

FGPF120N30

300V, 120A PDP IGBT

Features

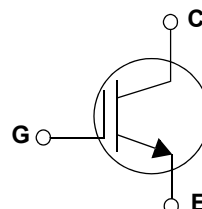
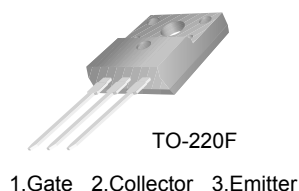
- High Current Capability
- Low saturation voltage : $V_{CE(sat)} = 1.1 \text{ V @ } I_C = 25\text{A}$
- High input impedance
- Fast switching

Application

PDP SYSTEM

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.



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 $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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Off Characteristics

BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	300	--	--	V
$\Delta BV_{CES} / \Delta T_J$	Temperature Coefficient of Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	--	0.6	--	V/ $^\circ\text{C}$
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	--	--	100	μA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	--	--	± 250	nA

On Characteristics

$V_{GE(th)}$	G-E Threshold Voltage	$I_C = 250\mu A, V_{CE} = V_{GE}$	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
		$I_C = 120A, V_{GE} = 15V$ $T_C = 25^\circ\text{C}$	--	1.9	--	V
		$I_C = 120A, V_{GE} = 15V$ $T_C = 125^\circ\text{C}$	--	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	$V_{CC} = 200V, I_C = 25A,$ $R_G = 8.7\Omega, V_{GE} = 15V,$ Resistive Load, $T_C = 25^\circ\text{C}$	--	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	$V_{CC} = 200V, I_C = 25A,$ $R_G = 8.7\Omega, V_{GE} = 15V,$ Resistive Load, $T_C = 125^\circ\text{C}$	--	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	$V_{CE} = 200V, I_C = 25A,$ $V_{GE} = 15V$	--	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

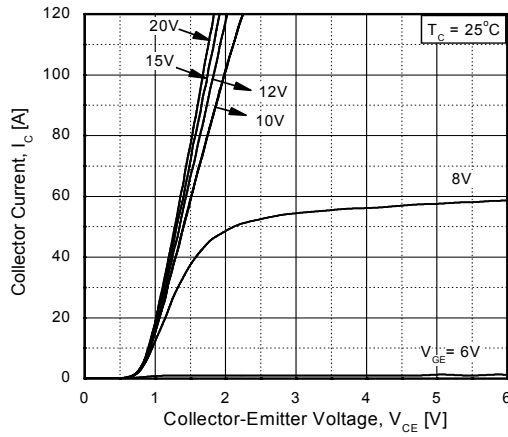


Figure 2. Typical Output Characteristics

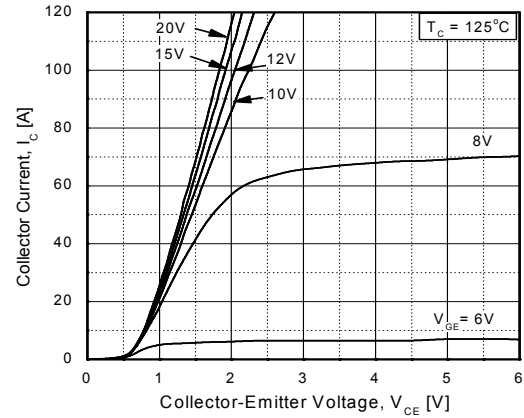


Figure 3 Typical Saturation Voltage Characteristics

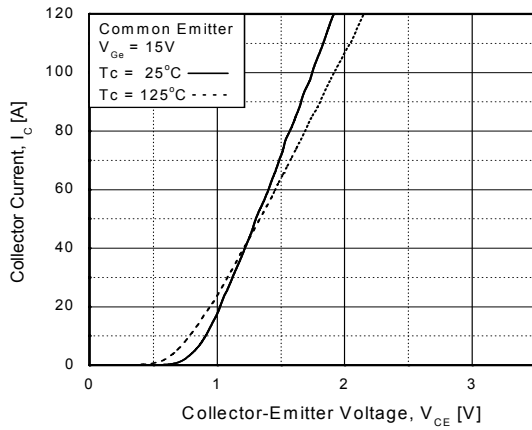


Figure 4. Transfer Characteristics

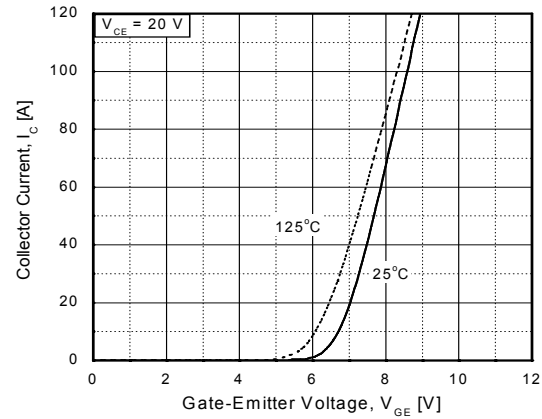


Figure 5. Saturation Voltage vs Case Temperature at Variant Current Level

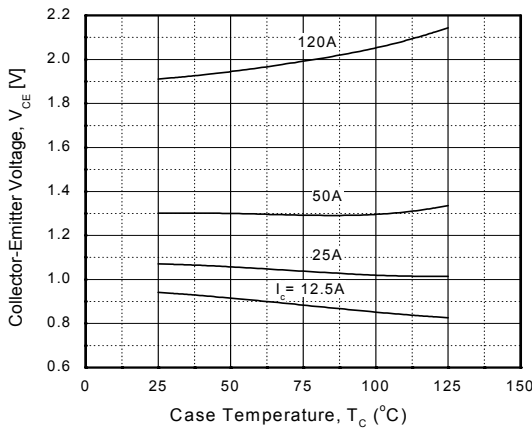


Figure 6. Saturation Voltage vs. Vge

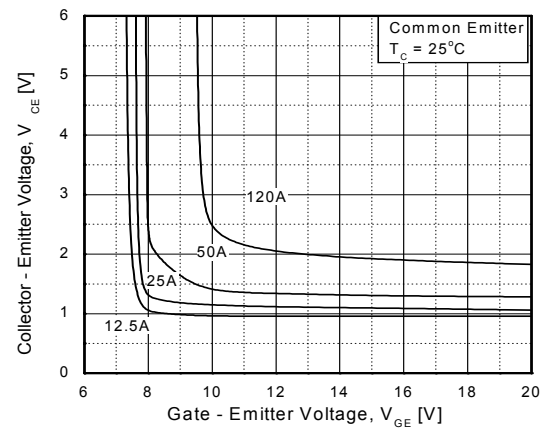


Figure 7. Saturation Voltage vs. V_{GE}

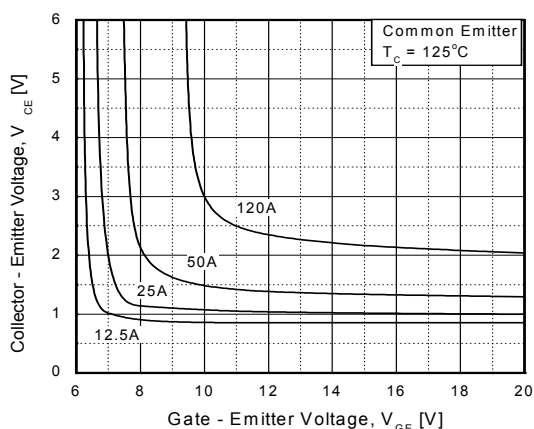


Figure 8. Capacitance Characteristics

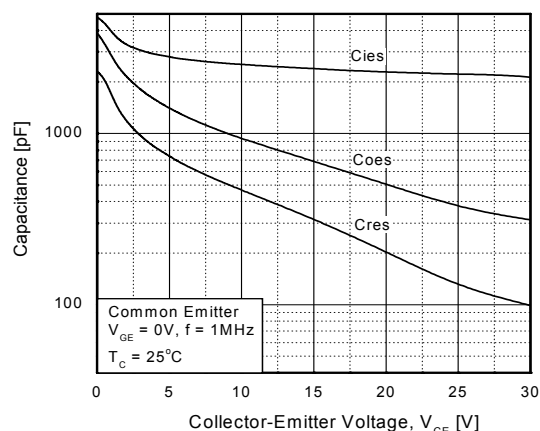


Figure 9. Gate Charge

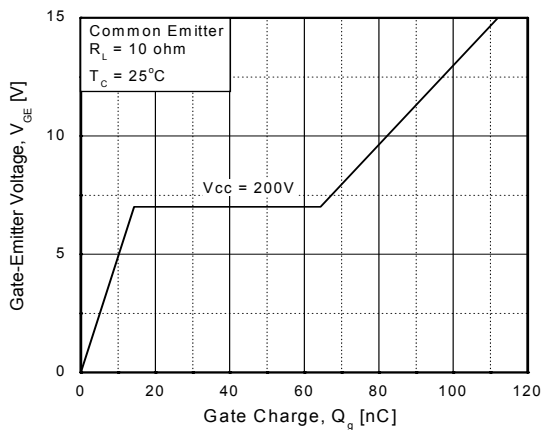


Figure 10. SOA Characteristics

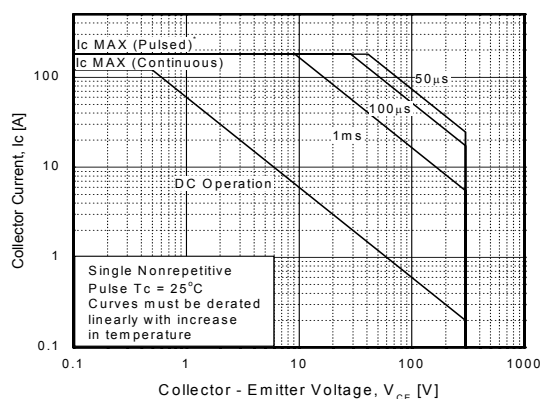


Figure 11. Turn-On Characteristics vs. Gate Resistance

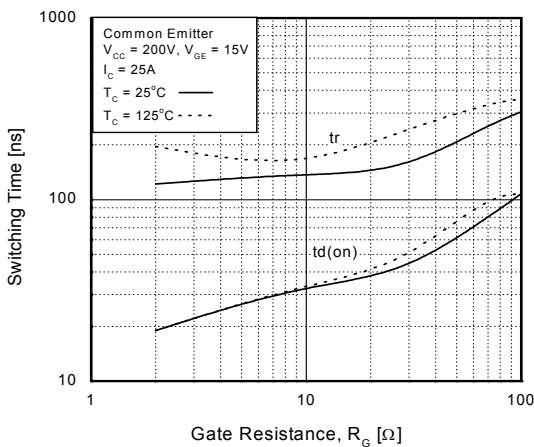


Figure 12. Turn-Off Characteristics vs. Gate Resistance

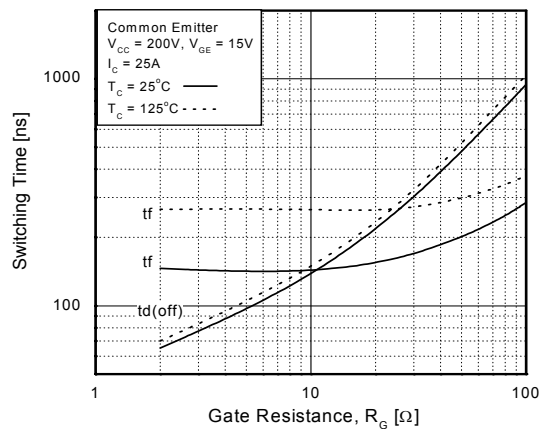


Figure 13 Turn-On Characteristics vs. Collector Current

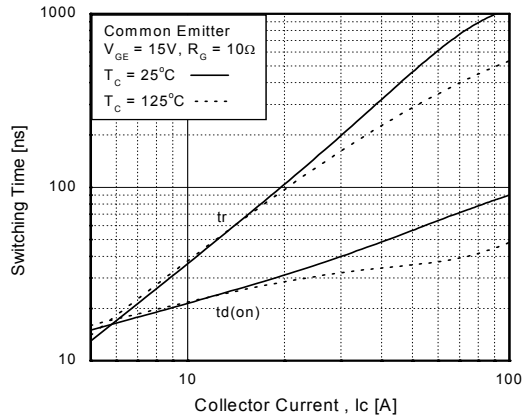


Figure 14. Turn-Off Characteristics vs. Collector Current

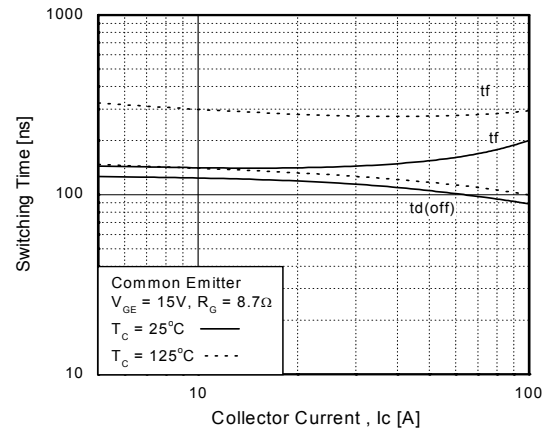


Figure 15. Switching Loss vs. Gate Resistance

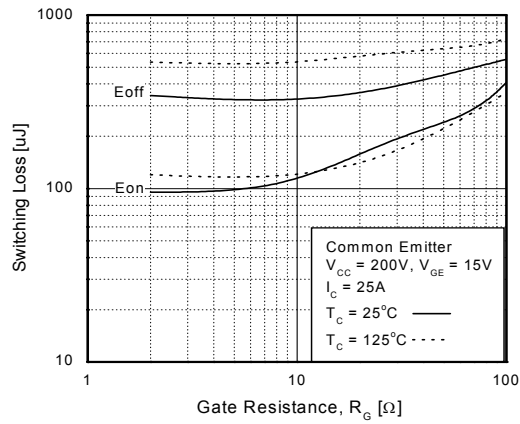


Figure 16. Switching Loss vs. Collector Current

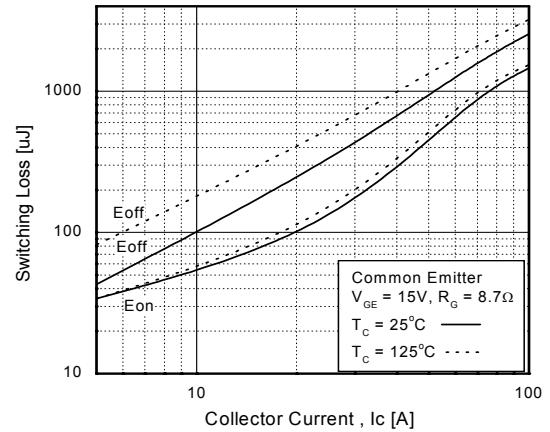
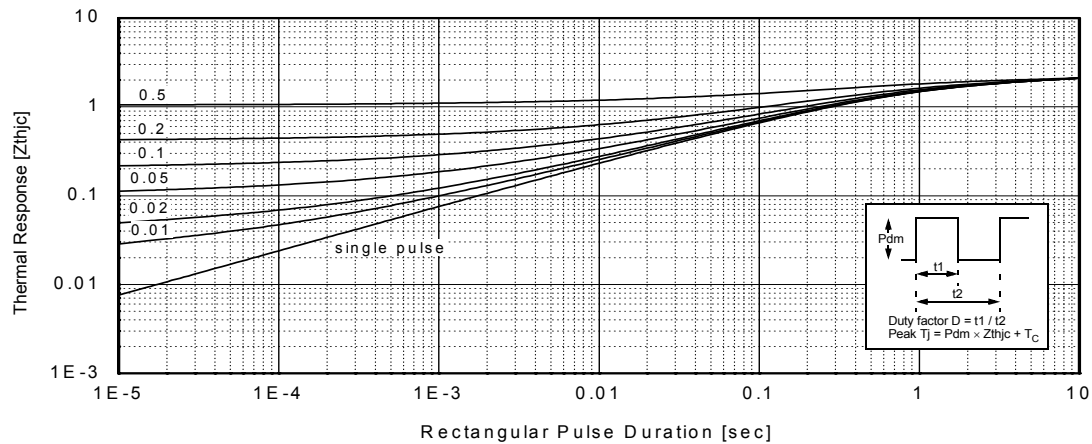
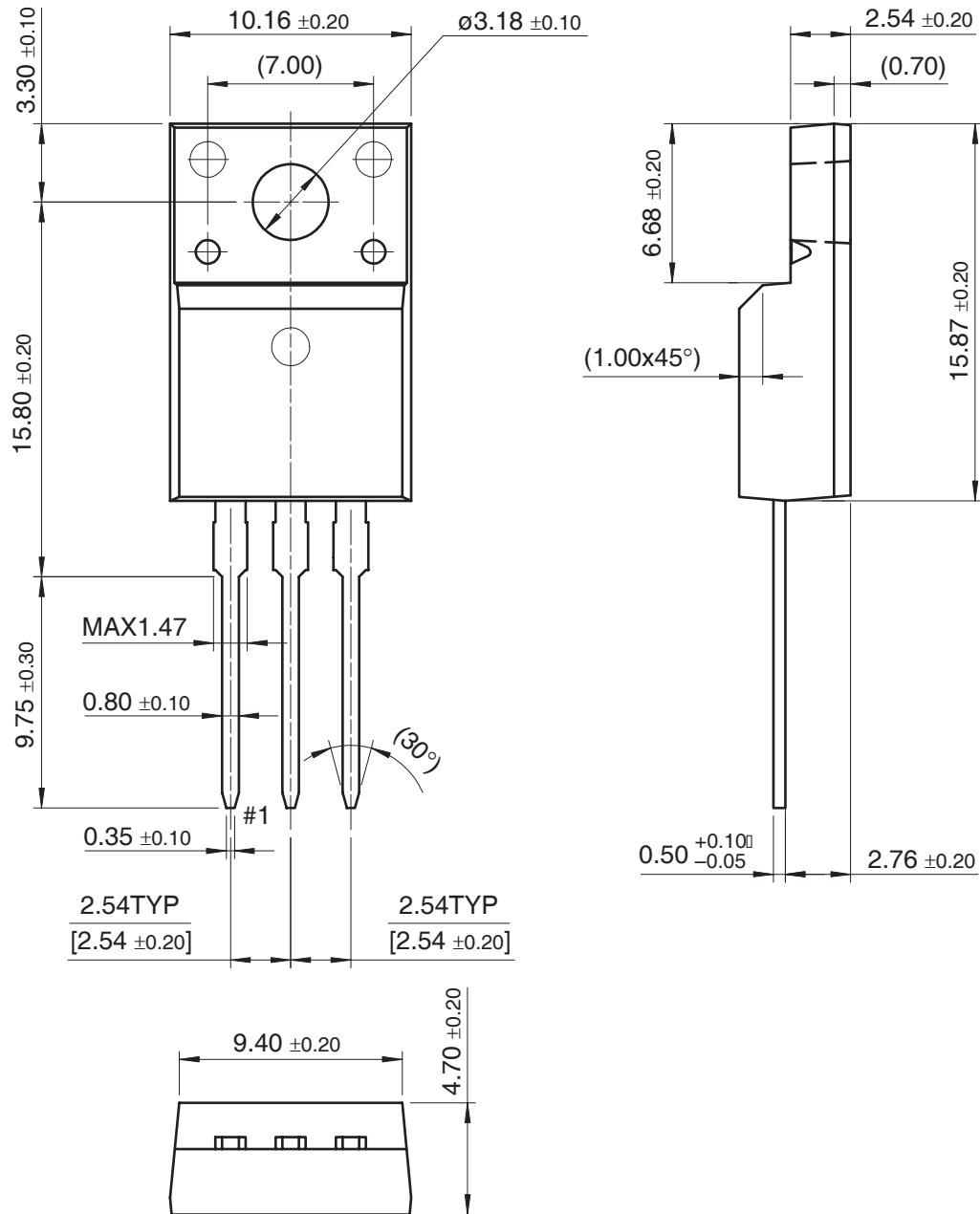


Figure 17. Transient Thermal Impedance of IGBT



Mechanical Dimensions

TO-220F



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Rev. 117