

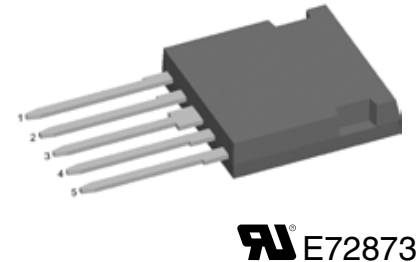
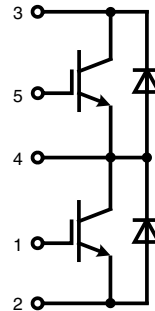
## IGBT phaseleg

in ISOPLUS i4-PAC™

$$I_{C25} = 40 \text{ A}$$

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

$$V_{CE(sat) \text{ typ.}} = 1.8 \text{ V}$$



| IGBT                |   |                 |               |
|---------------------|---|-----------------|---------------|
| Symbol              | Conditions  | Maximum Ratings |               |
| $V_{CES}$           | $T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$   | 600             | V             |
| $V_{GES}$           |   | $\pm 20$        | V             |
| $I_{C25}$           | $T_C = 25^{\circ}\text{C}$  | 40              | A             |
| $I_{C90}$           | $T_C = 90^{\circ}\text{C}$  | 25              | A             |
| $I_{CM}$            | $V_{GE} = \pm 15 \text{ V}; R_G = 33 \Omega; T_{VJ} = 125^{\circ}\text{C}$  | 60              | A             |
| $V_{CEK}$           | <b>RBSOA</b> Clamped inductive load; $L = 100 \mu\text{H}$  | $V_{CES}$       |               |
| $t_{SC}$<br>(SCSOA) | $V_{CE} = V_{CES}; V_{GE} = \pm 15 \text{ V}; R_G = 33 \Omega$<br>$T_{VJ} = 125^{\circ}\text{C}; \text{non-repetitive}$ | 10              | $\mu\text{s}$ |
| $P_{tot}$           | $T_C = 25^{\circ}\text{C}$  | 125             | W             |

| Symbol        | Conditions  | Characteristic Values   |      |      |          |
|---------------|---|---|------|------|----------|
|               |   | $(T_{VJ} = 25^{\circ}\text{C}, \text{ unless otherwise specified})$ |      |      |          |
|               |   | min.  | typ. | max. |          |
| $V_{CE(sat)}$ | $I_C = 25 \text{ A}; V_{GE} = 15 \text{ V}$   |   | 1.8  | 2.2  | V        |
|               |   |   | 2.0  |      | V        |
| $V_{GE(th)}$  | $I_C = 0.7 \text{ mA}; V_{GE} = V_{CE}$   | 4.5   |      | 6.5  | V        |
| $I_{CES}$     | $V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}$  |   | 0.6  | 0.6  | mA<br>mA |
|               |   |   |      |      |          |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$   |   |      | 200  | nA       |
| $t_{d(on)}$   | Inductive load $T_{VJ} = 125^{\circ}\text{C}$<br>$V_{CE} = 300 \text{ V}; I_C = 25 \text{ A}$<br>$V_{GE} = \pm 15 \text{ V}; R_G = 33 \Omega$ |   | 50   |      | ns       |
| $t_r$         |   |   | 50   |      | ns       |
| $t_{d(off)}$  |   |   | 270  |      | ns       |
| $t_f$         |   |   | 40   |      | ns       |
| $E_{on}$      |   |   | 1.2  |      | mJ       |
| $E_{off}$     |   |   | 0.8  |      | mJ       |
| $C_{ies}$     | $V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$  |   | 1.6  |      | nF       |
| $Q_{Gon}$     | $V_{CE} = 300 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 30 \text{ A}$   |   | 95   |      | nC       |
| $R_{thJC}$    | with heatsink compound  |   |      | 1    | K/W      |
| $R_{thJH}$    |   |   | 2    |      | K/W      |

## Features

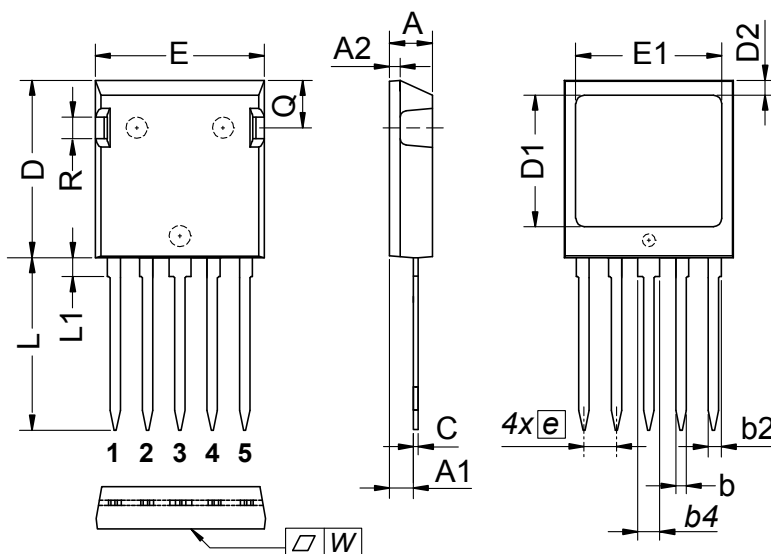
- NPT IGBT technology
  - low saturation voltage
  - positive temperature coefficient for easy paralleling
  - fast switching
- HiPerFRED™ diode
  - optimized fast and soft reverse recovery
  - low operating forward voltage
  - low leakage current
- ISOPLUS i4-PAC™ package
  - isolated back surface
  - low coupling capacity between pins and heatsink
  - enlarged creepage towards heatsink
  - application friendly pinout
  - low inductive current path
  - high reliability
  - industry standard outline
  - UL registered E 72873

## Applications

- single phaseleg
  - buck-boost chopper
- H bridge
  - power supplies
  - induction heating
  - four quadrant DC drives
  - controlled rectifier
- three phase bridge
  - AC drives
  - controlled rectifier

| Diode      |   |                       |                                |      |     |    |
|------------|---|-----------------------|--------------------------------|------|-----|----|
| Symbol     | Conditions  | Maximum Ratings       |                                |      |     |    |
| $V_{RRM}$  | $T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$  | 600                   | V                              |      |     |    |
| $I_{F25}$  | $T_C = 25^{\circ}\text{C}$  | 30                    | A                              |      |     |    |
| $I_{F90}$  | $T_C = 90^{\circ}\text{C}$  | 15                    | A                              |      |     |    |
| Symbol     | Conditions  | Characteristic Values |                                |      |     |    |
|            |   | min.                  | typ.                           | max. |     |    |
| $V_F$      | $I_F = 25\text{ A}$   |                       | $T_{VJ} = 25^{\circ}\text{C}$  | 2.5  | 2.8 | V  |
|            |   |                       | $T_{VJ} = 125^{\circ}\text{C}$ | 1.7  |     | V  |
| $I_{RM}$   | $I_F = 15\text{ A}; di_F/dt = -400\text{ A}/\mu\text{s};$<br>$V_R = 300\text{ V}; V_{GE} = 0\text{ V};$ |                       | $T_{VJ} = 125^{\circ}\text{C}$ | 7    |     | A  |
| $t_{rr}$   |   |                       |                                | 50   |     | ns |
| $R_{thJC}$ | (per diode)   |                       |                                | 2.3  | K/W |    |
| $R_{thJH}$ | with heatsink compound  |                       | 4.6                            | K/W  |     |    |

| Component  |   |                       |                    |      |    |  |
|------------|---|-----------------------|--------------------|------|----|--|
| Symbol     | Conditions  | Maximum Ratings       |                    |      |    |  |
| $T_{VJ}$   | operating   | -55...+150            | $^{\circ}\text{C}$ |      |    |  |
| $T_{stg}$  |   | -55...+125            | $^{\circ}\text{C}$ |      |    |  |
| $V_{ISOL}$ | $I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}; t = 1\text{ s}$        | 2500                  | V~                 |      |    |  |
| $F_C$      | Mounting force with clip  | 20...120              | Nm                 |      |    |  |
| Symbol     | Conditions  | Characteristic Values |                    |      |    |  |
|            |   | min.                  | typ.               | max. |    |  |
| $C_p$      | coupling capacity between shorted pins and mounting tab in the case |                       | 40                 |      | pF |  |
| $d_S, d_A$ | pin - pin   | 1.7                   |                    |      | mm |  |
| $d_S, d_A$ | pin - backside metal  | 5.5                   |                    |      | mm |  |
| Weight     |   |                       | 6                  | g    |    |  |



| DIM. | MILLIMETER |       | INCHES   |       |
|------|------------|-------|----------|-------|
|      | MIN        | MAX   | MIN      | MAX   |
| A    | 4.83       | 5.21  | 0.190    | 0.205 |
| A1   | 2.59       | 3.00  | 0.102    | 0.118 |
| A2   | 1.17       | 2.16  | 0.046    | 0.085 |
| b    | 1.14       | 1.40  | 0.045    | 0.055 |
| b2   | 1.47       | 1.73  | 0.058    | 0.068 |
| b4   | 2.54       | 2.79  | 0.100    | 0.110 |
| C    | 0.51       | 0.74  | 0.020    | 0.029 |
| D    | 20.80      | 21.34 | 0.819    | 0.840 |
| D1   | 14.99      | 15.75 | 0.590    | 0.620 |
| D2   | 1.65       | 2.03  | 0.065    | 0.080 |
| E    | 19.56      | 20.29 | 0.770    | 0.799 |
| E1   | 16.76      | 17.53 | 0.660    | 0.690 |
| e    | 3.81 BSC   |       | 0.15 BSC |       |
| L    | 19.81      | 21.34 | 0.780    | 0.840 |
| L1   | 2.11       | 2.59  | 0.083    | 0.102 |
| Q    | 5.33       | 6.20  | 0.210    | 0.244 |
| R    | 2.54       | 4.57  | 0.100    | 0.180 |
| W    | —          | 0.10  | —        | 0.004 |

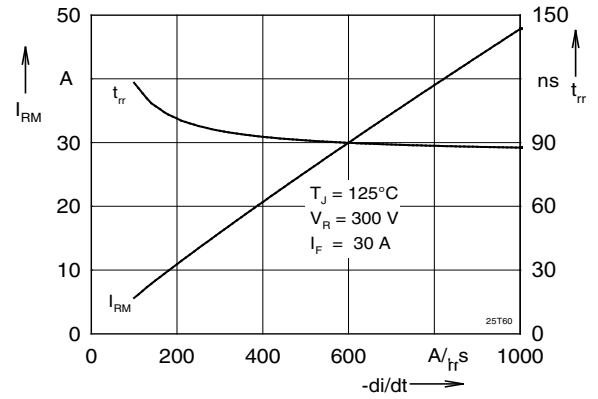
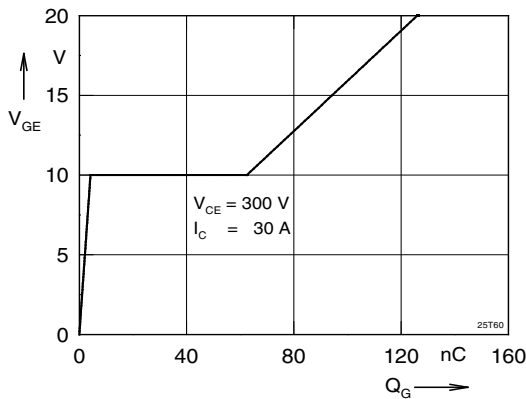
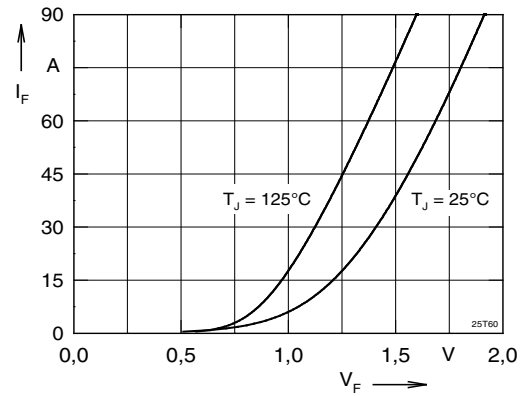
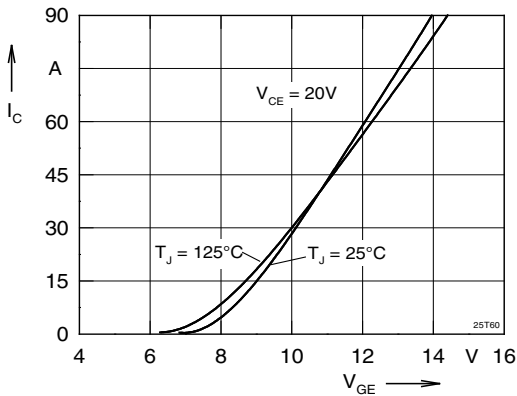
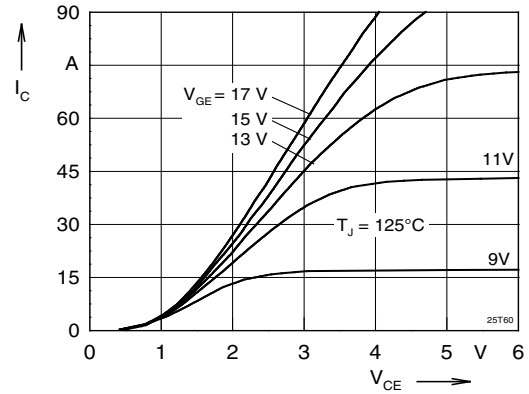
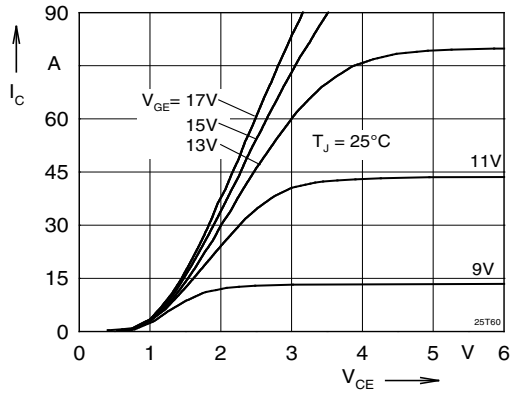
Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite  
The convex bow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side

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

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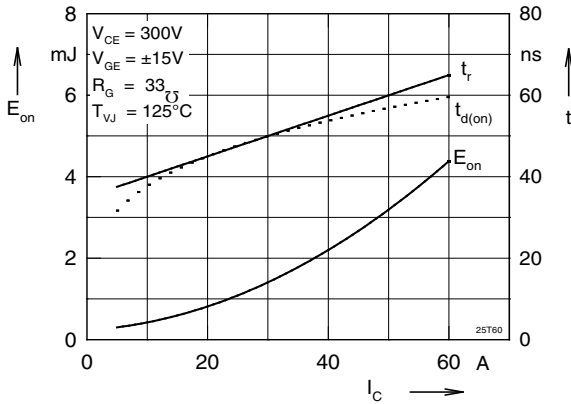


Fig. 7 Typ. turn on energy and switching

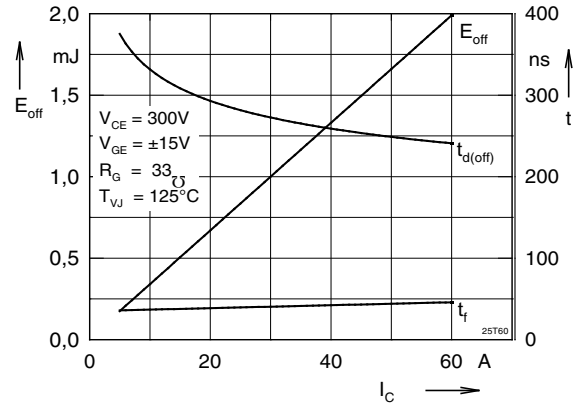


Fig. 8 Typ. turn off energy and switching times versus collector current times versus collector current

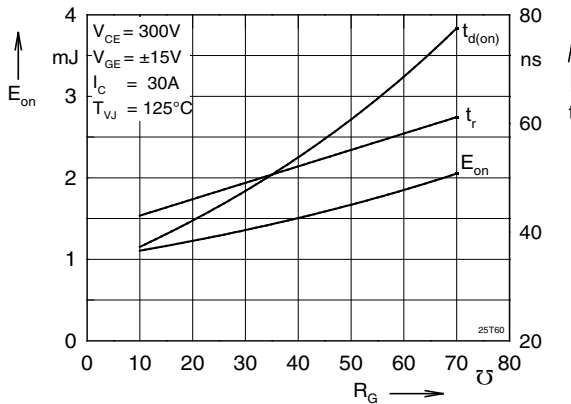


Fig. 9 Typ. turn on energy and switching

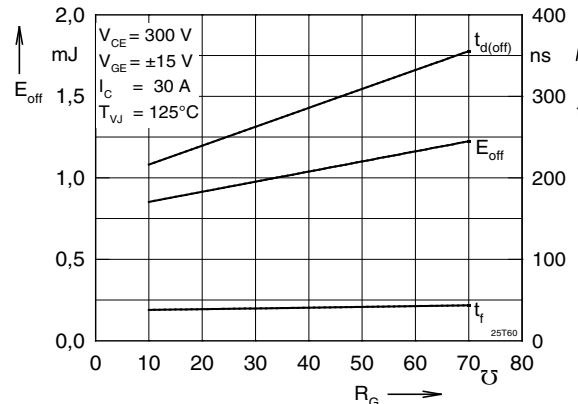


Fig. 10 Typ. turn off energy and switching times versus gate resistor times versus gate resistor

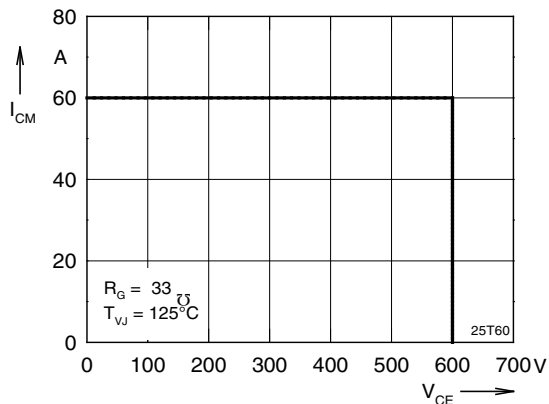


Fig. 11 Reverse biased safe operating area

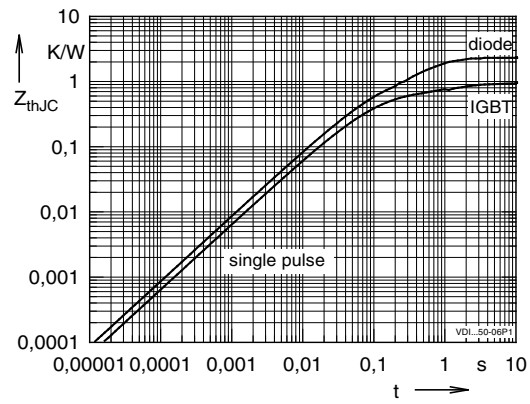


Fig. 12 Typ. transient thermal impedance RBSOA