

FGP90N30

300V, 90A PDP IGBT

Features

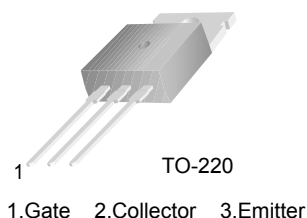
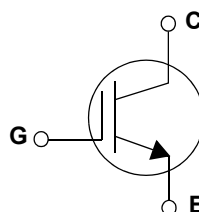
- High Current Capability
- Low saturation voltage : $V_{CE(sat)} = 1.1\text{ V @ } I_C = 20\text{ A}$
- High input impedance
- Fast switching

Application

. PDP System

General Description

Employing Unified IGBT Technology, Fairchild's PDP 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	FGP90N30	Units
V_{CES}	Collector-Emitter Voltage	300	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C = 25^\circ\text{C}$	90	A
$I_{C_pulse(1)}$	Pulse Collector Current @ $T_C = 25^\circ\text{C}$	130	A
P_D	Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$	192	W
	Maximum Power Dissipation @ $T_C = 100^\circ\text{C}$	77	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	--	0.65	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	62.5	$^\circ\text{C/W}$

Notes

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

Package Marking and Ordering Information

Device Marking	Device	Package	Packaging Type	Qty per Tube	Max Qty per Box
FGP90N30	FGP90N30TU	TO-220	Rail / Tube	50ea	-

Electrical Characteristics T_C = 25°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 = 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 = 20A, V _{GE} = 15V	--	1.1	1.4	V
		I _C = 90 A, V _{GE} = 15V T _C = 25°C	--	1.9	--	V
		I _C = 90 A, V _{GE} = 15V T _C = 125°C	--	2.0	--	V

Dynamic Characteristics

C _{ies}	Input Capacitance	V _{CE} = 30V, V _{GE} = 0V, f = 1MHz	--	1700	--	pF
C _{oes}	Output Capacitance		--	290	--	pF
C _{res}	Reverse Transfer Capacitance		--	80	--	pF

Switching Characteristics

t _{d(on)}	Turn-On Delay Time	V _{CC} = 200 V, I _C = 20A, R _G = 10Ω, V _{GE} = 15V, Resistive Load, T _C = 25°C	--	30	--	ns
t _r	Rise Time		--	150	--	ns
t _{d(off)}	Turn-Off Delay Time		--	110	--	ns
t _f	Fall Time		--	140	350	ns
t _{d(on)}	Turn-On Delay Time	V _{CC} = 200 V, I _C = 20 A, R _G = 10Ω, V _{GE} = 15V, Resistive Load, T _C = 125°C	--	30	--	ns
t _r	Rise Time		--	150	--	ns
t _{d(off)}	Turn-Off Delay Time		--	110	--	ns
t _f	Fall Time		--	330	--	ns
Q _g	Total Gate Charge	V _{CE} = 200 V, I _C = 20A, V _{GE} = 15V	--	87	130	nC
Q _{ge}	Gate-Emitter Charge		--	12	18	nC
Q _{gc}	Gate-Collector Charge		--	38	57	nC

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

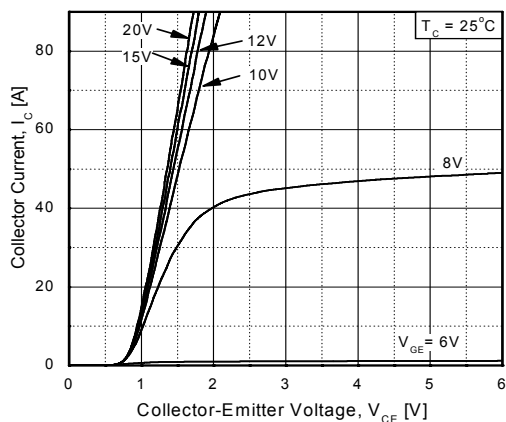


Figure 2. Typical Output Characteristics

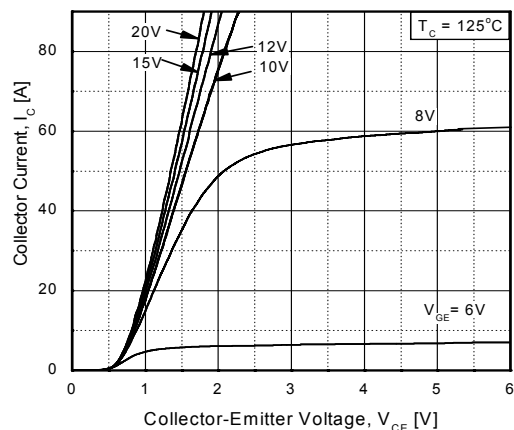


Figure 3 Typical Saturation Voltage Characteristics

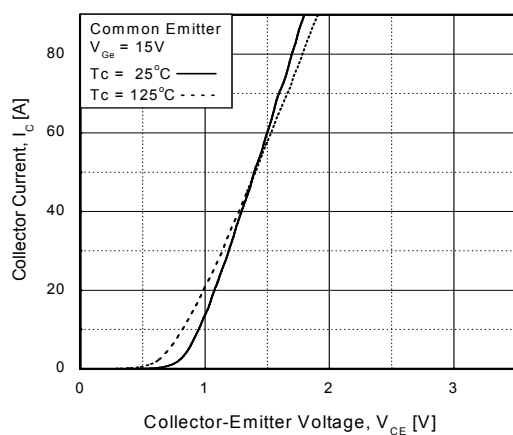


Figure 4. Transfer Characteristics

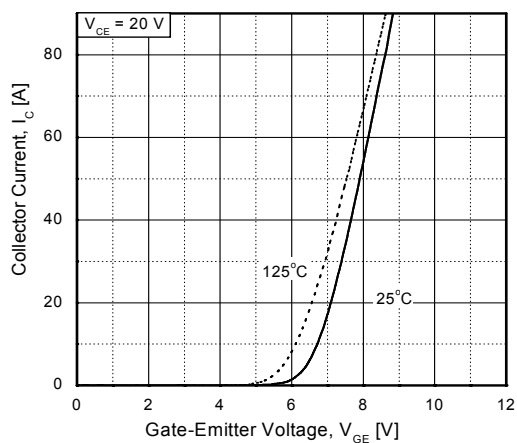


Figure 5. Saturation Voltage vs Case Temperature at Variant Current Level

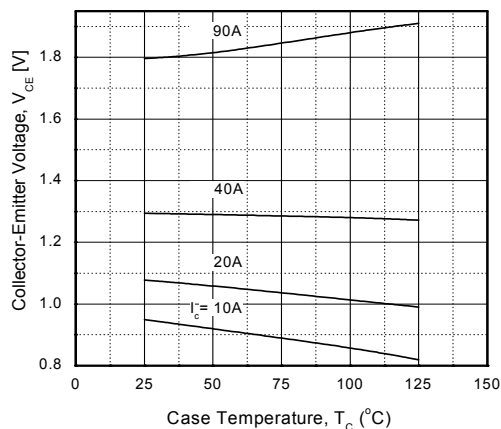


Figure 6. Saturation Voltage vs. Vge

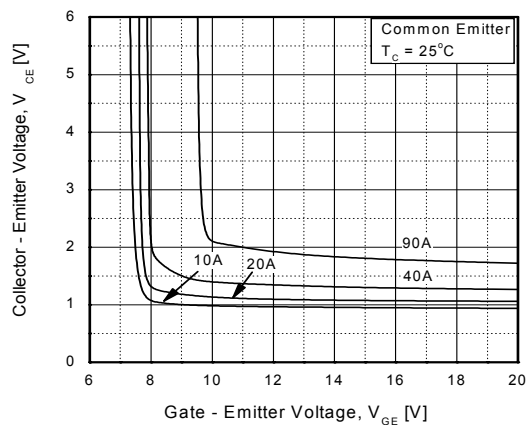


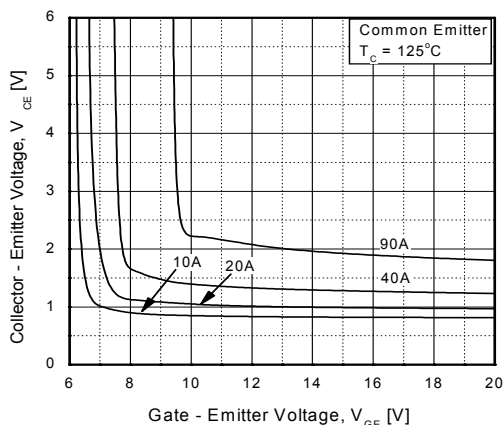
Figure 7. Saturation Voltage vs. V_{GE} 

Figure 8. Capacitance Characteristics

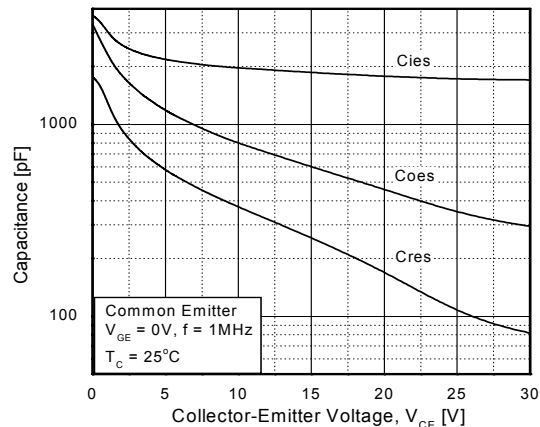


Figure 9. Gate Charge

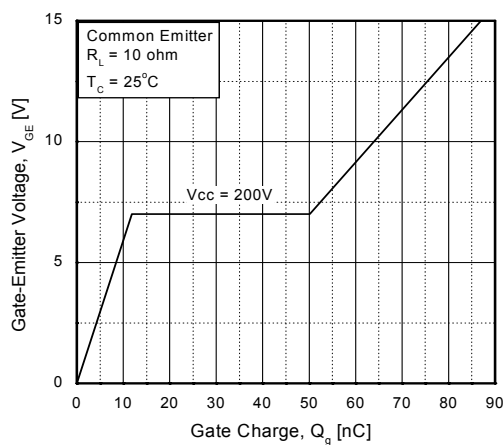


Figure 10. SOA Characteristics

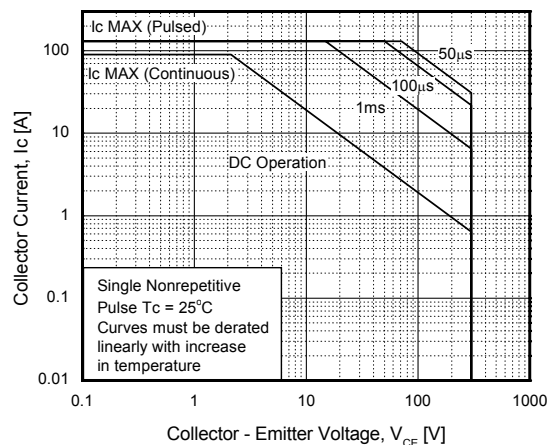


Figure 11. Turn-On Characteristics vs. Gate Resistance

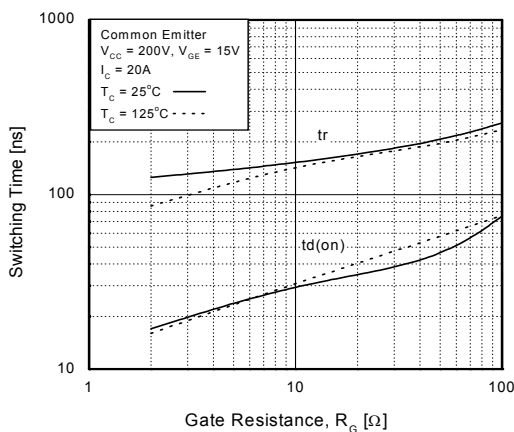


Figure 12. Turn-Off Characteristics vs. Gate Resistance

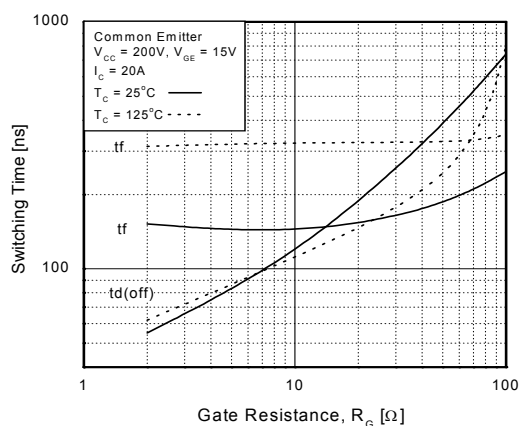


Figure 13 Turn-On Characteristics vs. Collector Current

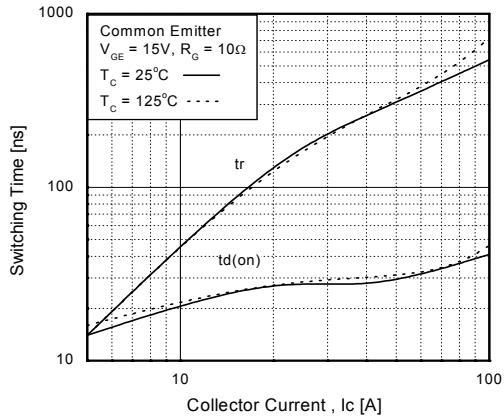


Figure 14. Turn-Off Characteristics vs. Collector Current

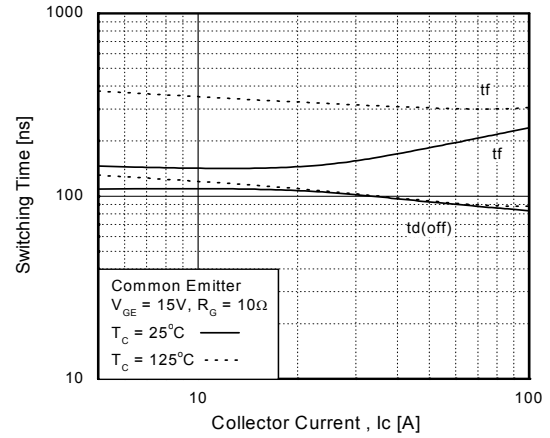


Figure 15. Switching Loss vs. Gate Resistance

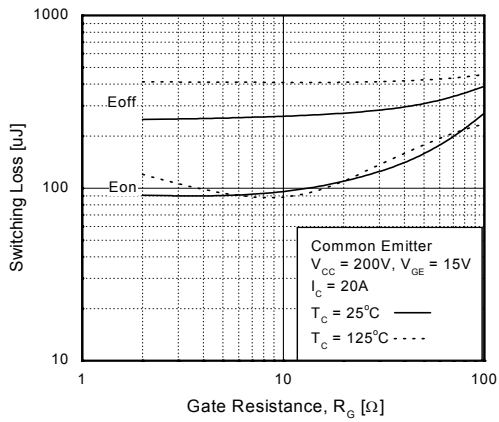


Figure 16. Switching Loss vs. Collector Current

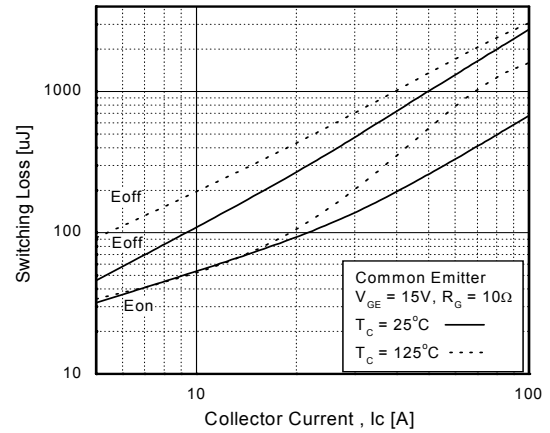
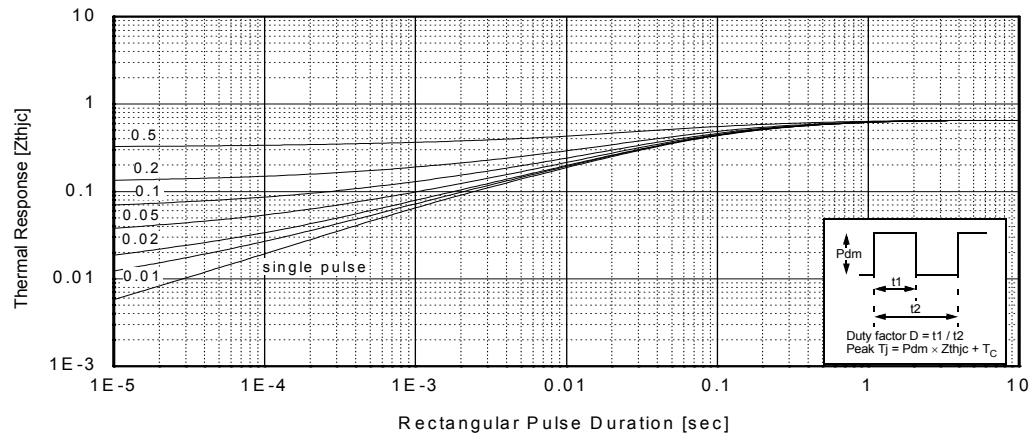
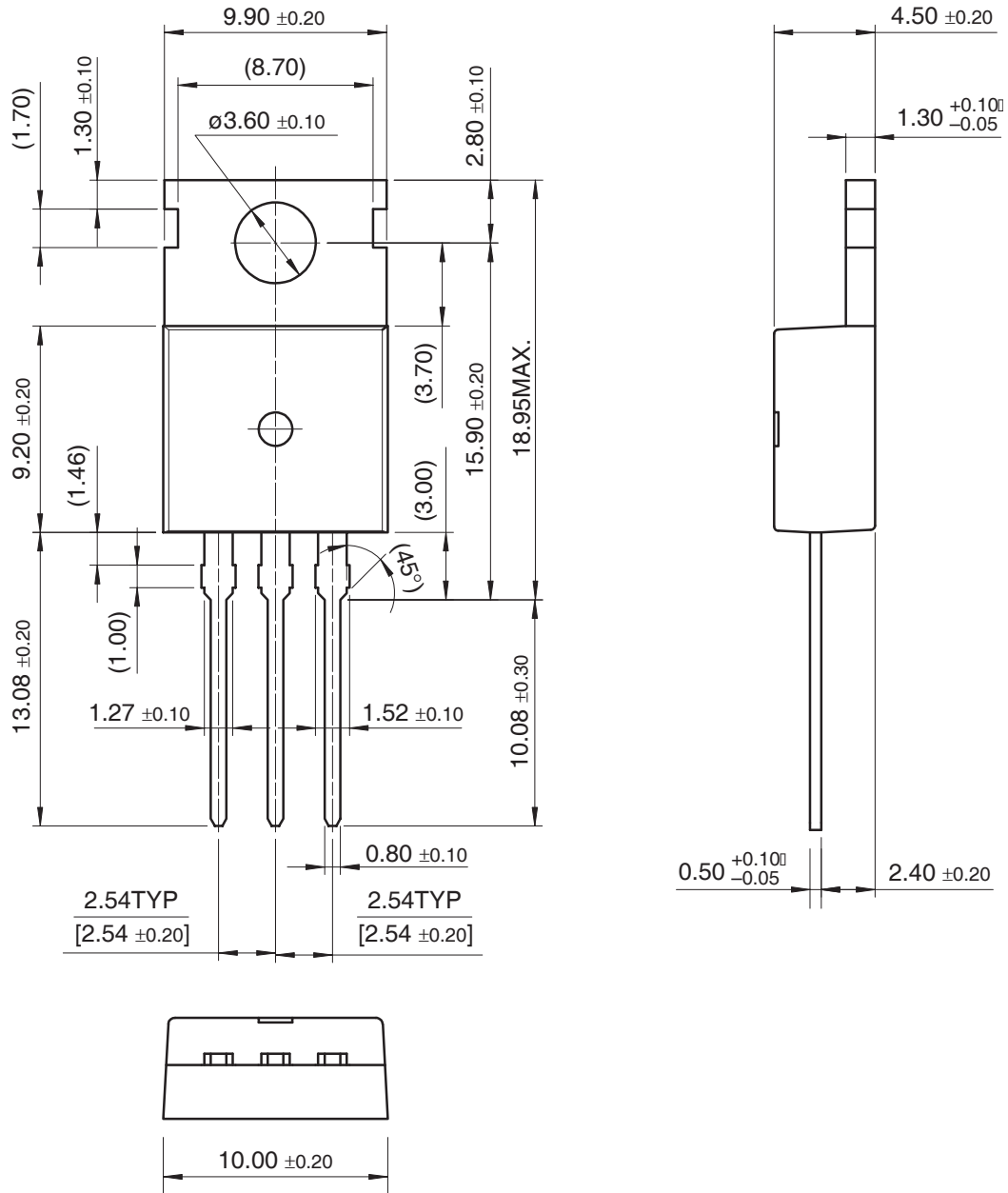


Figure 17. Transient Thermal Impedance of IGBT



Mechanical Dimensions

TO-220



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