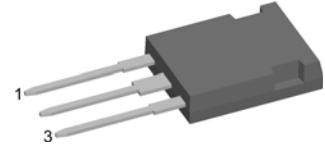
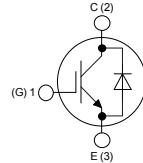


**XPT IGBT**

Copack

**I<sub>C25</sub>** = **58 A**  
**V<sub>CES</sub>** = **1200 V**  
**V<sub>CE(sat)typ</sub>** = **1.8 V**

**Part number****IXA37IF1200HJ****Features / Advantages:**

- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10  $\mu$ sec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 3x I<sub>c</sub>
- Thin wafer technology combined with the XPT design results in a competitive low V<sub>CE(sat)</sub>
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

**Applications:**

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers

**Package:**

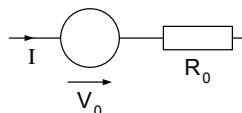
- Housing: ISOPLUS247
- Industry standard outline
- DCB isolated backside
- Isolation Voltage 3000 V
- Epoxy meets UL 94V-0
- RoHS compliant

**IGBT****Ratings**

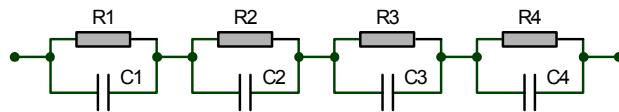
| Symbol               | Definition                           | Conditions  | min.                    | typ. | max.     | Unit    |   |
|----------------------|--------------------------------------|---|-------------------------|------|----------|---------|---|
| V <sub>CES</sub>     | Collector emitter voltage            | V <sub>GE</sub> = 0 V   | T <sub>VJ</sub> = 25°C  |      | 1200     | V       |   |
| V <sub>GES</sub>     | Maximum DC gate voltage              |   | T <sub>VJ</sub> = 25°C  |      | $\pm 20$ | V       |   |
| I <sub>C25</sub>     | Collector current                    |   | T <sub>C</sub> = 25°C   |      | 58       | A       |   |
| I <sub>C90</sub>     |                                      |   | T <sub>C</sub> = 90°C   |      | 37       | A       |   |
| P <sub>tot</sub>     | Total power dissipation              |   | T <sub>VJ</sub> = 25°C  |      | 195      | W       |   |
| I <sub>CES</sub>     | Collector emitter leakage current    | V <sub>CE</sub> = V <sub>CES</sub> ; V <sub>GE</sub> = 0 V                        | T <sub>VJ</sub> = 25°C  |      | 0.1      | mA      |   |
|                      |                                      |   | T <sub>VJ</sub> = 125°C |      | 0.1      | mA      |   |
| I <sub>GES</sub>     | Gate emitter leakage current         | V <sub>CE</sub> = 0 V; V <sub>GE</sub> = $\pm 20$ V                               |                         |      | 500      | nA      |   |
| V <sub>CE(sat)</sub> | Collector emitter saturation voltage | I <sub>C</sub> = 35 A; V <sub>GE</sub> = 15 V                                     | T <sub>VJ</sub> = 25°C  | 1.8  | 2.1      | V       |   |
|                      |                                      |   | T <sub>VJ</sub> = 125°C | 2.1  |          | V       |   |
| V <sub>GE(th)</sub>  | Gate emitter threshold voltage       | I <sub>C</sub> = 1.5 mA; V <sub>GE</sub> = V <sub>CE</sub>                        |                         | 5.4  | 6        | 6.5     | V |
| Q <sub>Gon</sub>     | Total gate charge                    | V <sub>CE</sub> = 600 V; V <sub>GE</sub> = 15 V; I <sub>C</sub> = 35 A            |                         | 106  |          | nC      |   |
| t <sub>d(on)</sub>   | Turn-on delay time                   |   |                         | 70   |          | ns      |   |
| t <sub>r</sub>       | Current rise time                    |   |                         | 40   |          | ns      |   |
| t <sub>d(off)</sub>  | Turn-off delay time                  | Inductive load  |                         | 250  |          | ns      |   |
| t <sub>f</sub>       | Current fall time                    | V <sub>CE</sub> = 600 V; I <sub>C</sub> = 35 A                                    |                         | 100  |          | ns      |   |
| E <sub>on</sub>      | Turn-on energy per pulse             | V <sub>GE</sub> = $\pm 15$ V; R <sub>G</sub> = 27 $\Omega$                        | T <sub>VJ</sub> = 125°C | 3.8  |          | mJ      |   |
| E <sub>off</sub>     | Turn-off energy per pulse            |   |                         | 4.1  |          | mJ      |   |
| RBSOA                | Reverse bias safe operation area     | V <sub>GE</sub> = 15 V; R <sub>G</sub> = 27 $\Omega$<br>V <sub>CEK</sub> = 1200 V | T <sub>VJ</sub> = 125°C |      | 105      | A       |   |
| SCSOA                | Short circuit safe operation area    |   |                         |      |          |         |   |
| t <sub>sc</sub>      | Short circuit duration               | V <sub>CE</sub> = 900 V; V <sub>GE</sub> = $\pm 15$ V                             | T <sub>VJ</sub> = 125°C |      | 10       | $\mu$ s |   |
| I <sub>sc</sub>      | Short circuit current                | R <sub>G</sub> = 27 $\Omega$ ; non-repetitive                                     |                         |      | 140      | A       |   |
| R <sub>thJC</sub>    | Thermal resistance junction to case  |   |                         |      | 0.64     | K/W     |   |

**Diode**

| Symbol         | Definition                          | Conditions                              | Ratings                |      |      |         |
|----------------|-------------------------------------|---|------------------------|------|------|---------|
|                |                                     |   | min.                   | typ. | max. | Unit    |
| $I_{F25}$      | Forward current                     | $T_C = 25^\circ C$                      |                        |      | 42   | A       |
| $I_{F90}$      |                                     | $T_C = 90^\circ C$                      |                        |      | 25   | A       |
| $V_F$          | Forward voltage                     | $I_F = 30 A$                            | $T_{VJ} = 25^\circ C$  | 1.95 | 2.2  | V       |
|                |                                     |   | $T_{VJ} = 125^\circ C$ | 1.95 |      | V       |
| $Q_{rr}$       | Reverse recovery charge             |   |                        | 3.5  |      | $\mu C$ |
| $I_{RM}$       | Maximum reverse recovery current    | $V_R = 600 V$                           |                        | 30   |      | A       |
| $t_{rr}$       | Reverse recovery time               | $dI_F/dt = -600 A/\mu s$ ; $I_F = 30 A$ | $T_{VJ} = 125^\circ C$ | 350  |      | ns      |
| $E_{rec(off)}$ | Reverse recovery losses at turn-off |   |                        | 0.9  |      | mJ      |
| $R_{thJC}$     | Thermal resistance junction to case |   |                        |      | 1.2  | K/W     |

**Equivalent Circuits for Simulation****Ratings**

| Symbol | Definition | $T_{VJ} = 150^\circ C$ | Ratings |      |      |           |
|--------|------------|------------------------|---------|------|------|-----------|
|        |            |                        | min.    | typ. | max. | Unit      |
| $V_0$  | IGBT       |                        |         |      | 1.1  | V         |
| $R_0$  |            |                        |         |      | 39   | $m\Omega$ |
| $V_0$  | Diode      | $T_{VJ} = 150^\circ C$ |         |      | 1.25 | V         |
| $R_0$  |            |                        |         |      | 28.3 | $m\Omega$ |



$$Z_{th}(t) = \sum_{i=1}^n \left[ R_i \cdot \left( 1 - \exp\left(-\frac{t}{\tau_i}\right) \right) \right]$$

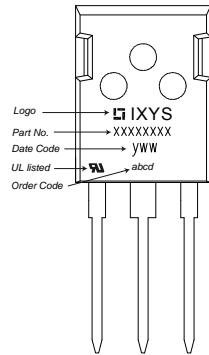
$$\tau_i = R_i \cdot C_i$$

|          | IGBT   | Diode  |
|----------|--------|--------|
| $R_1$    | 0.152  | 0.3413 |
| $R_2$    | 0.0724 | 0.2171 |
| $R_3$    | 0.3078 | 0.3475 |
| $R_4$    | 0.1078 | 0.2941 |
| $\tau_1$ | 0.0025 | 0.0025 |
| $\tau_2$ | 0.03   | 0.03   |
| $\tau_3$ | 0.03   | 0.03   |
| $\tau_4$ | 0.08   | 0.08   |

## Package ISOPLUS247

| Ratings           |                                     |              |      |      |      |      |
|-------------------|-------------------------------------|--------------|------|------|------|------|
| Symbol            | Definition                          | Conditions   | min. | typ. | max. | Unit |
| T <sub>VJ</sub>   | Virtual junction temperature        |              | -55  |      | 150  | °C   |
| T <sub>stg</sub>  | Storage temperature                 |              | -55  |      | 150  | °C   |
| R <sub>thCH</sub> | Thermal resistance case to heatsink |              |      | 0.25 |      | K/W  |
| <b>Weight</b>     |                                     |              |      | 6    |      | g    |
| F <sub>c</sub>    | Mounting force with clip            |              | 20   |      | 120  | N    |
| V <sub>ISOL</sub> | Isolation voltage                   | t = 1 second | 3600 |      |      | V    |
|                   |                                     | t = 1 minute | 3000 |      |      | V    |
| d <sub>s</sub>    | Creepage distance on surface        |              |      |      |      | mm   |
| d <sub>A</sub>    | Striking distance through air       |              |      |      |      | mm   |

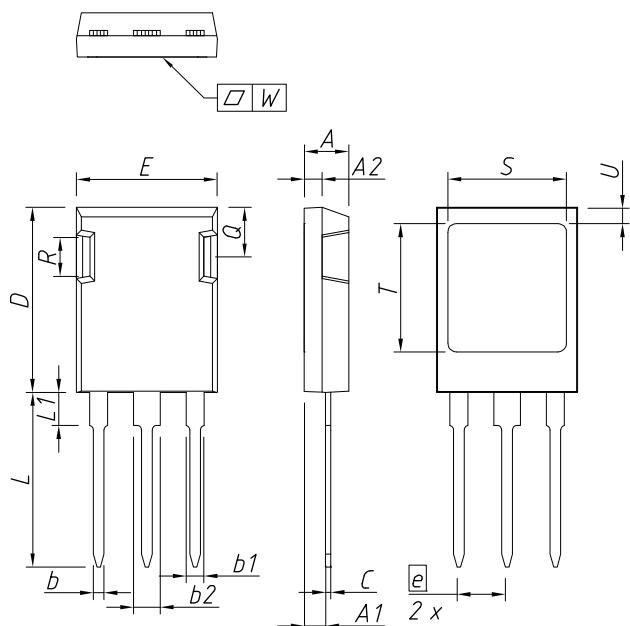
## Product Marking



## Part number

I = IGBT  
 X = XPT IGBT  
 A = Gen 1 / std  
 37 = Current Rating [A]  
 IF = Copack  
 1200 = Reverse Voltage [V]  
 HJ = ISOPLUS247 (3)

| Ordering | Part Name         | Marking on Product | Delivering Mode | Base Qty | Code Key |
|----------|-------------------|--------------------|-----------------|----------|----------|
| Standard | IXA 37 IF 1200 HJ | IXA37IF1200HJ      | Tube            | 30       | 507993   |



| DIM. | MILLIMETER |       | INCHES    |       |
|------|------------|-------|-----------|-------|
|      | MIN        | MAX   | MIN       | MAX   |
| A    | 4,83       | 5,21  | 0,190     | 0,205 |
| A1   | 2,29       | 2,54  | 0,090     | 0,100 |
| A2   | 1,91       | 2,16  | 0,075     | 0,085 |
| b    | 1,14       | 1,40  | 0,045     | 0,055 |
| b1   | 1,91       | 2,15  | 0,075     | 0,085 |
| b2   | 2,92       | 3,20  | 0,115     | 0,126 |
| C    | 0,61       | 0,83  | 0,024     | 0,033 |
| D    | 20,80      | 21,34 | 0,819     | 0,840 |
| E    | 15,75      | 16,13 | 0,620     | 0,635 |
| e    | 5,45 BSC   |       | 0,215 BSC |       |
| L    | 19,81      | 20,60 | 0,780     | 0,811 |
| L1   | 3,81       | 4,38  | 0,150     | 0,172 |
| Q    | 5,59       | 6,20  | 0,220     | 0,244 |
| R    | 4,32       | 4,85  | 0,170     | 0,191 |
| S    | 13,21      | 13,72 | 0,520     | 0,540 |
| T    | 15,75      | 16,26 | 0,620     | 0,640 |
| U    | 1,65       | 2,03  | 0,065     | 0,080 |
| W    | -          | 0,10  | -         | 0,004 |

Die konvexe Form des Substrates ist typ. < 0,04 mm über der Kunststoffoberfläche der Bauteilunterseite

The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L<sub>max</sub>.  
This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except L<sub>max</sub>.

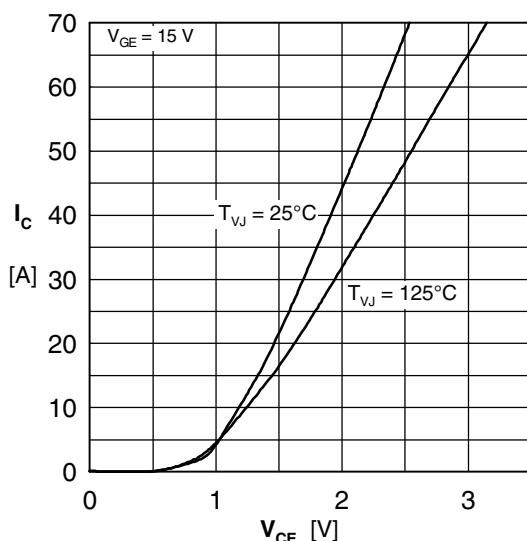


Fig. 1 Typ. output characteristics

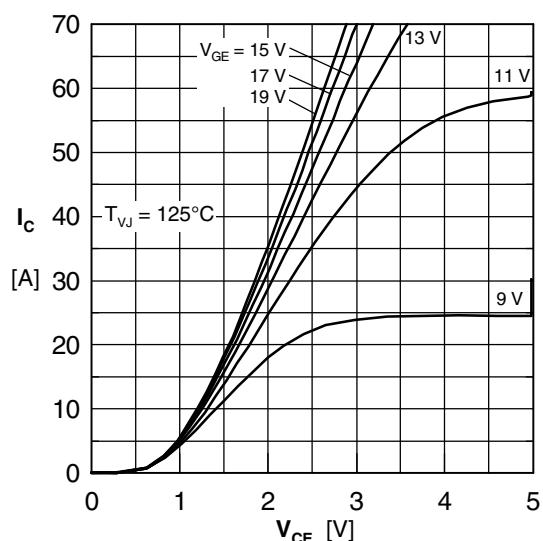


Fig. 2 Typ. output characteristics

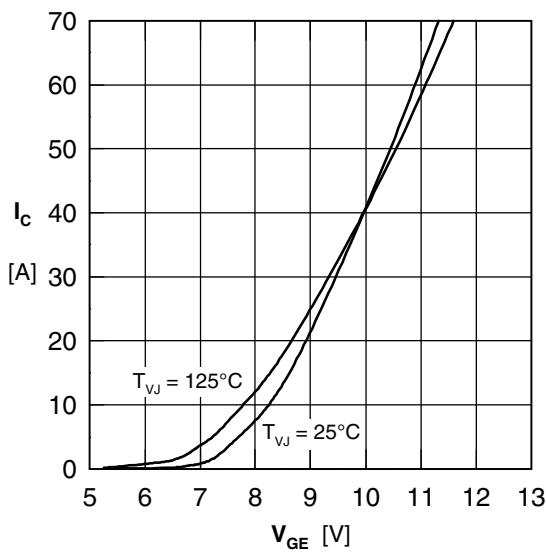


Fig. 3 Typ. tranfer characteristics

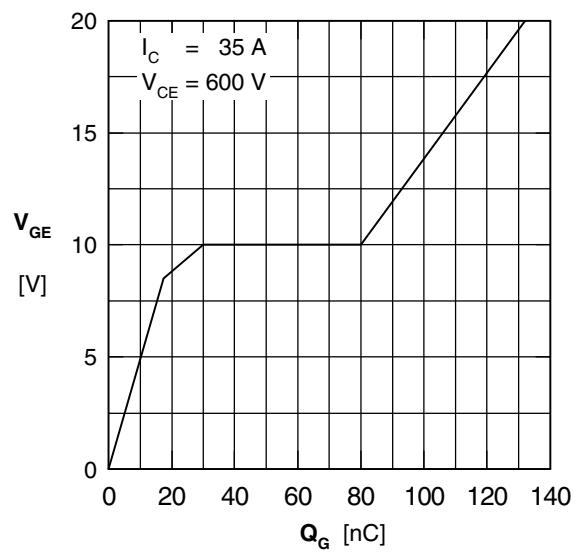


Fig. 4 Typ. turn-on gate charge

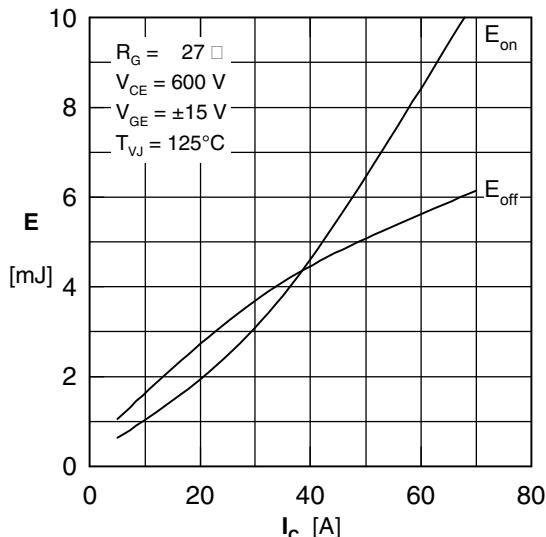


Fig. 5 Typ. switching energy vs. collector current

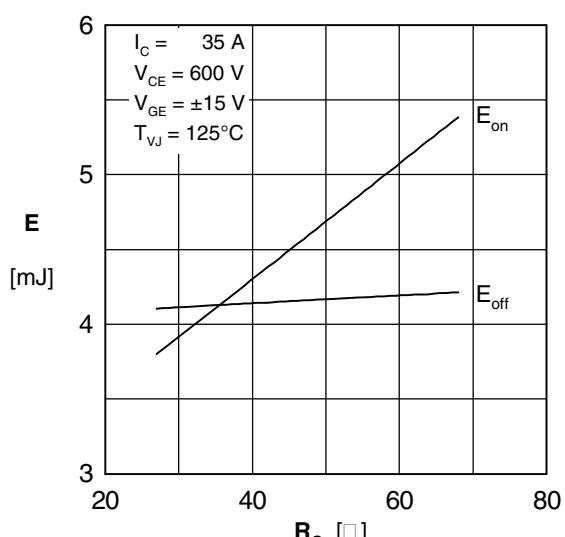


Fig. 6 Typ. switching energy vs. gate resistance

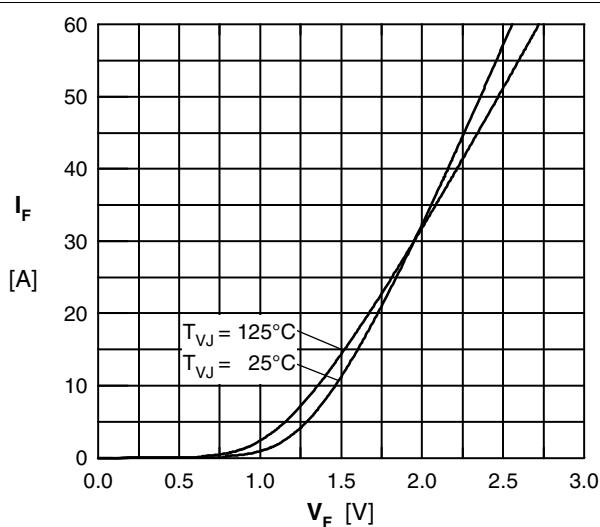
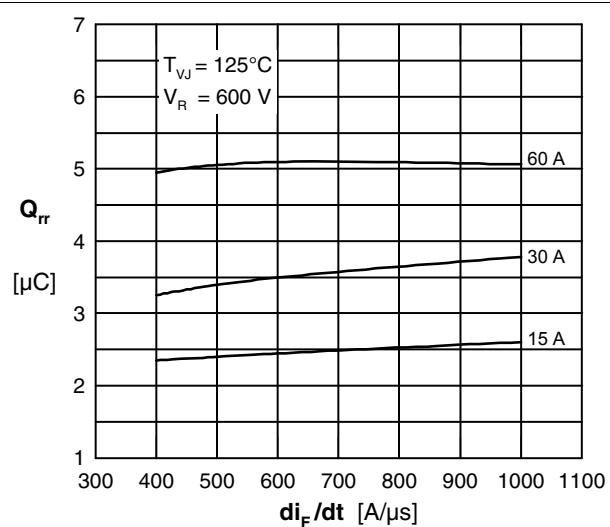
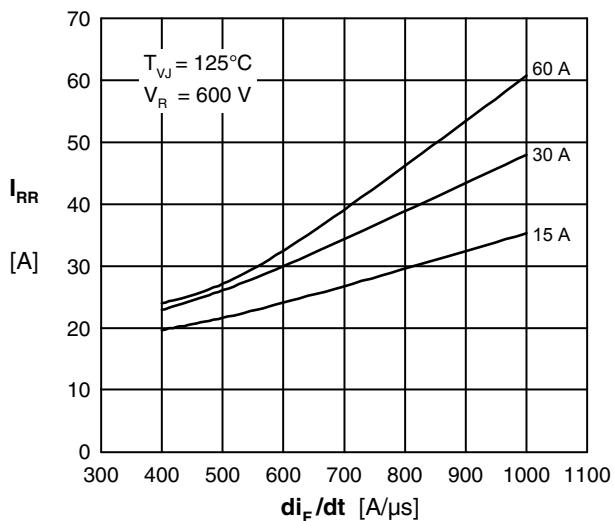
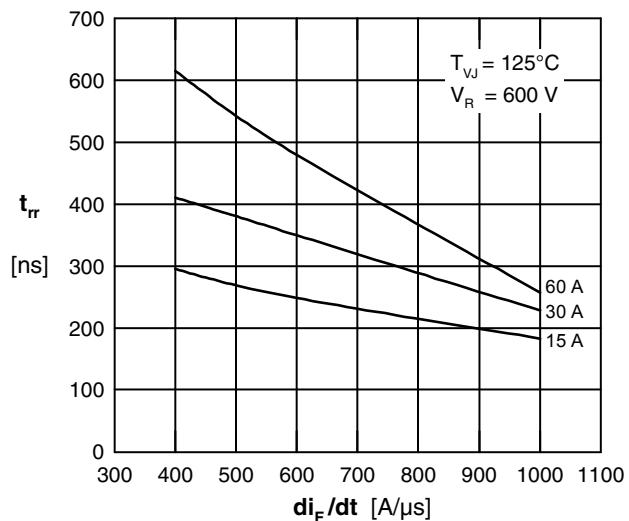
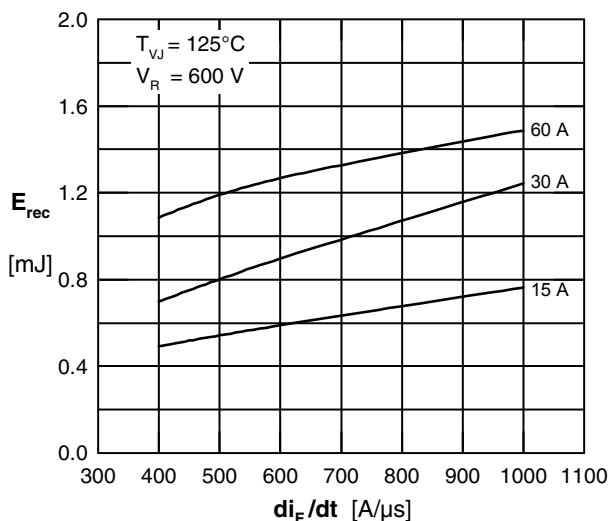
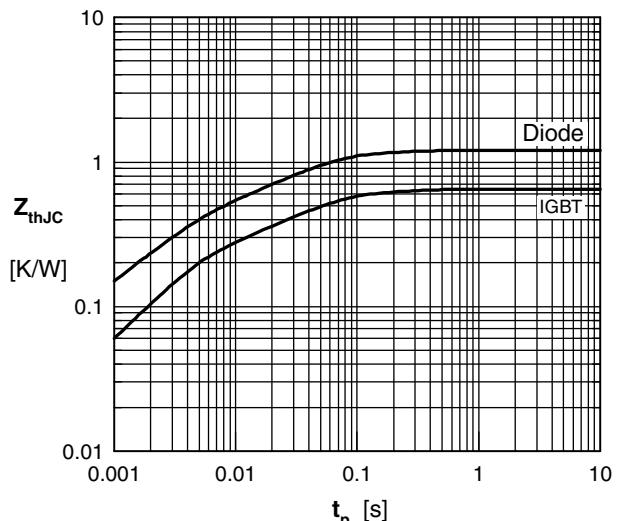
Fig. 7 Typ. Forward current versus  $V_F$ Fig. 8 Typ. reverse recov.charge  $Q_{rr}$  vs.  $di/dt$ Fig. 9 Typ. peak reverse current  $I_{RM}$  vs.  $di/dt$ Fig. 10 Typ. recovery time  $t_{rr}$  versus  $di/dt$ Fig. 5 Typ. recovery energy  $E_{rec}$  versus  $di/dt$ 

Fig. 12 Typ. transient thermal impedance