V_{GE}$ = ± 15 V; $R_G$ = 47 Ω



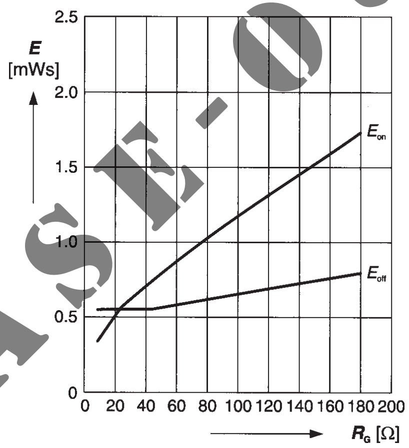
**Typ. switching time**
$t = f(R_G)$, inductive load, $T_j$ = 125 °C
parameter: $V_{CE}$ = 300 V; $V_{GE}$ = ± 15 V; $I_C$ = 20 A



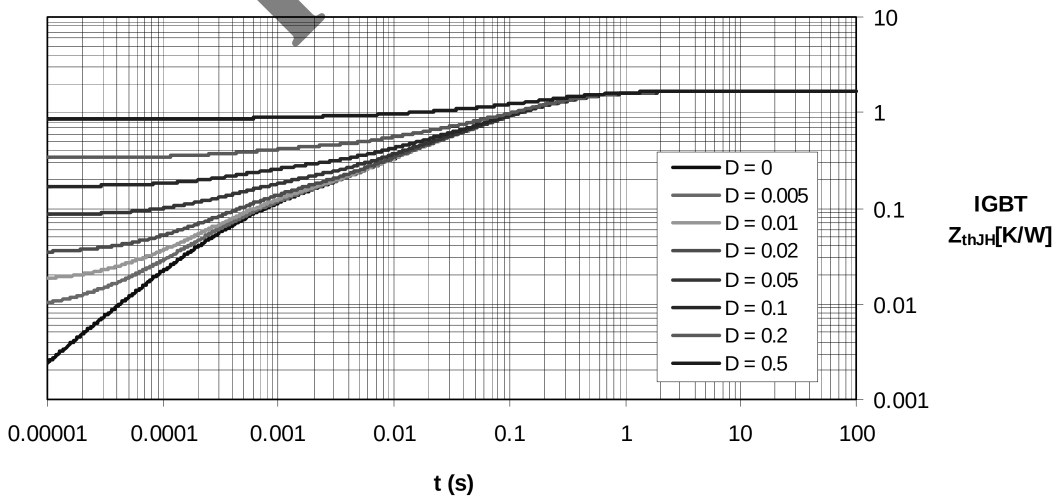
**Typ. switching losses**
$E = f(I_C)$, inductive load, $T_j$ = 125 °C
parameter: $V_{CE}$ = 300 V; $V_{GE}$ = ± 15 V; $R_G$ = 47 Ω



**Typ. switching losses**
$E = f(R_G)$, inductive load, $T_j$ = 125 °C
parameter: $V_{CE}$ = 300 V; $V_{GE}$ = ± 15 V; $I_C$ = 20 A



Transient thermal resistance junction to heatsink



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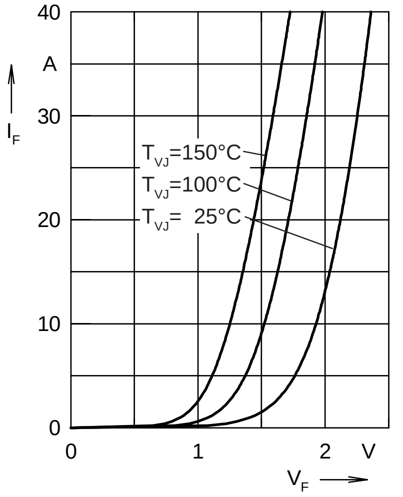
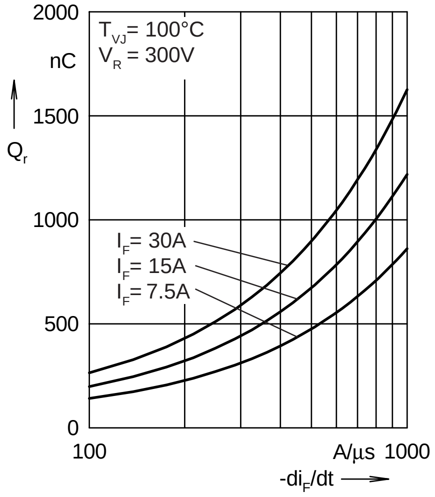
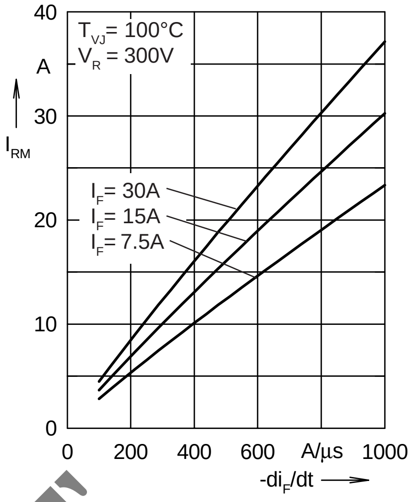
## Diode



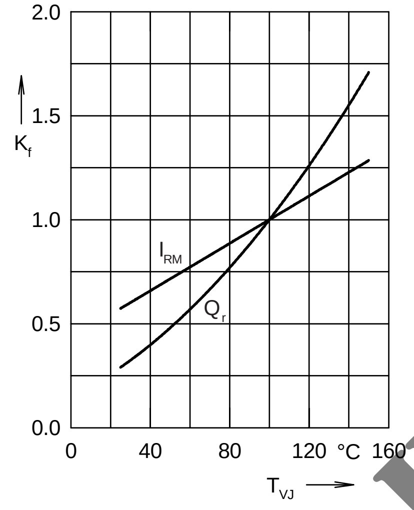
Forward current $I_F$ versus $V_F$



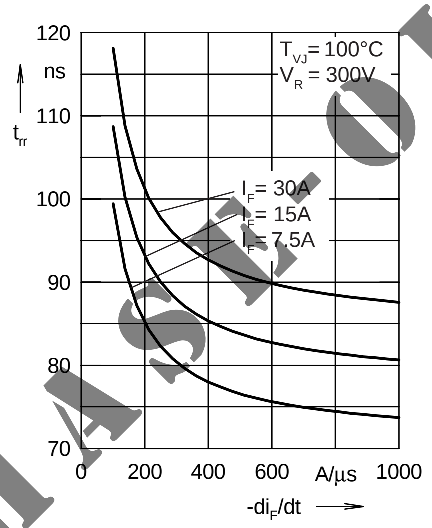
Reverse recovery charge $Q_r$ versus $-di_F/dt$



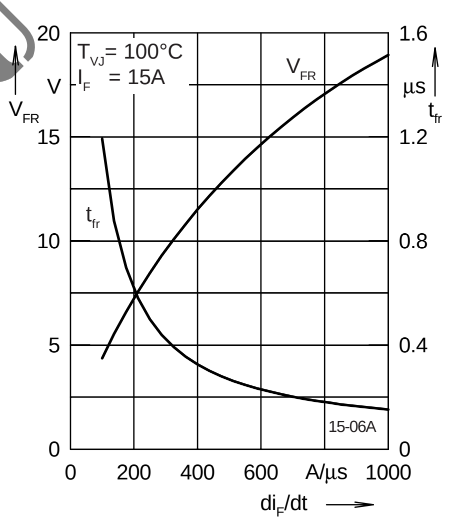
Peak reverse current $I_{RM}$ versus $-di_F/dt$



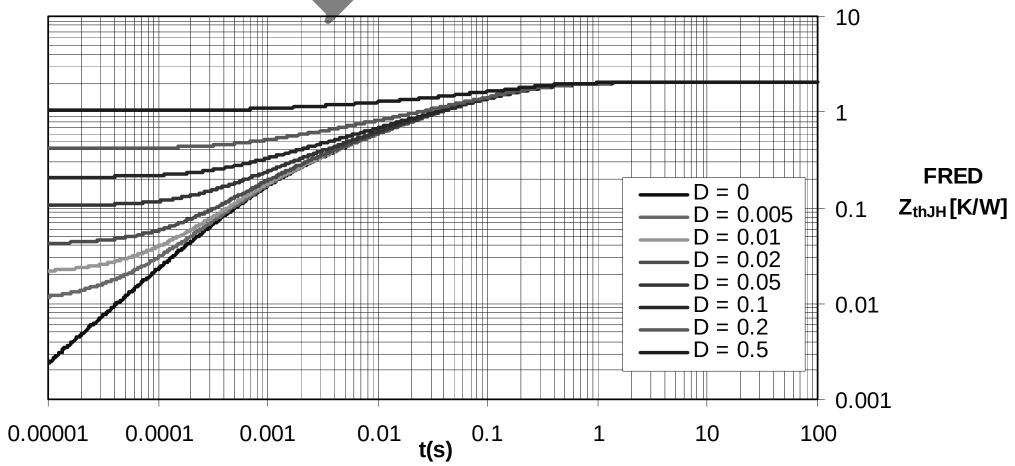
Dynamic parameters $Q_r$, $I_{RM}$ versus $T_{VJ}$



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

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