

IGBT with optional Diode

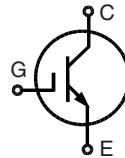
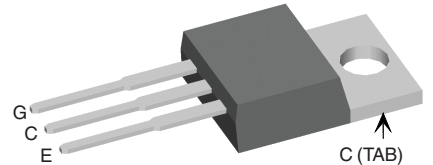
Replacement Type
IXYP30N65C3

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

$$I_{C25} = 60 \text{ A}$$

$$V_{CE(sat) \text{ typ}} = 2.1 \text{ V}$$

High Speed,
Low Saturation Voltage


TO-220 AB


Gate, Emitter, Collector, TAB = Collector

| Symbol | Conditions | Maximum Ratings | |
|----------------------------|---|---------------------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 600 | V |
| V_{CGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 20 \text{ k}\Omega$ | 600 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 60 | A |
| I_{C90} | $T_C = 90^\circ\text{C}$ | 35 | A |
| I_{CM} | $T_C = 90^\circ\text{C}, t_p = 1 \text{ ms}$ | 70 | A |
| RBSOA | $V_{GE} = \pm 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 10 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$ | $I_{CM} = 110$ $V_{CEK} < V_{CES}$ | A |
| t_{SC} (SCSOA) | $V_{GE} = \pm 15 \text{ V}, V_{CE} = 600 \text{ V}, T_J = 125^\circ\text{C}$ $R_G = 10 \Omega$, non repetitive | 10 | μs |
| P_c | $T_C = 25^\circ\text{C}$ | IGBT | 250 W |
| | | Diode | 80 W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{stg} | | -40 ... +150 | $^\circ\text{C}$ |
| | Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |
| M_d | Mounting torque | TO-220 | 0.4 - 0.6 Nm |
| | | TO-247 | 0.8 - 1.2 Nm |
| Weight | | 6 | g |

Features

- NPT IGBT technology
- low switching losses
- low tail current
- no latch up
- short circuit capability
- positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- optional ultra fast diode
- International standard package

Advantages

- Space savings
- High power density

Typical Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

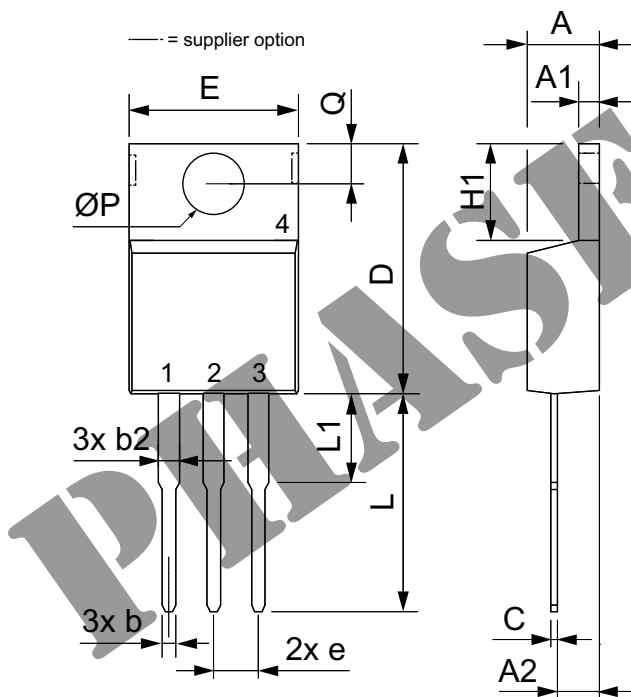
| Symbol | Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------|---|---|---|----------------------|
| | | min. | typ. | max. |
| $V_{(BR)CES}$ | $V_{GE} = 0 \text{ V}$ | 600 | | V |
| $V_{GE(th)}$ | $I_C = 0.7 \text{ mA}, V_{CE} = V_{GE}$ | 3 | | 5 V |
| I_{CES} | $V_{CE} = V_{CES}$ | | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | 0.1 mA mA |
| I_{GES} | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$ | | | $\pm 500 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = 35 \text{ A}, V_{GE} = 15 \text{ V}$ | 2.2 | 2.7 | V |

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

20190131a

| Symbol | Conditions | Characteristic Values | | |
|---------------------|---|---|------|---------|
| | | (T _J = 25°C, unless otherwise specified) | | |
| | | min. | typ. | max. |
| C _{ies} | V _{CE} = 25 V, V _{GE} = 0 V, f = 1 MHz | | 1600 | pF |
| C _{oes} | | | 150 | pF |
| C _{res} | | | 90 | pF |
| Q _g | I _C = 35 A, V _{GE} = 15 V, V _{CE} = 480 V | | 120 | nC |
| t _{d(on)} | Inductive load, T _J = 125°C I _C = 35 A, V _{GE} = ±15 V, V _{CE} = 300 V, R _G = 10 Ω | | 30 | ns |
| t _r | | | 45 | ns |
| t _{d(off)} | | | 320 | ns |
| t _f | | | 70 | ns |
| E _{on} | | | 1.6 | mJ |
| E _{off} | | | 0.8 | mJ |
| R _{thJC} | | | | 0.5 K/W |
| R _{thCH} | TO 247 Package with heatsink compound | 0.25 | | K/W |
| R _{thCH} | TO 220 Package with heatsink compound | 0.5 | | K/W |

| Symbol | Conditions | Characteristic Values | | |
|-------------------|---|---|------|---------|
| | | (T _J = 25°C, unless otherwise specified) | | |
| | | min. | typ. | max. |
| V _F | I _F = 35 A, V _{GE} = 0 V | 2.1 | 2.4 | V |
| | I _F = 35 A, V _{GE} = 0 V, T _J = 125°C | 1.6 | | V |
| I _F | T _C = 25°C | | 45 | A |
| | T _C = 90°C | | 25 | A |
| I _{RM} | I _F = 15 A, -di _F /dt = 400 A/μs, V _R = 300 V | 13 | | A |
| t _{rr} | V _{GE} = 0 V, T _J = 125°C | 90 | | ns |
| t _{rr} | I _F = 1 A, -di _F /dt = 100 A/μs, V _R = 30 V, V _{GE} = 0 V | 40 | | ns |
| R _{thJC} | | | | 1.6 K/W |


TO-220 AB Outline

| Dim. | Millimeter | | Inches | |
|------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.32 | 4.82 | 0.170 | 0.190 |
| A1 | 1.14 | 1.39 | 0.045 | 0.055 |
| A2 | 2.29 | 2.79 | 0.090 | 0.110 |
| b | 0.64 | 1.01 | 0.025 | 0.040 |
| b2 | 1.15 | 1.65 | 0.045 | 0.065 |
| C | 0.35 | 0.56 | 0.014 | 0.022 |
| D | 14.73 | 16.00 | 0.580 | 0.630 |
| E | 9.91 | 10.66 | 0.390 | 0.420 |
| e | 2.54 | BSC | 0.100 | BSC |
| H1 | 5.85 | 6.85 | 0.230 | 0.270 |
| L | 12.70 | 13.97 | 0.500 | 0.550 |
| L1 | 2.79 | 5.84 | 0.110 | 0.230 |
| ØP | 3.54 | 4.08 | 0.139 | 0.161 |
| Q | 2.54 | 3.18 | 0.100 | 0.125 |

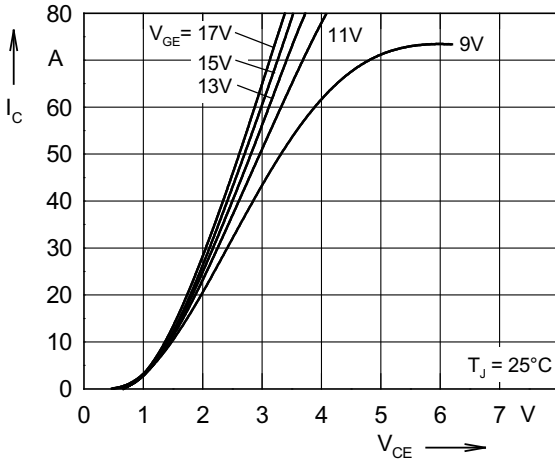


Fig. 1 Typ. output characteristics

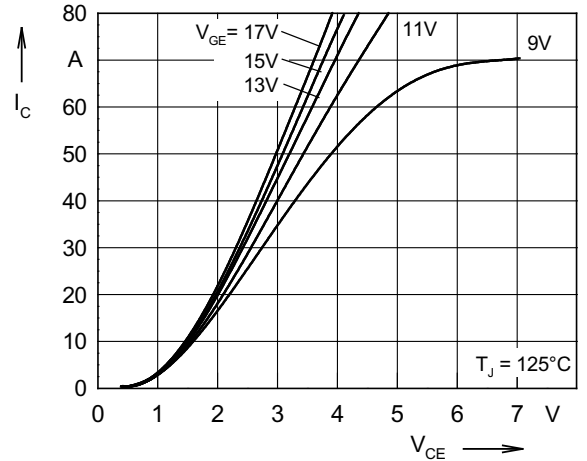


Fig. 2 Typ. output characteristics

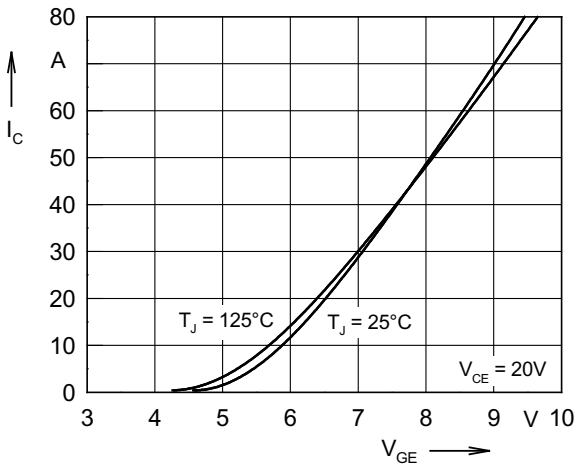


Fig. 3 Typ. transfer characteristics

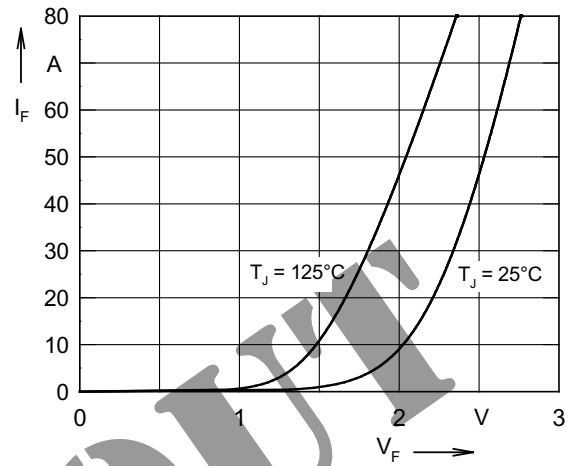


Fig. 4 Typ. forward characteristics of free wheeling diode

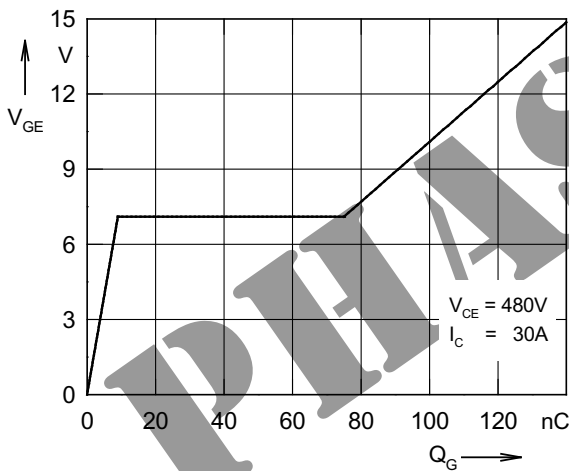


Fig. 5 Typ. turn on gate charge

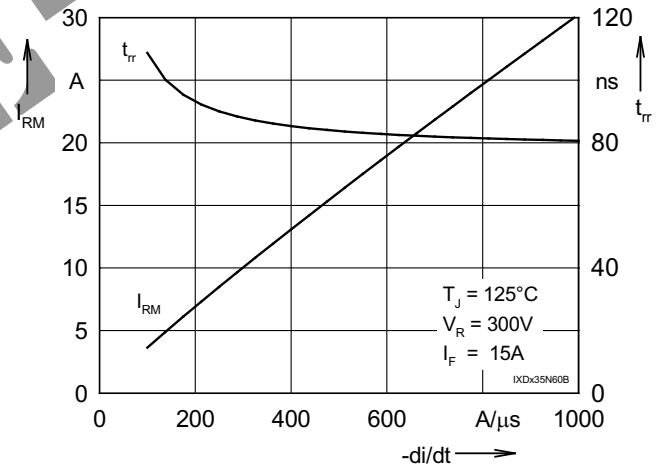


Fig. 6 Typ. turn off characteristics of free wheeling diode

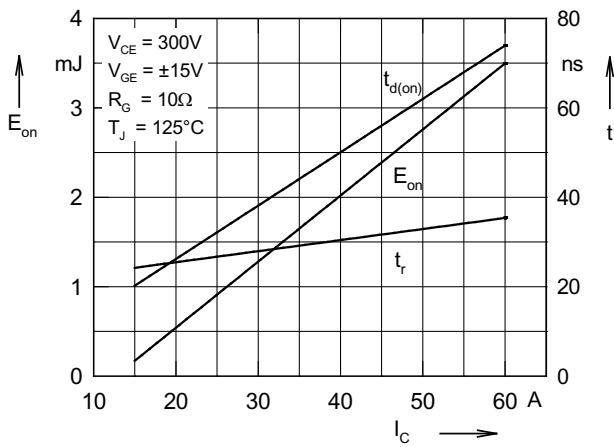


Fig. 7 Typ. turn on energy and switching times versus collector current

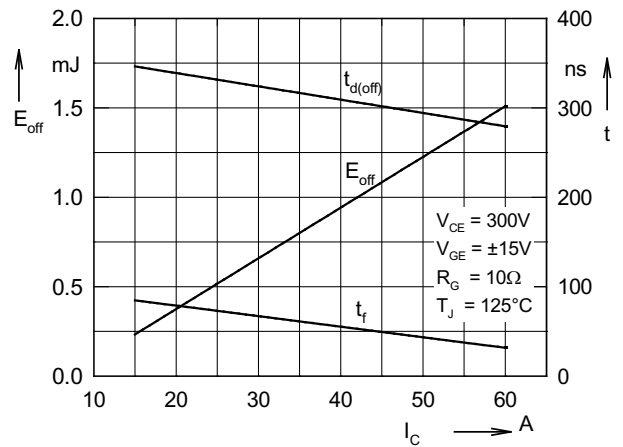


Fig. 8 Typ. turn off energy and switching times versus collector current

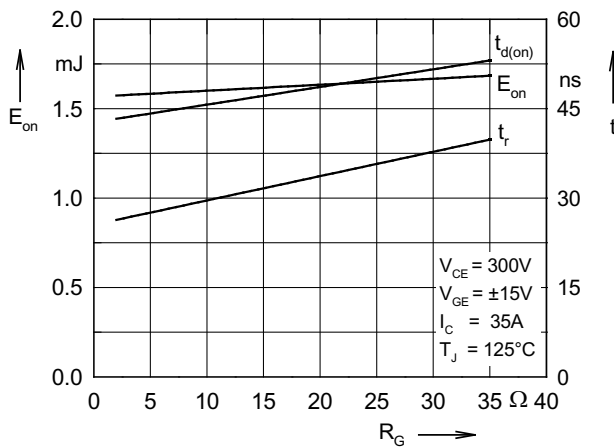


Fig. 9 Typ. turn on energy and switching times versus gate resistor

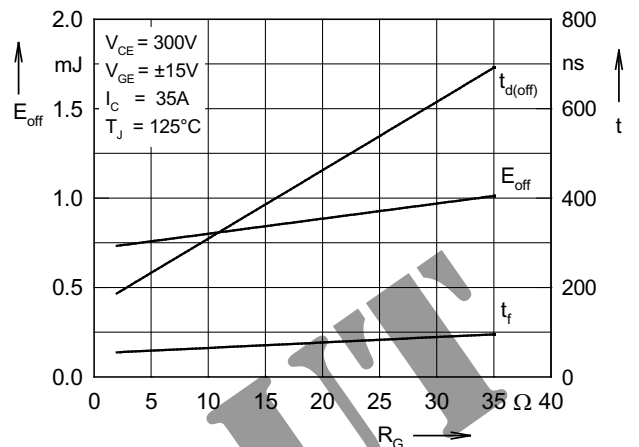


Fig.10 Typ. turn off energy and switching times versus gate resistor

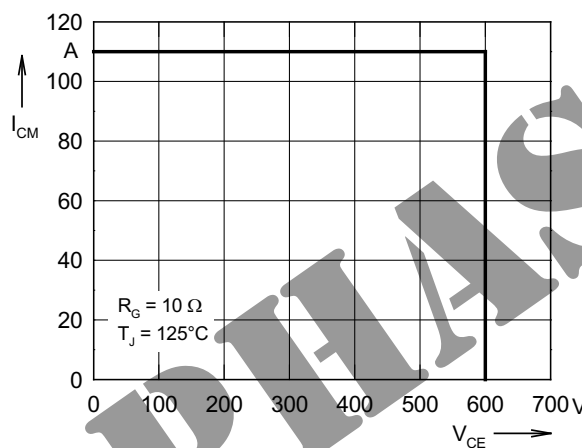


Fig. 11 Reverse biased safe operating area RBSOA

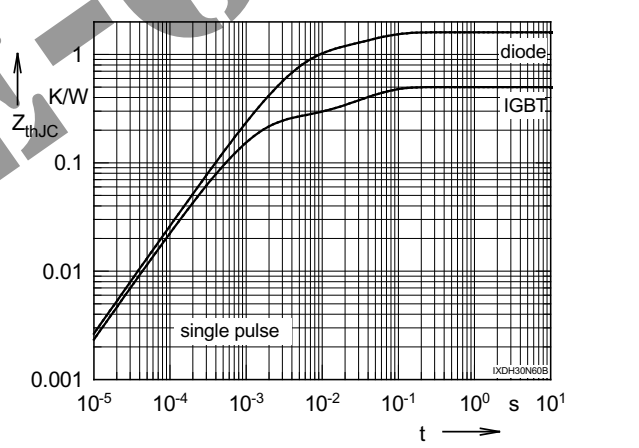


Fig. 12 Typ. transient thermal impedance