

FGPF120N30

300V, 120A PDP IGBT

Features

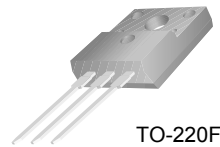
- High Current Capability
- Low saturation voltage : $V_{CE(sat)} = 1.1\text{ V @ } I_C = 25\text{A}$
- High input impedance
- Fast switching

General Description

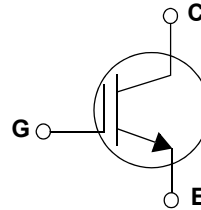
Employing Unified IGBT Technology, Fairchild's PWD series of IGBTs provides low conduction and switching loss. The PWD series offers the optimum solution for PDP applications where low conduction loss is essential.

Application

PDP SYSTEM



TO-220F
1.Gate 2.Collector 3.Emitter



Absolute Maximum Ratings

| Symbol | Description | FGPF120N30 | Units |
|-------------------|---|-------------|------------------|
| V_{CES} | Collector-Emitter Voltage | 300 | V |
| V_{GES} | Gate-Emitter Voltage | ± 20 | V |
| I_C | Collector Current @ $T_C = 25^\circ\text{C}$ | 120 | A |
| $I_{C_pulse(1)}$ | Pulse Collector Current @ $T_C = 25^\circ\text{C}$ | 180 * | A |
| P_D | Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$ | 60 | W |
| | Maximum Power Dissipation @ $T_C = 100^\circ\text{C}$ | 24 | W |
| T_J | Operating Junction Temperature | -55 to +150 | $^\circ\text{C}$ |
| T_{stg} | Storage Temperature Range | -55 to +150 | $^\circ\text{C}$ |
| T_L | Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds | 300 | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Units |
|------------------------------|---|------|------|--------------------|
| $R_{\theta JC}(\text{IGBT})$ | Thermal Resistance, Junction-to-Case | -- | 2.1 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | -- | 62.5 | $^\circ\text{C/W}$ |

Notes

(1) Repetitive test , pulse width=100usec , Duty=0.5

* I_{C_pulse} limited by max T_J

Package Marking and Ordering Information

| Device Marking | Device | Package | Packaging Type | Qty per Tube | Max Qty per Box |
|----------------|--------------|---------|----------------|--------------|-----------------|
| FGPF120N30 | FGPF120N30TU | TO-220F | Rail / Tube | 50ea | - |

Electrical Characteristics T_C = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|--------|-----------|-----------------|------|------|------|-------|
|--------|-----------|-----------------|------|------|------|-------|

Off Characteristics

| | | | | | | |
|-------------------------------------|--|---|-----|-----|-------|------|
| BV _{CES} | Collector-Emitter Breakdown Voltage | V _{GE} = 0V, I _C = 250uA | 300 | -- | -- | V |
| ΔBV _{CES} /ΔT _J | Temperature Coefficient of Breakdown Voltage | V _{GE} = 0V, I _C = 250uA | -- | 0.6 | -- | V/°C |
| I _{CES} | Collector Cut-Off Current | V _{CE} = V _{CES} , V _{GE} = 0V | -- | -- | 100 | uA |
| I _{GES} | G-E Leakage Current | V _{GE} = V _{GES} , V _{CE} = 0V | -- | -- | ± 250 | nA |

On Characteristics

| | | | | | | |
|----------------------|---|--|-----|-----|-----|---|
| V _{GE(th)} | G-E Threshold Voltage | I _C = 250uA, V _{CE} = V _{GE} | 2.5 | 4.0 | 5.0 | V |
| V _{CE(sat)} | Collector to Emitter Saturation Voltage | I _C = 25A, V _{GE} = 15V | -- | 1.1 | 1.4 | V |
| | | I _C = 120A, V _{GE} = 15V T _C = 25°C | -- | 1.9 | -- | V |
| | | I _C = 120A, V _{GE} = 15V T _C = 125°C | -- | 2.1 | -- | V |

Dynamic Characteristics

| | | | | | | |
|------------------|------------------------------|--|----|------|----|----|
| C _{ies} | Input Capacitance | V _{CE} = 30V, V _{GE} = 0V, f = 1MHz | -- | 2190 | -- | pF |
| C _{oes} | Output Capacitance | | -- | 310 | -- | pF |
| C _{res} | Reverse Transfer Capacitance | | -- | 98 | -- | pF |

Switching Characteristics

| | | | | | | |
|---------------------|-----------------------|--|----|-----|-----|----|
| t _{d(on)} | Turn-On Delay Time | V _{CC} = 200 V, I _C = 25A, R _G = 8.7Ω, V _{GE} = 15V, Resistive Load, T _C = 25°C | -- | 35 | -- | ns |
| t _r | Rise Time | | -- | 140 | -- | ns |
| t _{d(off)} | Turn-Off Delay Time | | -- | 120 | -- | ns |
| t _f | Fall Time | | -- | 140 | 350 | ns |
| t _{d(on)} | Turn-On Delay Time | V _{CC} = 200 V, I _C = 25 A, R _G = 8.7Ω, V _{GE} = 15V, Resistive Load, T _C = 125°C | -- | 35 | -- | ns |
| t _r | Rise Time | | -- | 140 | -- | ns |
| t _{d(off)} | Turn-Off Delay Time | | -- | 130 | -- | ns |
| t _f | Fall Time | | -- | 280 | -- | ns |
| Q _g | Total Gate Charge | V _{CE} = 200 V, I _C = 25A, V _{GE} = 15V | -- | 112 | 168 | nC |
| Q _{ge} | Gate-Emitter Charge | | -- | 14 | 21 | nC |
| Q _{gc} | Gate-Collector Charge | | -- | 50 | 75 | nC |

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

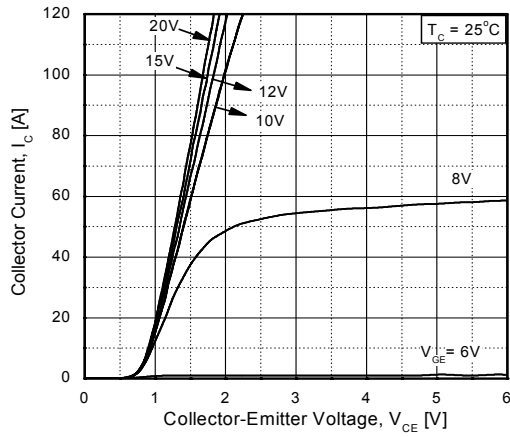


Figure 2. Typical Output Characteristics

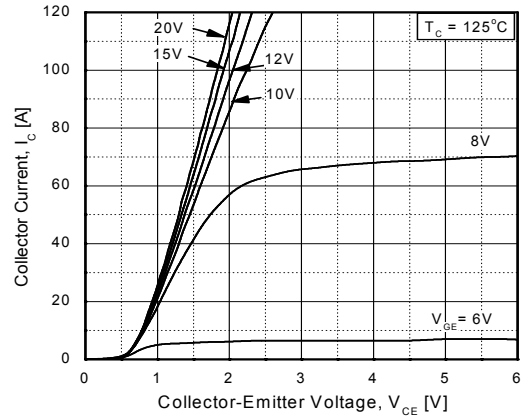


Figure 3 Typical Saturation Voltage Characteristics

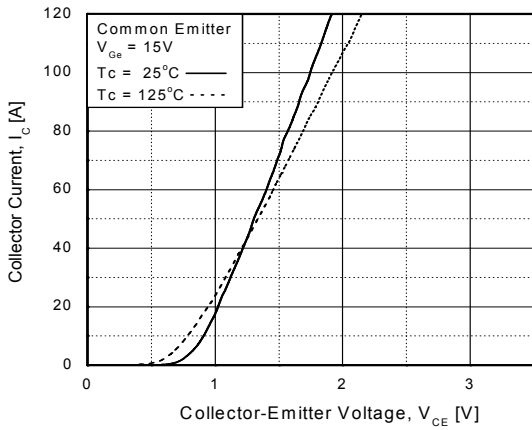


Figure 4. Transfer Characteristics

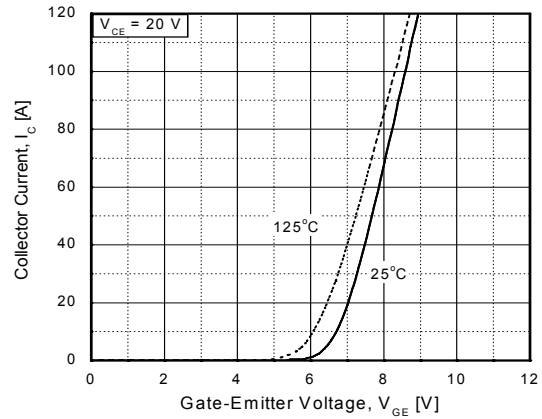


Figure 5. Saturation Voltage vs Case Temperature at Variant Current Level

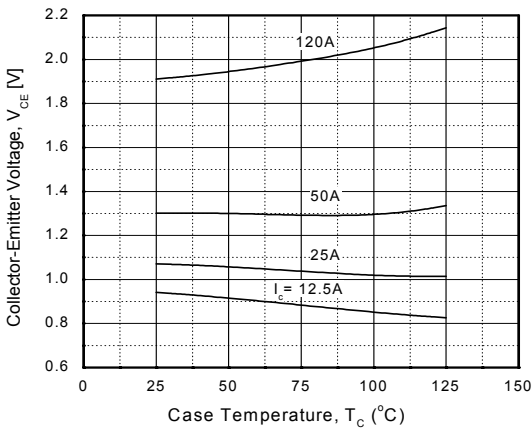


Figure 6. Saturation Voltage vs. Vge

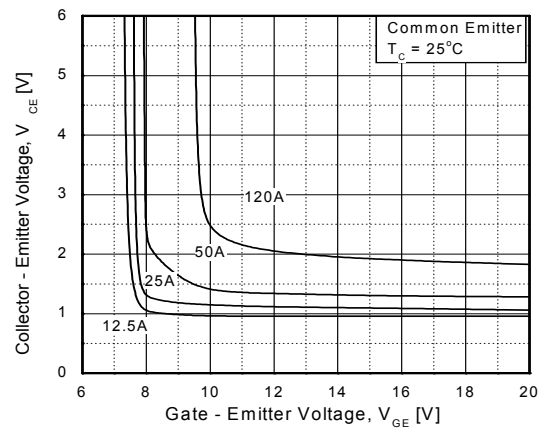


Figure 7. Saturation Voltage vs. V_{GE}

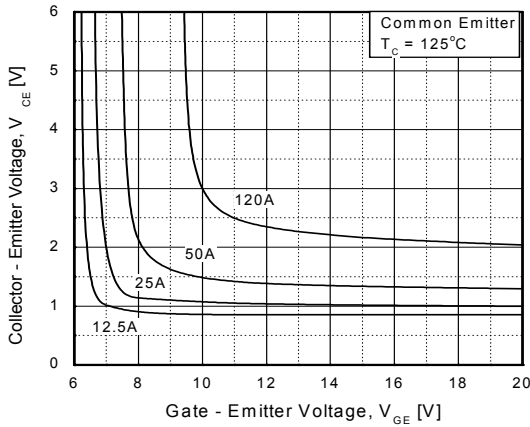


Figure 8. Capacitance Characteristics

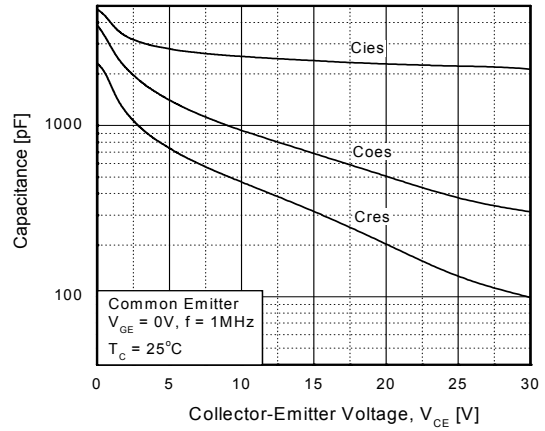


Figure 9. Gate Charge

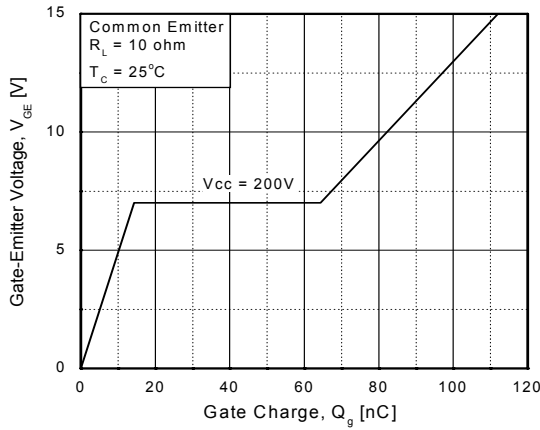


Figure 10. SOA Characteristics

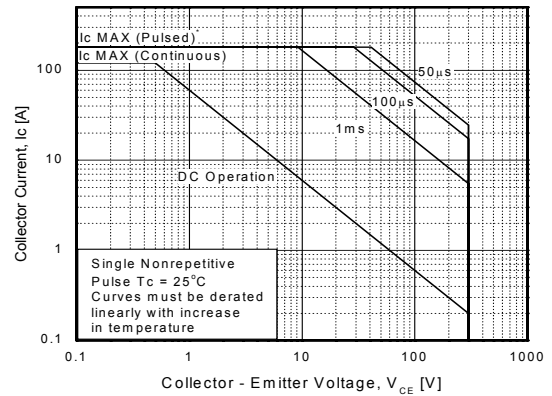


Figure 11. Turn-On Characteristics vs. Gate Resistance

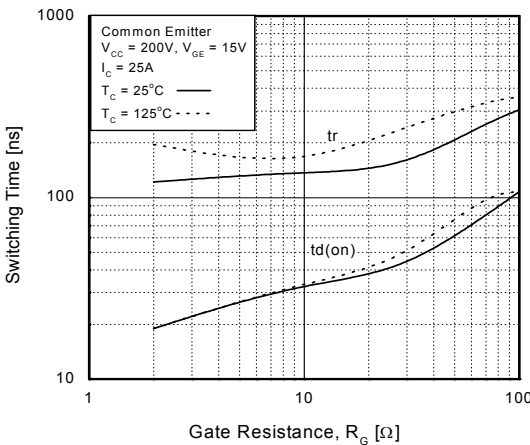


Figure 12. Turn-Off Characteristics vs. Gate Resistance

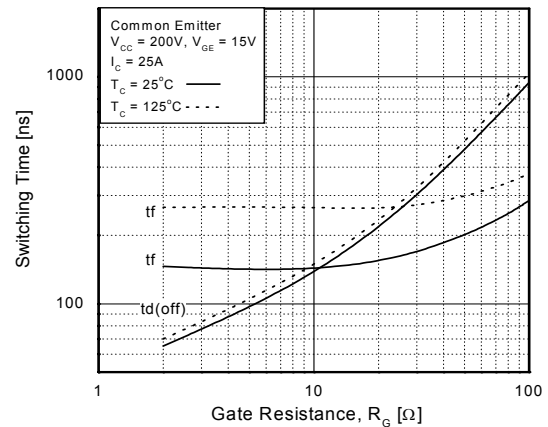


Figure 13 Turn-On Characteristics vs. Collector Current

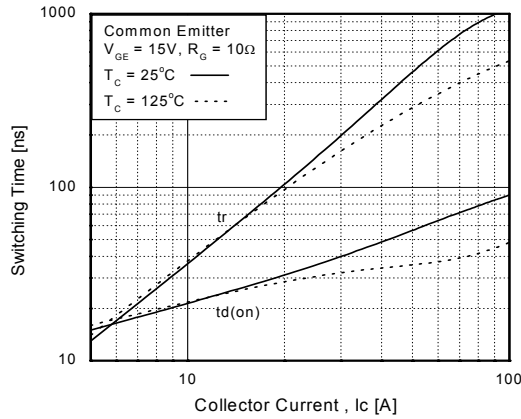


Figure 14. Turn-Off Characteristics vs. Collector Current

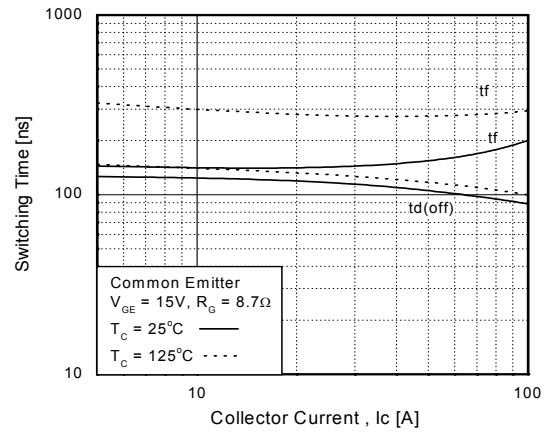


Figure 15. Switching Loss vs. Gate Resistance

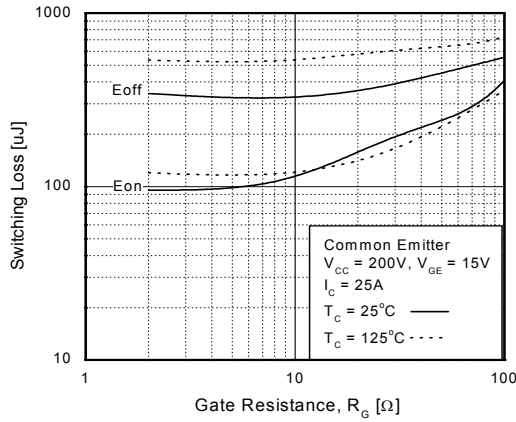


Figure 16. Switching Loss vs. Collector Current

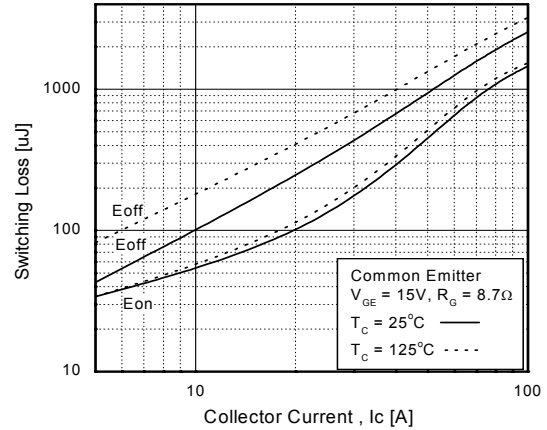
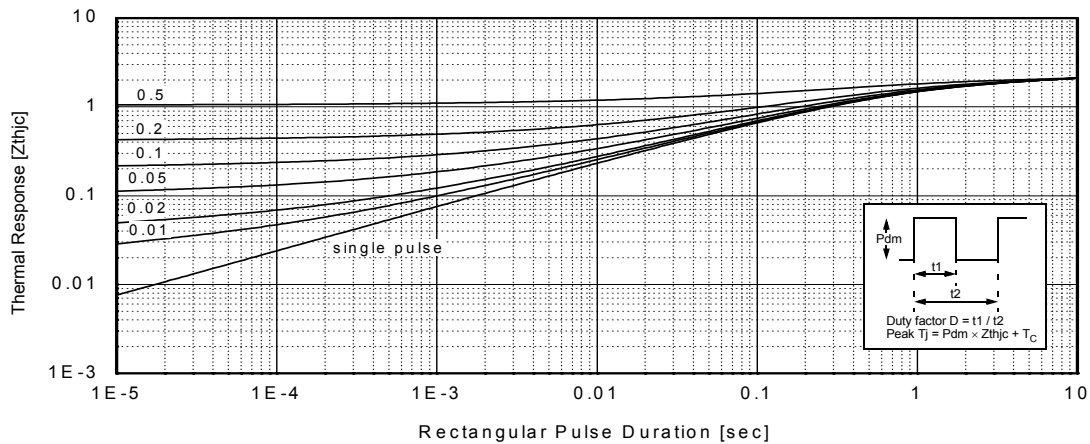
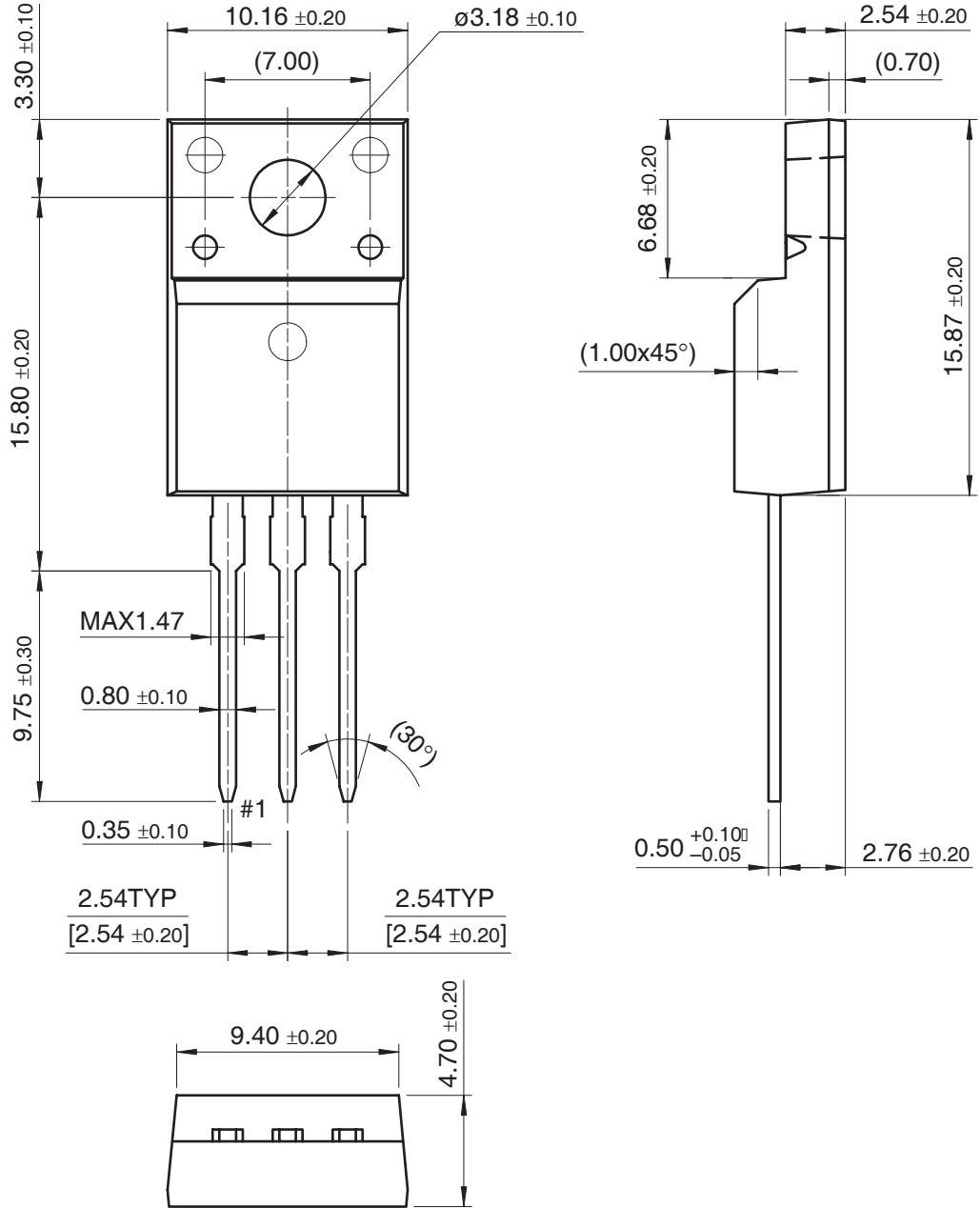


Figure 17. Transient Thermal Impedance of IGBT



Mechanical Dimensions

TO-220F



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