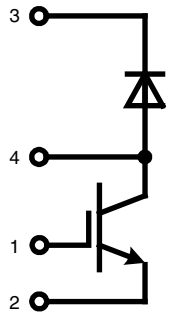
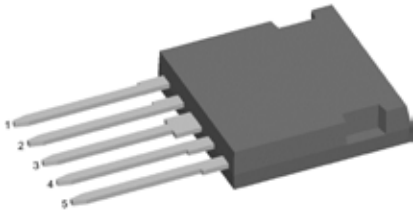
# IGBT Boost Chopper

in ISOPLUS i4-PAC™

$I_{C25}$ = 65 A
$V_{CES}$ = 600 V
$V_{CE(sat)\ typ.}$ = 1.6 V



E72873

| IGBT | | | |
|---|---|---|---|
| **Symbol** | **Conditions** | **Maximum Ratings** | |
| $V_{CES}$ | $T_{VJ}$ = 25°C to 150°C | 600 | V |
| $V_{GES}$ | | ± 20 | V |
| $I_{C25}$ | $T_C$ = 25°C | 65 | A |
| $I_{C90}$ | $T_C$ = 90°C | 40 | A |
| $I_{CM}$ | $V_{GE}$ = ±15 V; $R_G$ = 22 Ω; $T_{VJ}$ = 125°C | 100 | A |
| $V_{CEK}$ | **RBSOA** Clamped inductive load; L = 100 µH | $V_{CES}$ | |
| $t_{SC}$ (SCSOA) | $V_{CE}$ = $V_{CES}$; $V_{GE}$ = ±15 V; $R_G$ = 22 Ω; $T_{VJ}$ = 125°C; non-repetitive | 10 | µs |
| $P_{tot}$ | $T_C$ = 25°C | 200 | W |

| **Symbol** | **Conditions** | | **Characteristic Values** ($T_{VJ}$ = 25°C, unless otherwise specified) | | | |
|---|---|---|---|---|---|---|
| | | | **min.** | **typ.** | **max.** | |
| $V_{CE(sat)}$ | $I_C$ = 30 A; $V_{GE}$ = 15 V | $T_{VJ}$ = 25°C | | 1.6 | 2.0 | V |
| | | $T_{VJ}$ = 125°C | | 1.8 | | V |
| $V_{GE(th)}$ | $I_C$ = 1 mA; $V_{GE}$ = $V_{CE}$ | | 4.5 | | 6.5 | V |
| $I_{CES}$ | $V_{CE}$ = $V_{CES}$; $V_{GE}$ = 0 V | $T_{VJ}$ = 25°C | | | 0.1 | mA |
| | | $T_{VJ}$ = 125°C | | 0.1 | | mA |
| $I_{GES}$ | $V_{CE}$ = 0 V; $V_{GE}$ = ± 20 V | | | | 200 | nA |
| $t_{d(on)}$ | Inductive load | $T_{VJ}$ = 125°C | | 50 | | ns |
| $t_r$ | $V_{CE}$ = 300 V; $I_C$ = 30 A | | | 60 | | ns |
| $t_{d(off)}$ | $V_{GE}$ = ±15 V; $R_G$ = 22 Ω | | | 300 | | ns |
| $t_f$ | | | | 30 | | ns |
| $E_{on}$ | | | | 1.0 | | mJ |
| $E_{off}$ | | | | 1.4 | | mJ |
| $C_{ies}$ | $V_{CE}$ = 25 V; $V_{GE}$ = 0 V; f = 1 MHz | | | 2.8 | | nF |
| $Q_{Gon}$ | $V_{CE}$ = 300 V; $V_{GE}$ = 15 V; $I_C$ = 50 A | | | 120 | | nC |
| $R_{thJC}$ | | | | | 0.6 | K/W |
| $R_{thJH}$ | with heatsink compound | | | 1.2 | | K/W |

### Features

- NPT IGBT technology
  - low saturation voltage with positive temperature coefficient
  - fast switching
  - wide safe operating area
- HiPerFRED™ diode
  - fast 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

- medium frequency power supplies
  - boost chopper for power factor correction
  - transformer primary switch
- drives: supply of
  - switched reluctance machines
  - armature or excitation winding of DC machines
  - excitation winding of synchronous machines

## Diode

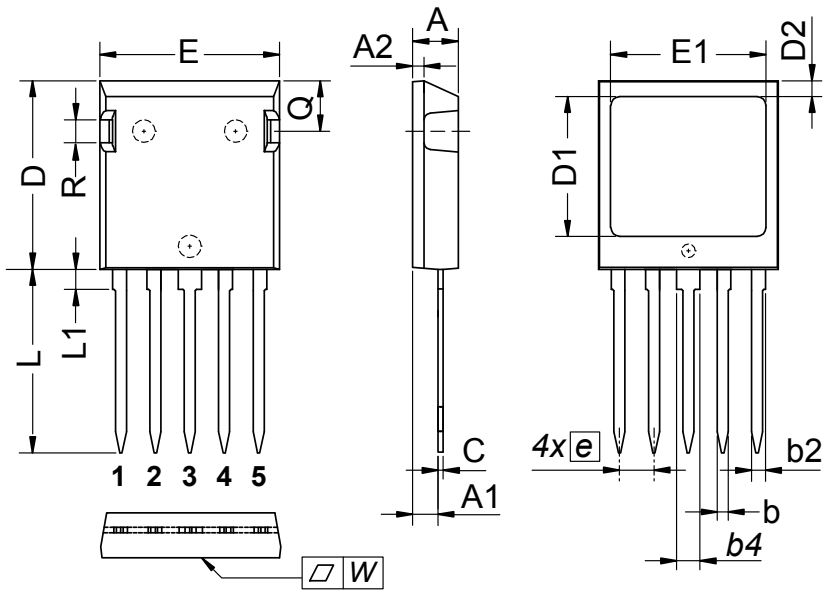
| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{RRM}$ | $T_{VJ}$ = 25°C to 150°C | 600 | V |
| $I_{F25}$ | $T_C$ = 25°C | 52 | A |
| $I_{F90}$ | $T_C$ = 90°C | 31 | A |

| Symbol | Conditions | | Characteristic Values min. | typ. | max. | |
|---|---|---|---|---|---|---|
| $V_F$ | $I_F$ = 30 A | $T_{VJ}$ = 25°C | | 2.2 | 2.6 | V |
| | | $T_{VJ}$ = 125°C | | 1.5 | | V |
| $I_R$ | $V_R = V_{RRM}$ | $T_{VJ}$ = 25°C | | | 0.3 | mA |
| | | $T_{VJ}$ = 125°C | | 0.3 | | mA |
| $I_{RM}$ | $I_F$ = 30 A; $di_F/dt$ = -500 A/µs; | | | 15 | | A |
| $t_{rr}$ | $V_R$ = 300 V; $V_{GE}$ = 0 V; | $T_{VJ}$ = 125°C | | 70 | | ns |
| $R_{thJC}$ | | | | | 1.3 | K/W |
| $R_{thJH}$ | with heatsink compound | | | 2.6 | | K/W |

## Component

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $T_{VJ}$ | operating | -55...+150 | °C |
| $T_{stg}$ | | -55...+125 | °C |
| $V_{ISOL}$ | $I_{ISOL} \leq$ 1 mA; 50/60 Hz; t = 1 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 MIN | MILLIMETER MAX | INCHES MIN | INCHES 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 ofdevice bottom side*

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

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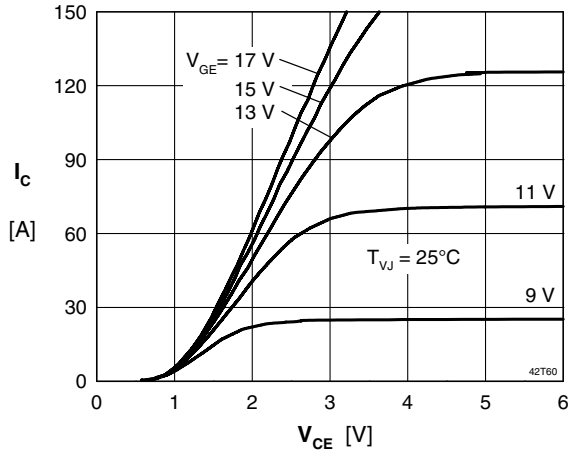


Fig. 1 Typ. output characteristics

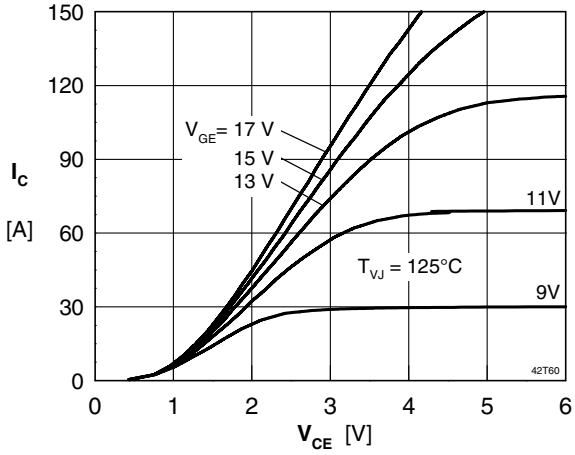


Fig. 2 Typ. output characteristics

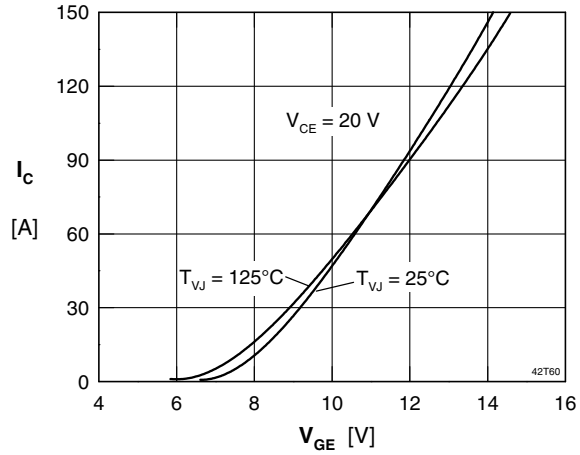


Fig. 3 Typ. transfer characteristics

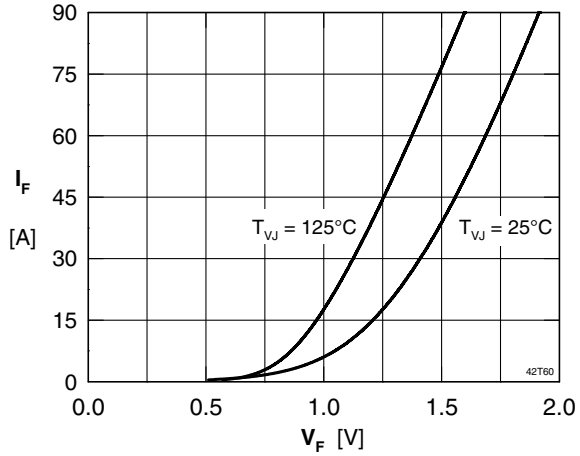


Fig. 4 Typ. forward characteristics of free wheeling diode

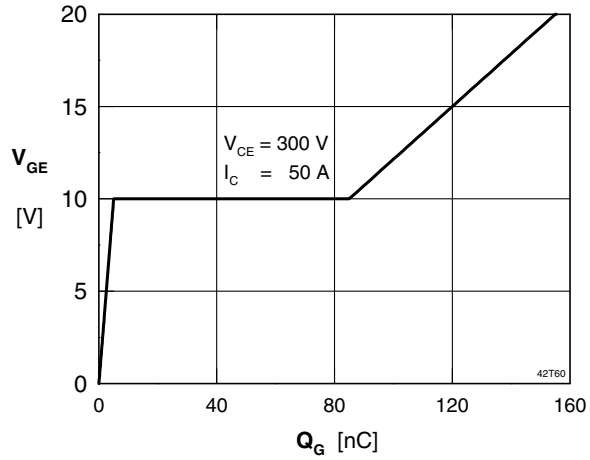


Fig. 5 Typ. turn on gate charge

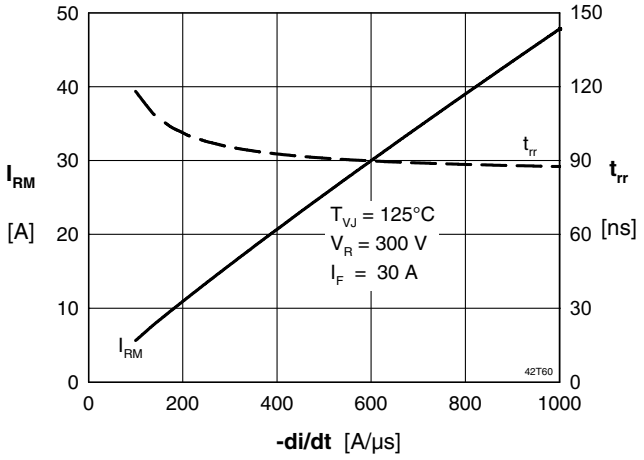


Fig. 6 Typ. turn off characteristics of free wheeling diode

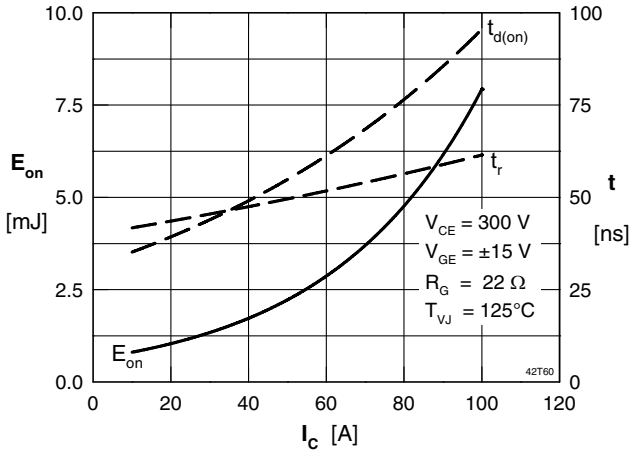


Fig. 7 Typ. turn on energy and switching

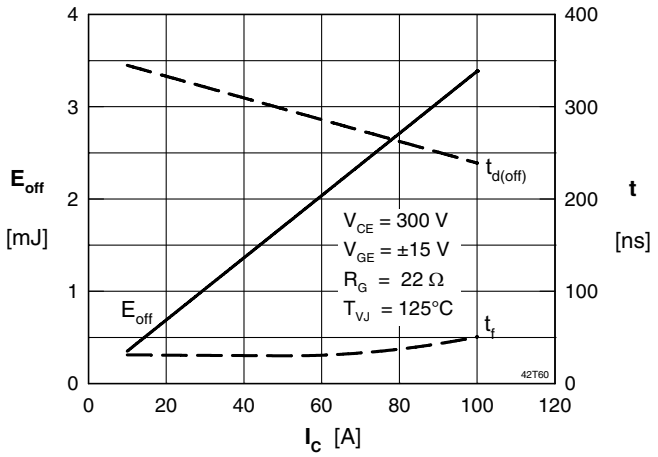


Fig. 8 Typ. turn off energy and switching times versus collector current times versus collector current

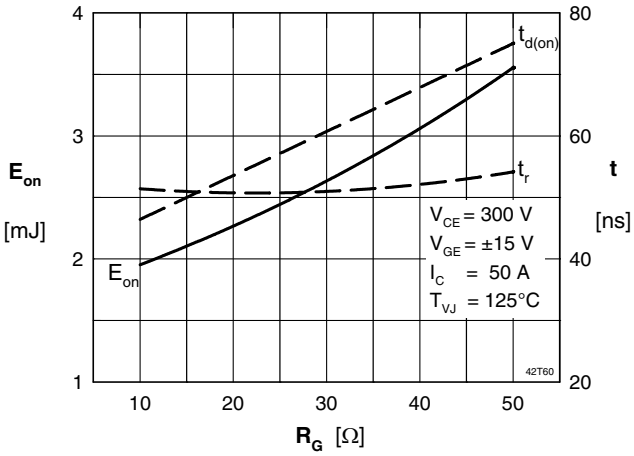


Fig. 9 Typ. turn on energy and switching

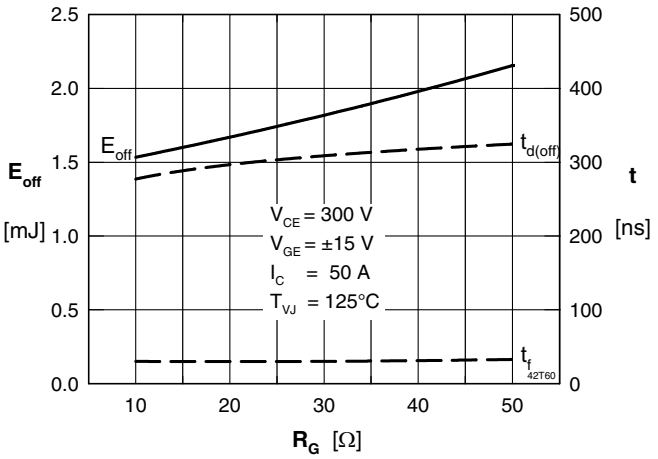


Fig. 10 Typ. turn off energy and switching times versus gate resistor times versus gate resistor

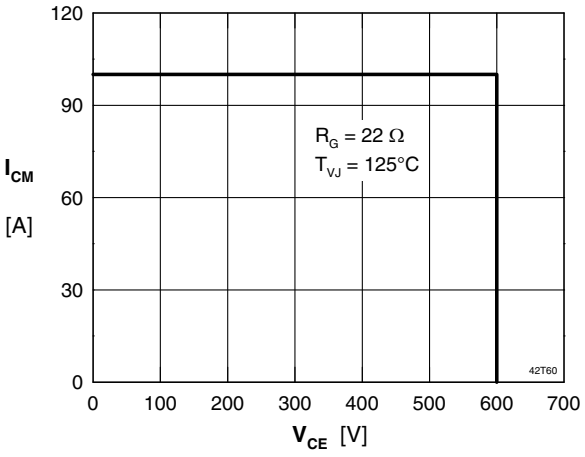


Fig. 11 Reverse biased safe operating area

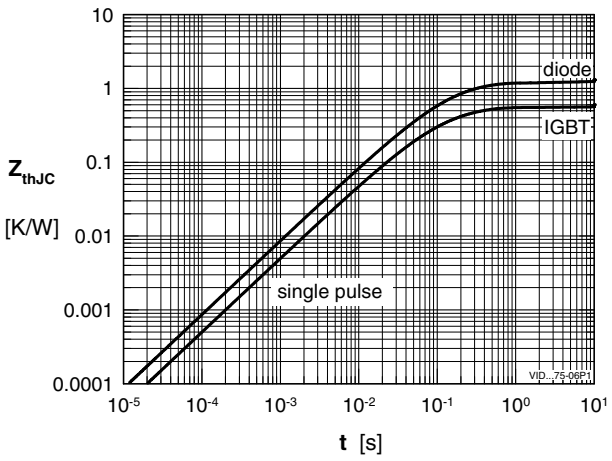


Fig. 12 Typ. transient thermal impedance RBSOA

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