



# FGPF30N45T

## 450V, 30A PDP Trench IGBT

### Features

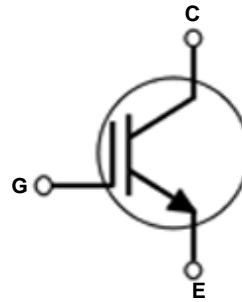
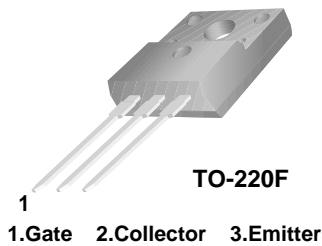
- High Current Capability
- Low saturation voltage:  $V_{CE(sat)} = 1.55V @ I_C = 30A$
- High input impedance
- Fast switching

### General Description

Using Novel Trench IGBT Technology, Fairchild's new series of trench IGBTs offer the optimum performance for PDP applications where low conduction and switching losses are essential.

### Applications

- PDP System



### Absolute Maximum Ratings

Symbol	Description	Ratings	Units
$V_{CES}$	Collector to Emitter Voltage	450	V
$V_{GES}$	Gate to Emitter Voltage	$\pm 30$	V
$I_{CM}$ (1)	Pulsed Collector Current @ $T_C = 25^\circ C$	120	A
$P_D$	Maximum Power Dissipation @ $T_C = 25^\circ C$	50.4	W
	Maximum Power Dissipation @ $T_C = 100^\circ C$	20.1	W
$T_J$	Operating Junction Temperature	-55 to +150	$^\circ C$
$T_{stg}$	Storage Temperature Range	-55 to +150	$^\circ C$
$T_L$	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds	300	$^\circ C$

**Notes:**


1: Repetitive test , Pulse width=100usec , Duty=0.1

\*  $I_{c\_pluse}$  limited by max  $T_j$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (IGBT)	Thermal Resistance, Junction to Case	-	2.48	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	62.5	$^\circ C/W$

## Package Marking and Ordering Information

Device Marking	Device	Package	 Eco Status	Packaging Type	Qty per Tube
FGPF30N45T	FGPF30N45TTU	TO-220F	RoHS	Rail / Tube	50ea

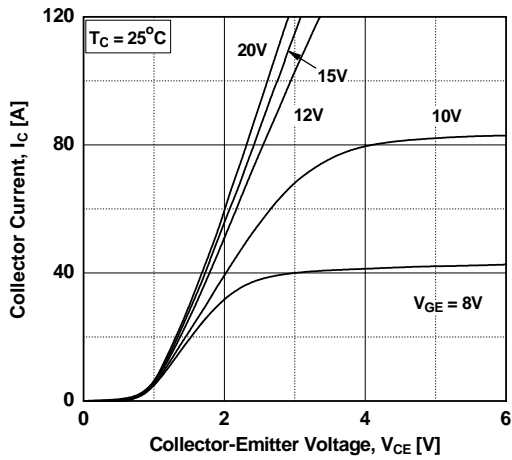
 For Fairchild's definition of "green" Eco Status, please visit: [http://www.fairchildsemi.com/company/green/rohs\\_green.html](http://www.fairchildsemi.com/company/green/rohs_green.html).

## Electrical Characteristics of the IGBT T<sub>C</sub> = 25°C unless otherwise noted

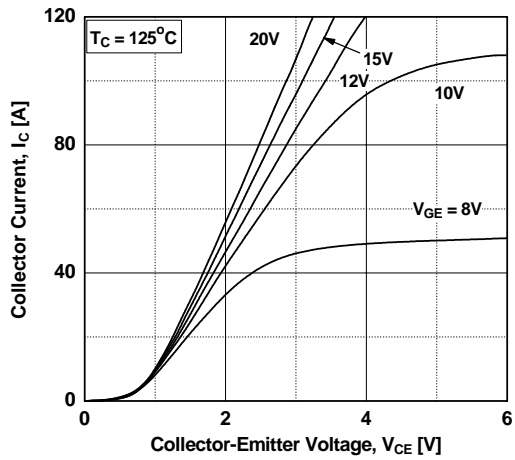
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
$BV_{CES}$	Collector to Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	450	-	-	V
$\Delta BV_{CES}$ $\Delta T_J$	Temperature Coefficient of Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	-	0.5	-	V/°C
$I_{CES}$	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	-	-	100	$\mu A$
$I_{GES}$	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	-	-	±400	nA
<b>On Characteristics</b>						
$V_{GE(th)}$	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	$I_C = 20A, V_{GE} = 15V$	-	1.35	1.6	
		$I_C = 30A, V_{GE} = 15V$	-	1.55	-	V
		$I_C = 30A, V_{GE} = 15V,$ $T_C = 125^\circ C$	-	1.53	-	V
<b>Dynamic Characteristics</b>						
$C_{ies}$	Input Capacitance	$V_{CE} = 30V, V_{GE} = 0V,$ $f = 1MHz$	-	1610	-	pF
$C_{oes}$	Output Capacitance		-	88	-	pF
$C_{res}$	Reverse Transfer Capacitance		-	68	-	pF
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 200V, I_C = 30A,$ $R_G = 15\Omega, V_{GE} = 15V,$ Resistive Load, $T_C = 25^\circ C$	-	19	-	ns
$t_r$	Rise Time		-	57	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	119	-	ns
$t_f$	Fall Time		-	220	330	ns
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 200V, I_C = 30A,$ $R_G = 15\Omega, V_{GE} = 15V,$ Resistive Load, $T_C = 125^\circ C$	-	20	-	ns
$t_r$	Rise Time		-	60	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	122	-	ns
$t_f$	Fall Time		-	265	-	ns
$Q_g$	Total Gate Charge	$V_{CE} = 200V, I_C = 30A,$ $V_{GE} = 15V$	-	73	-	nC
$Q_{ge}$	Gate to Emitter Charge		-	11	-	nC
$Q_{gc}$	Gate to Collector Charge		-	33	-	nC

## Typical Performance Characteristics

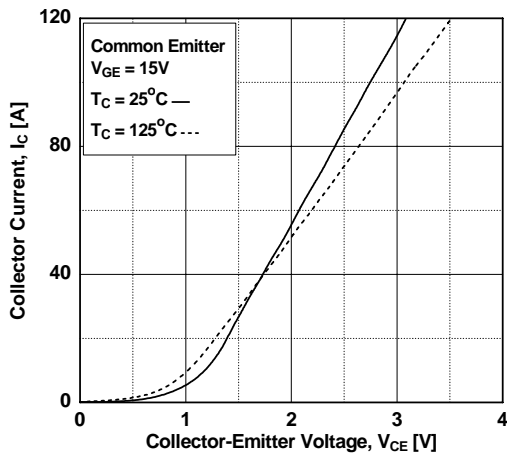
**Figure 1. Typical Output Characteristics**



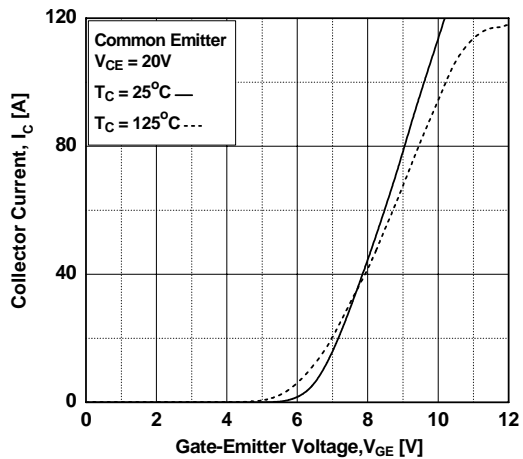
**Figure 2. Typical Output Characteristics**



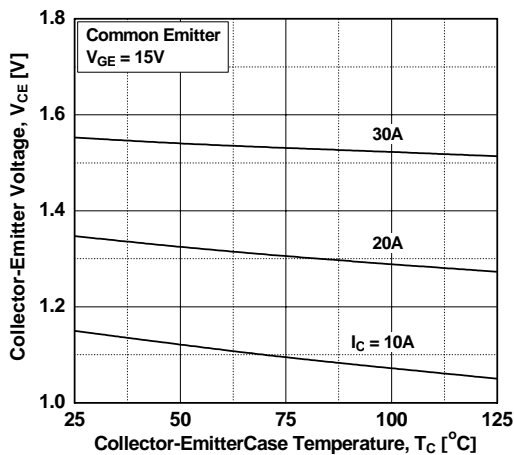
**Figure 3. Typical Saturation Voltage Characteristics**



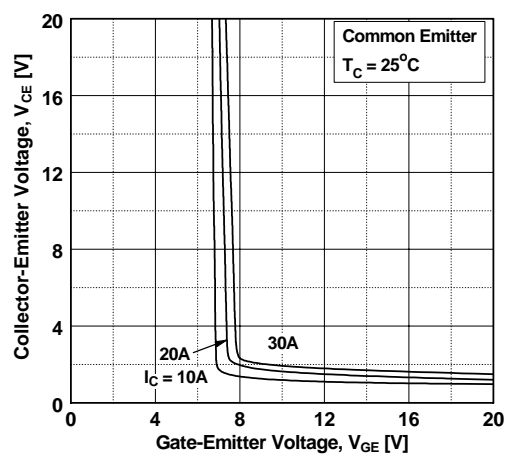
**Figure 4. Transfer Characteristics**



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



**Figure 6. Saturation Voltage vs. Vge**



## Typical Performance Characteristics

Figure 7. Saturation Voltage vs.  $V_{GE}$

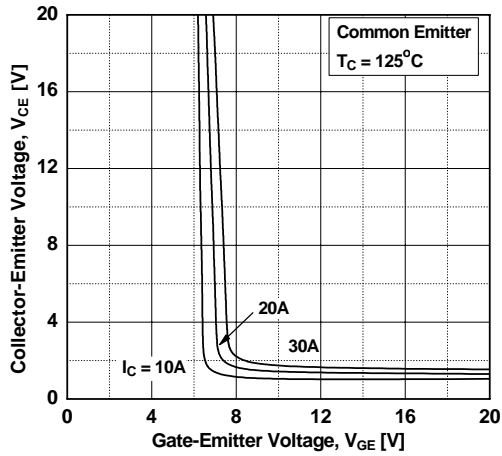


Figure 8. Capacitance Characteristics

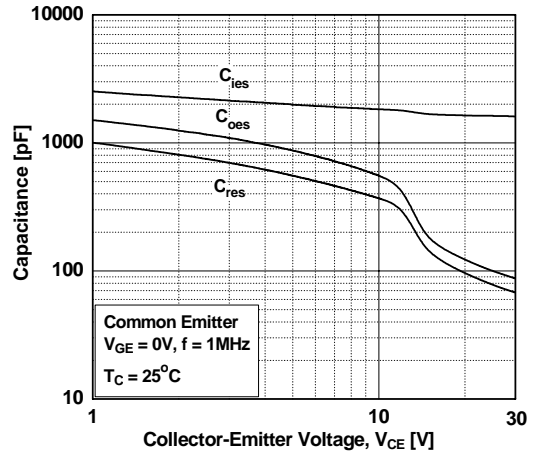


Figure 9. Gate charge Characteristics

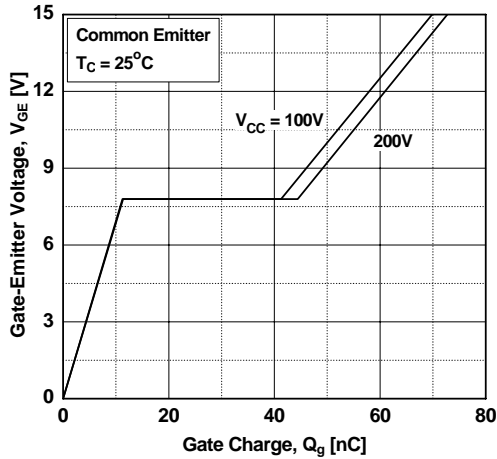


Figure 10. SOA Characteristics

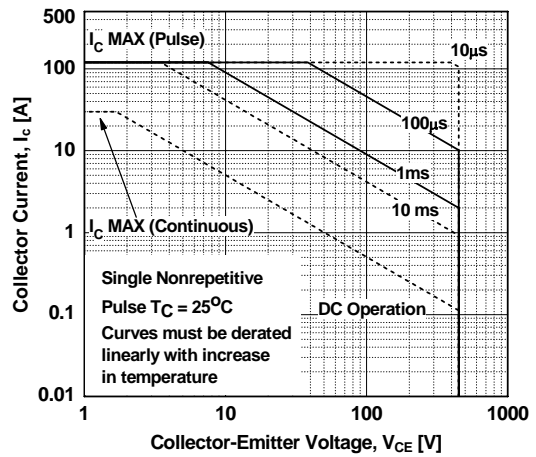


Figure 11. Turn-on Characteristics vs. Gate Resistance

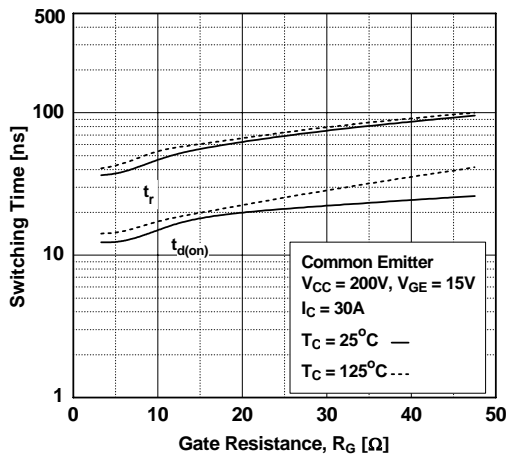
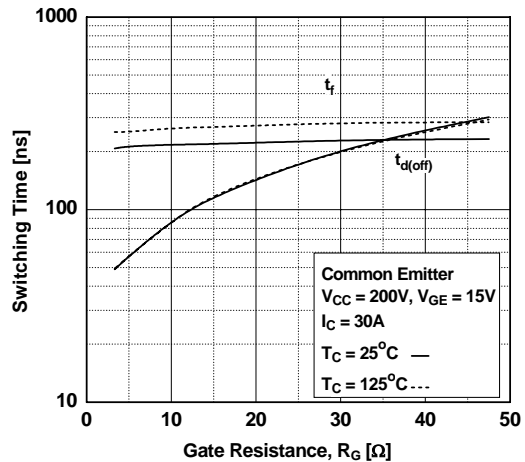
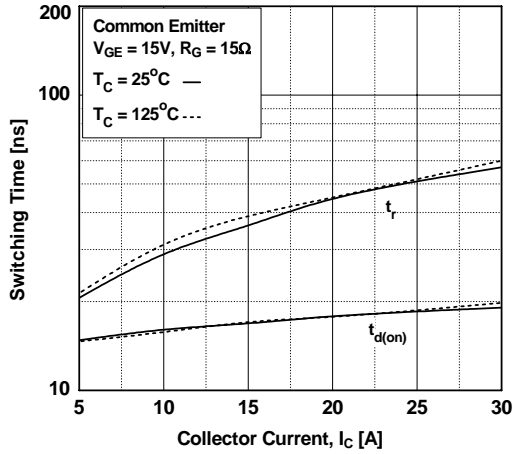


Figure 12. Turn-off Characteristics vs. Gate Resistance

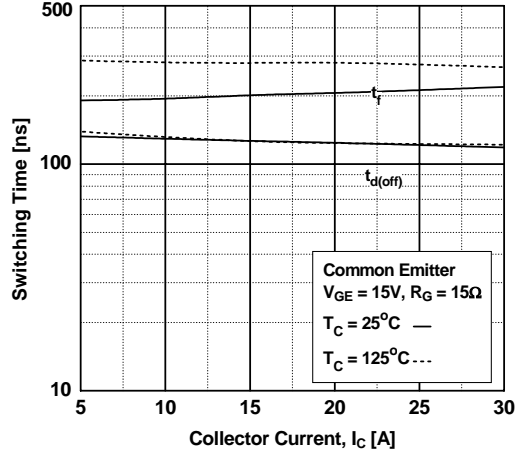


### Typical Performance Characteristics

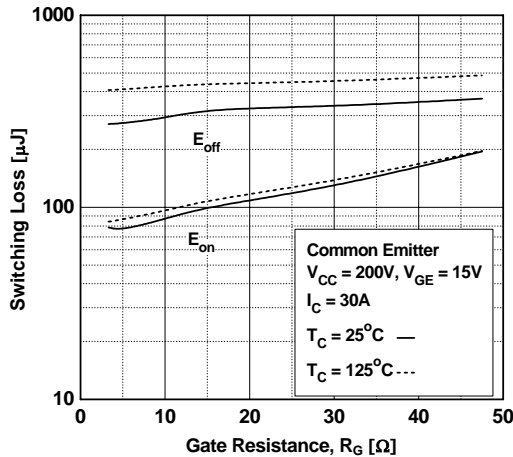
**Figure 13. Turn-on Characteristics vs. Collector Current**



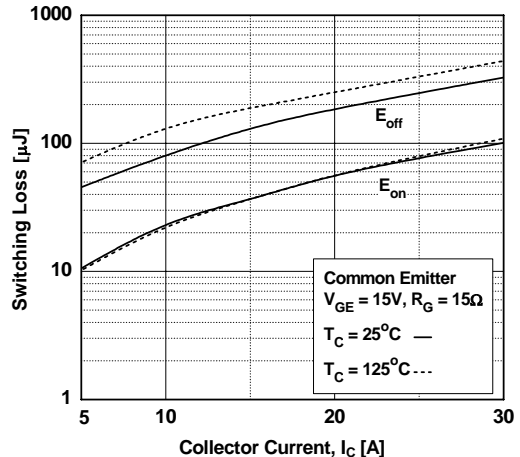
**Figure 14. Turn-off Characteristics vs. Collector Current**



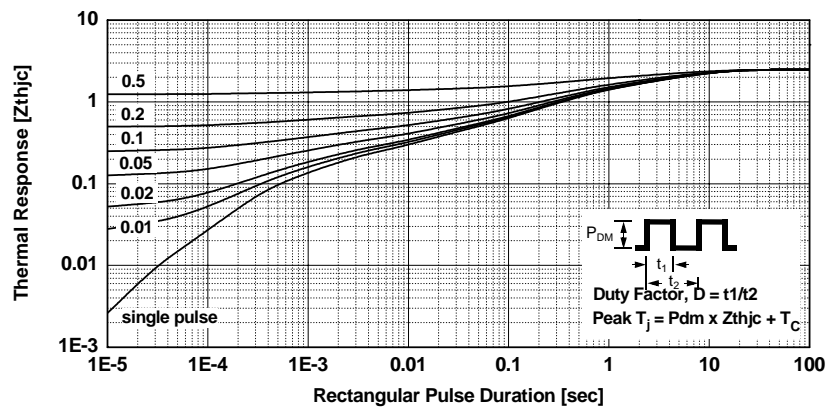
**Figure 15. Switching Loss vs. Gate Resistance**



**Figure 16. Switching Loss vs. Gate Resistance**

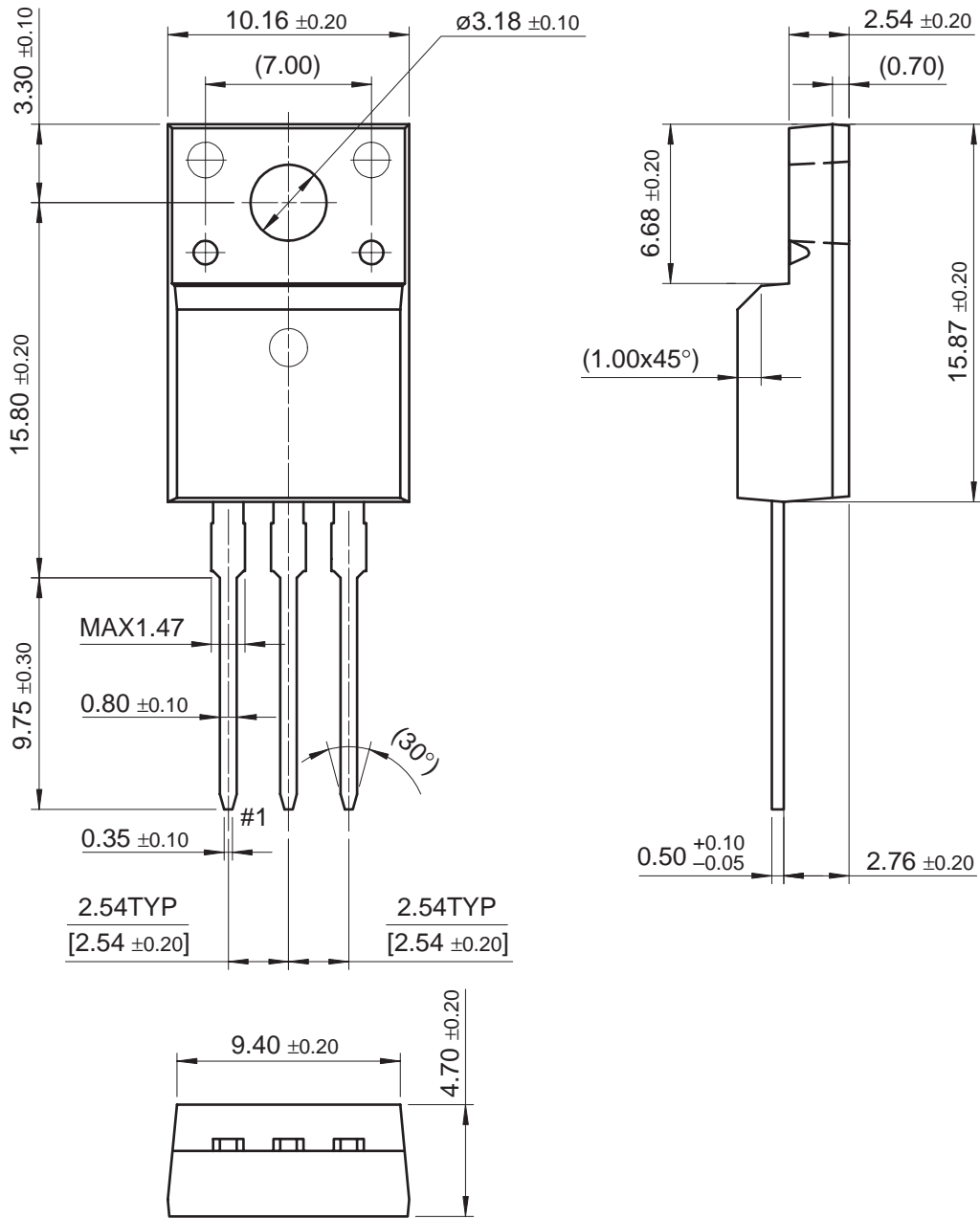


**Figure 17. Transient Thermal Impedance of IGBT**



Mechanical Dimensions

TO-220F









Dimensions in Millimeters



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