



PARA LIGHT ELECTRONICS CO., LTD.
11F., No. 8, Jiankang Rd., Zhonghe Dist., New Taipei City 235, Taiwan,
Tel: 886-2-2225-3733 Fax: 886-2-2225-4800
E-mail: para@para.com.tw <http://www.para.com.tw>

DATA SHEET

PART NO. : PC30H060AA

REV : A / 0

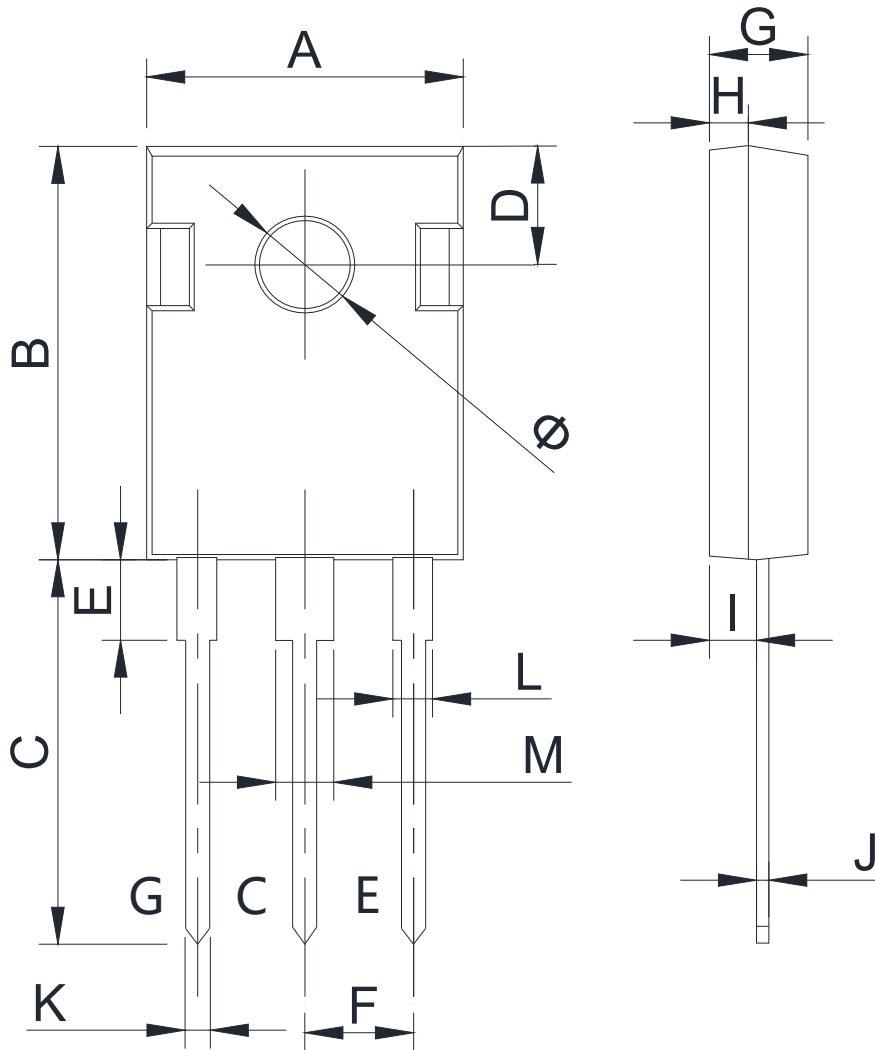
CUSTOMER'S APPROVAL : _____ DCC : _____

DRAWING NO. : DS-91P-23-0002

DATE : 2023-06-07

Page : 1

Package Dimensions



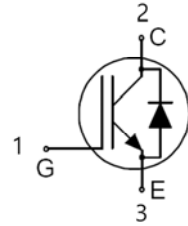
| DIM | MILLIMETERS | |
|--------|-------------|-------|
| | MIN | MAX |
| A | 15.75 | 15.85 |
| B | 20.9 | 21.05 |
| C | 19.85 | 20.05 |
| D | 5.75 | 5.85 |
| E | 4.15 | 4.25 |
| F | 5.44BSC. | |
| G | 4.95 | 5.05 |
| H | 1.97 | 2.03 |
| I | 2.35 | 2.45 |
| J | 0.6 | 0.65 |
| K | 1.17 | 1.25 |
| L | 1.95 | 2.05 |
| M | 2.85 | 3.11 |
| ϕ | 3.5 | 3.7 |

Features

600V, 30A

$V_{CE(sat)(typ.)} = 1.70V, I_C = 30A$

Maximum Junction Temperature 175°C

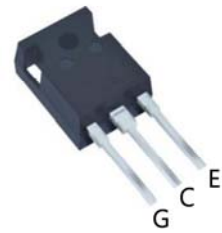


Applications

Motor control

Key Performance and Package Parameters

| V_{CE} | I_C | $V_{CEsat}, T_{vj}=25^\circ C$ | T_{vjmax} |
|----------|-------|--------------------------------|-------------|
| 600V | 30A | 1.7V | 175°C |



Absolute Maximum Ratings

| Symbol | Parameter | Value | Unit |
|-----------|---|------------|------|
| V_{CES} | Collector-Emitter Voltage ($T_{vj}=25^\circ C$) | 600 | V |
| V_{GES} | Gate-Emitter Voltage ($T_{vj}=25^\circ C$) | ± 30 | V |
| I_C | Continuous Collector Current ($T_C = 25^\circ C$) | 60 | A |
| | Continuous Collector Current ($T_C = 100^\circ C$) | 30 | A |
| I_{CM} | Pulsed Collector Current (Note 1) ($T_{vj} \leq 175^\circ C$) | 90 | A |
| I_F | Diode Forward Current ($T_C = 25^\circ C$) | 60 | A |
| | Diode Forward Current ($T_C = 100^\circ C$) | 30 | A |
| I_{FRM} | Diode pulsed current ($T_{vj} \leq 175^\circ C$) | 90 | A |
| P_D | Maximum Power Dissipation ($T_C = 25^\circ C$) | 200 | W |
| T_J | Operating Junction Temperature Range | -40 to 175 | °C |
| T_{STG} | Storage Temperature Range | -50 to 150 | °C |

Thermal Data

| Symbol | Parameter | Max. | Unit |
|---------------|--|------|------|
| $R_{th(J-C)}$ | Thermal Resistance, Junction to Case for IGBT | 0.75 | K/W |
| $R_{th(J-C)}$ | Thermal Resistance, Junction to Case for Diode | 1.15 | K/W |
| $R_{th(J-C)}$ | Thermal Resistance, Junction to Ambient | 40 | K/W |

Electrical Characteristics (Tc=25°C unless otherwise noted.)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------------------|--|--|------|------|------|------|
| V(BR)CES | Collector-Emitter Breakdown Voltage | V _{GE} = 0V, I _c = 0.5mA, T _{vj} = 25°C | 600 | --- | --- | V |
| I _{CES} | Collector-Emitter Leakage Current | V _{CE} = 600V, V _{GE} = 0V, T _{vj} = 175°C | --- | --- | 500 | μA |
| I _{GES} | Gate Leakage Current, Forward | V _{GE} = 30V, V _{CE} = 0V, T _{vj} = 125°C | --- | --- | ±200 | nA |
| V _{GE(th)} | Gate Threshold Voltage | V _{GE} = V _{CE} , I _c = 3mA, T _{vj} = 25°C | 4.5 | 5.0 | 6.0 | V |
| V _{CE(sat)} | Collector-Emitter Saturation Voltage | V _{GE} = 15V, I _c = 30A, T _{vj} = 25°C | --- | 1.7 | 2.1 | V |
| | | V _{GE} = 15V, I _c = 30A, T _{vj} = 175°C | --- | 2.2 | --- | V |
| Q _G | Total Gate Charge | I _c = 30A, V _{CE} = 480V, V _{GE} = 15V, T _{vj} = 25°C | --- | 45 | --- | nC |
| Q _{GE} | Gate-Emitter Charge | | --- | 7 | --- | nC |
| Q _{GC} | Gate-Collector Charge | | --- | 22 | --- | nC |
| I _{SC} | Short circuit collector current | T _{vj} = 25°C, V _{CE} = 400V, V _{GE} = 15V | --- | 150 | --- | A |
| t _{d(on)} | Turn-on Delay Time(T _{vj} = 25°C) | V _{CC} = 600V I _C = 30A R _{G(on)} = 20Ω R _{G(off)} = 20Ω C = 0nF V _{GE} = 15V L _{load} = 150μH | --- | 29 | --- | ns |
| | Turn-on Delay Time(T _{vj} = 175°C) | | --- | 30 | --- | ns |
| t _r | Turn-on Rise Time(T _{vj} = 25°C) | | --- | 49 | --- | ns |
| | Turn-on Rise Time(T _{vj} = 175°C) | | --- | 53 | --- | ns |
| t _{d(off)} | Turn-off Delay Time(T _{vj} = 25°C) | | --- | 131 | --- | ns |
| | Turn-off Delay Time(T _{vj} = 175°C) | | --- | 152 | --- | ns |
| t _f | Turn-off Fall Time(T _{vj} = 25°C) | | --- | 84 | --- | ns |
| | Turn-off Fall Time(T _{vj} = 175°C) | | --- | 144 | --- | ns |
| E _{on} | Turn-on Switching Loss(T _{vj} = 25°C) | | --- | 796 | --- | μJ |
| | Turn-on Switching Loss(T _{vj} = 175°C) | | --- | 1432 | --- | μJ |
| E _{off} | Turn-off Switching Loss(T _{vj} = 25°C) | | --- | 875 | --- | μJ |
| | Turn-off Switching Loss(T _{vj} = 175°C) | | --- | 1248 | --- | μJ |

Electrical Characteristics (Tc=25°C unless otherwise noted.)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------|------------------------------|--|------|------|------|------|
| C _{ies} | Input Capacitance | V _{GE} = 0V, V _{CE} = 25V, f = 1MHz, T _{vj} = 25°C | --- | 929 | --- | pF |
| C _{oes} | Output Capacitance | | --- | 69 | --- | pF |
| C _{res} | Reverse Transfer Capacitance | | --- | 36 | --- | pF |
| R _g | Internal gate resistor | | --- | 0 | --- | Ω |

Diode Characteristics (TC=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit | |
|----------------------|-------------------------------------|---|------------------------|------|------|------|------|
| V _F | Diode Forward Voltage | V _{GE} =0V, I _F =30A, T _{vj} =25°C | --- | 1.6 | 2.0 | V | |
| | | V _{GE} =0V, I _F 30A, T _{vj} =175°C | --- | 1.4 | --- | V | |
| t _{rr} | Diode Reverse Recovery Time | I _F = 30A, V _R =600V, di _F /dt=900A/μs | T _{vj} =25°C | --- | 95 | --- | ns |
| | Diode Reverse Recovery Time | | T _{vj} =175°C | --- | 234 | --- | ns |
| Q _{rr} | Diode Reverse Recovery Charge | | T _{vj} =25°C | | 0.53 | | μC |
| | | | T _{vj} =175°C | | 1.9 | | |
| I _{rr} | Diode peak Reverse Recovery Current | | T _{vj} =25°C | --- | 12 | --- | A |
| | Diode peak Reverse Recovery Current | | T _{vj} =175°C | --- | 20 | --- | A |
| di _{rr} /dt | Peak rate of irr | | T _{vj} =25°C | --- | 222 | --- | A/μs |
| | Peak rate of irr | | T _{vj} =175°C | --- | 198 | --- | A/μs |
| E _{rec} | Reverse recovery energy | | T _{vj} =25°C | --- | 112 | --- | μJ |
| | Reverse recovery energy | | T _{vj} =175°C | --- | 420 | --- | μJ |

Note1: Repetitive rating, pulse width limited by maximum junction temperature

Typical Characteristics

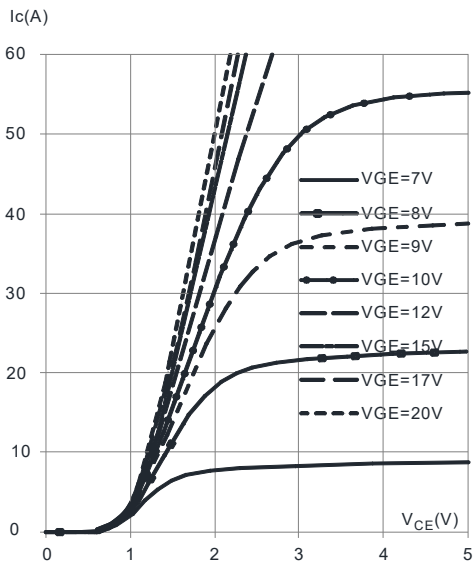


Fig. 1 Typical Output Characteristic ($T_c = 25^\circ\text{C}$)

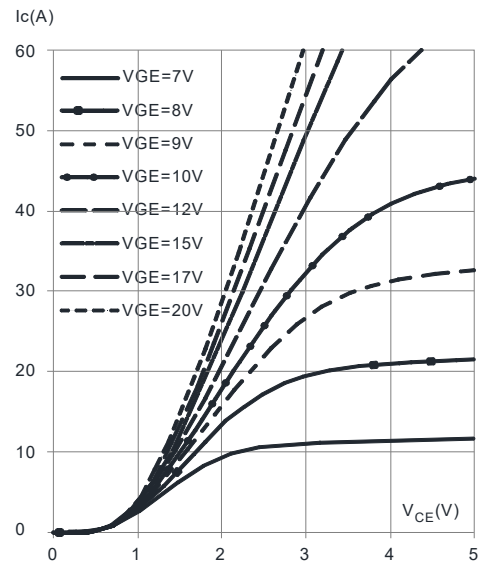


Fig. 2 Typical Output Characteristic ($T_c = 175^\circ\text{C}$)

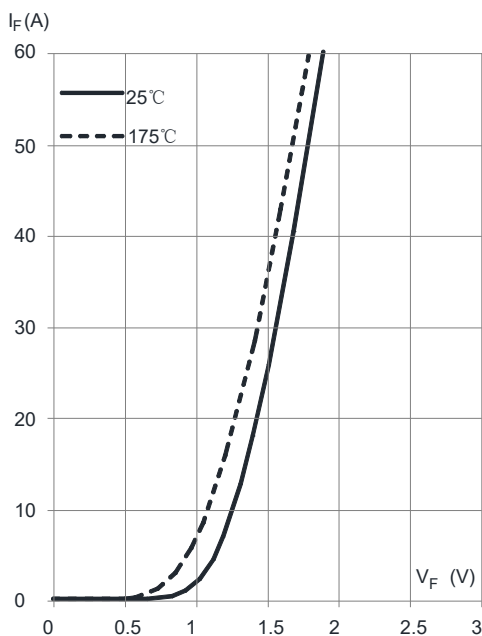


Fig. 3 Typical I_F as a function of V_F

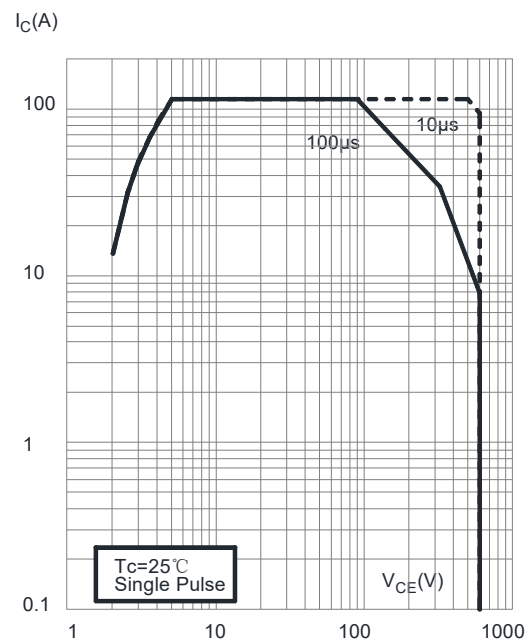


Fig. 4 Forward bias safe operating area

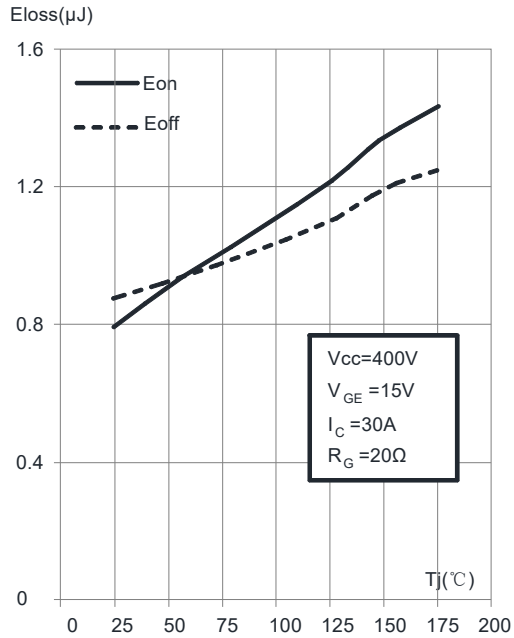


Fig. 5 Typical switching losses as T_j

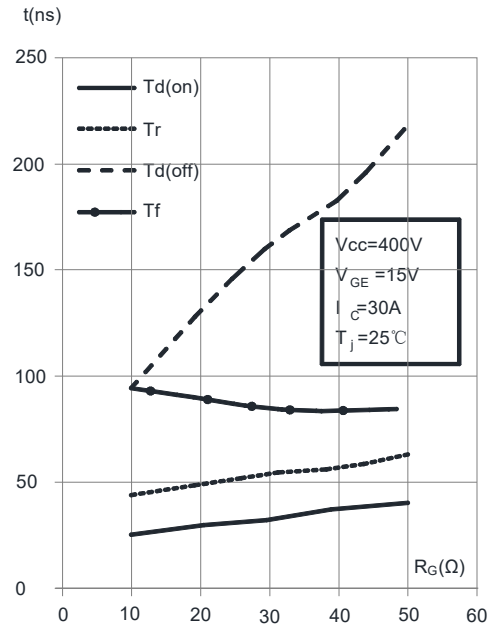


Fig. 6 Switching times as R_G

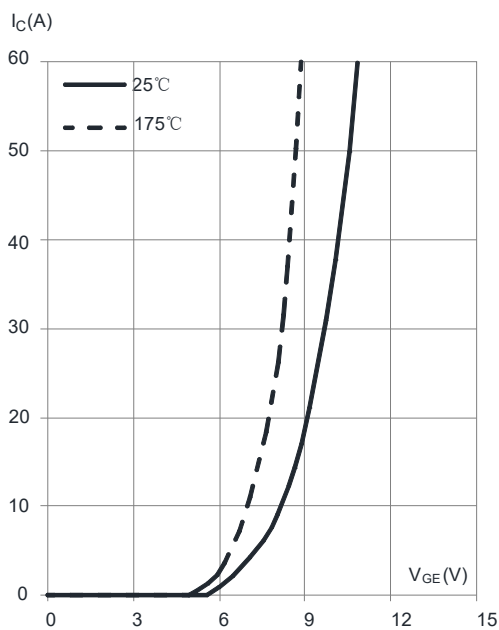


Fig. 7 Typical transfer characteristic

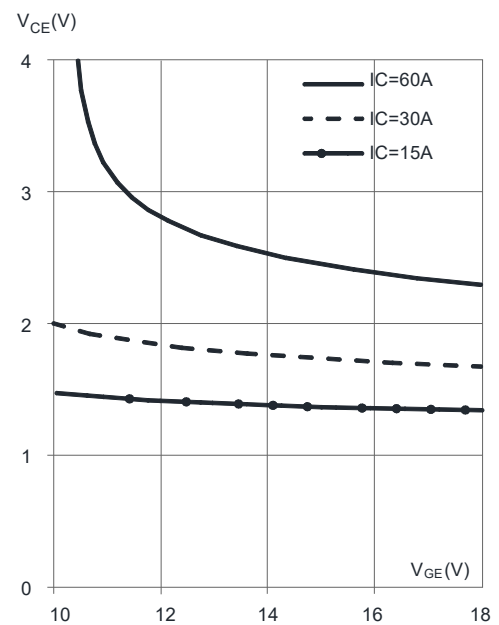


Fig. 8 Typical V_{CE} as a function of V_{GE}

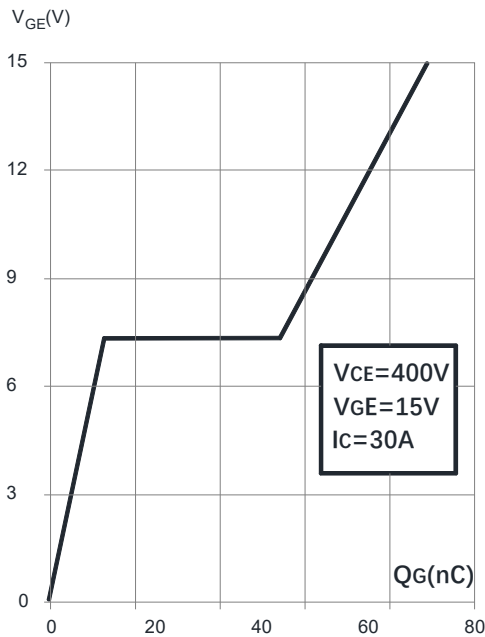


Fig. 9 Typical gate charge

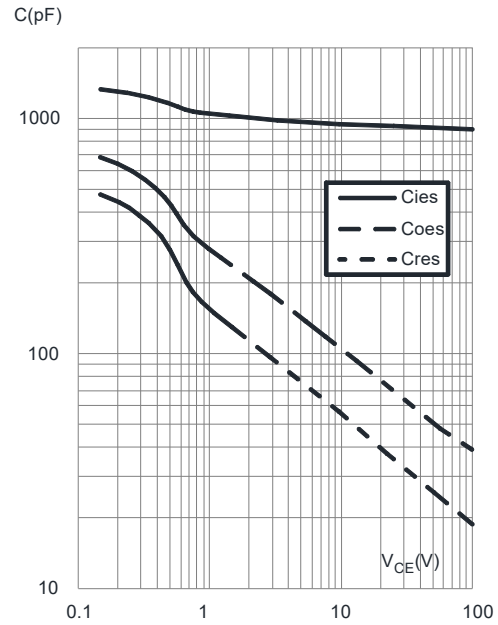


Fig. 10 Capacitance as a function of Vce

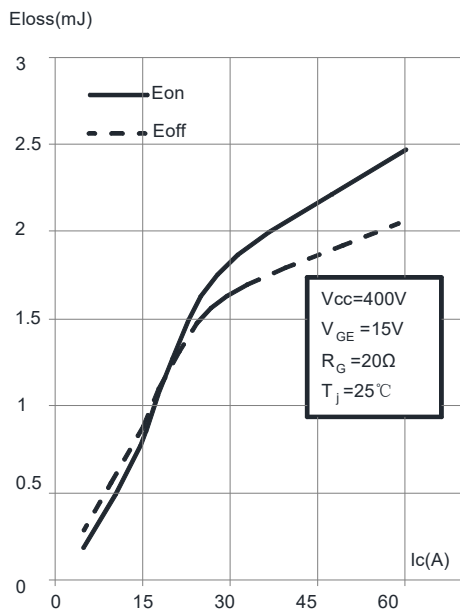


Fig. 11 Typical switching losses as I_C

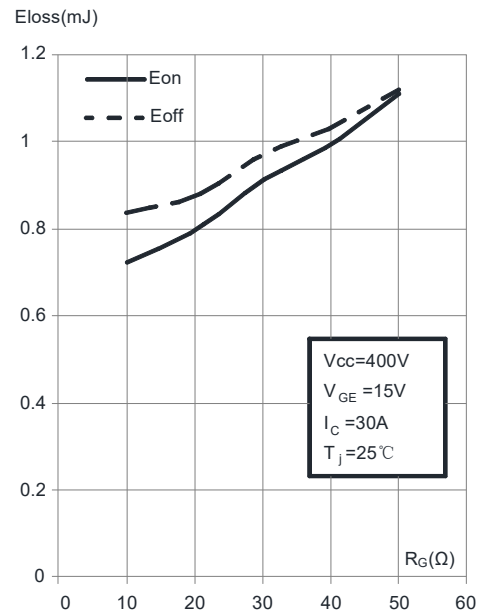


Fig. 12 Typical switching losses as R_G



Trench Field-Stop Technology IGBT

PC30H060AA

REV:A / 0

● PART NO. SYSTEM :

P C 15 H 120 A C

