



# FGPF30N30

## 300V, 30A PDP IGBT

### Features

- High Current Capability
- Low saturation voltage:  $V_{CE(sat)} = 1.4V @ I_C = 20A$
- High Input Impedance
- Fast switching
- RoHS Compliant

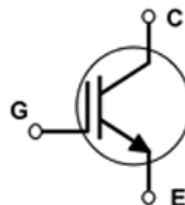
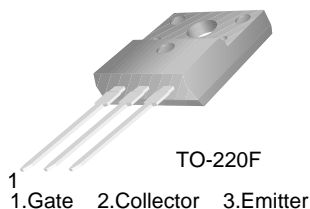


### Application

. PDP System

### General Description

Employing Unified IGBT Technology, Fairchild's PDP IGBTs provides low conduction and switching loss. FGPF30N30 offers the optimum solution for PDP applications where low-conduction loss is essential.



### Absolute Maximum Ratings

Symbol	Description	FGPF30N30	Units
$V_{CES}$	Collector-Emitter Voltage	300	V
$V_{GES}$	Gate-Emitter Voltage	$\pm 30$	V
$I_C$ pulse(1)	Pulsed Collector Current @ $T_C = 25^\circ C$	80	A
$P_D$	Maximum Power Dissipation @ $T_C = 25^\circ C$	46	W
	Maximum Power Dissipation @ $T_C = 100^\circ C$	18.5	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	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$ (IGBT)	Thermal Resistance, Junction-to-Case	--	2.7	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	62.5	$^\circ C/W$

#### Notes:

(1) Repetitive test, pulse width = 100usec, Duty = 0.1

\*  $I_{c\_pulse}$  limited by max  $T_J$

### Package Marking and Ordering Information

Device Marking	Device	Package	Packaging Type	Qty per Tube	Max Qty per Box
FGPF30N30	FGFP30N30TU	TO-220F	Rail / Tube	50ea	-

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
BV <sub>CES</sub>	Collector-Emitter Breakdown Voltage	V <sub>GE</sub> = 0V, I <sub>C</sub> = 250uA	300	--	--	V
$\frac{\Delta BV_{CES}}{\Delta T_J}$	Temperature Coefficient of Breakdown Voltage	V <sub>GE</sub> = 0V, I <sub>C</sub> = 250uA	--	0.6	--	V/°C
I <sub>CES</sub>	Collector Cut-Off Current	V <sub>CE</sub> = V <sub>CES</sub> , V <sub>GE</sub> = 0V	--	--	100	uA
I <sub>GES</sub>	G-E Leakage Current	V <sub>GE</sub> = V <sub>GES</sub> , V <sub>CE</sub> = 0V	--	--	± 250	nA
<b>On Characteristics</b>						
V <sub>GE(th)</sub>	G-E Threshold Voltage	I <sub>C</sub> = 250uA, V <sub>CE</sub> = V <sub>GE</sub>	2.5	4.0	5.0	V
V <sub>CE(sat)</sub>	Collector to Emitter Saturation Voltage	I <sub>C</sub> = 10A, V <sub>GE</sub> = 15V	--	1.2	1.5	V
		I <sub>C</sub> = 20A, V <sub>GE</sub> = 15V	--	1.4	--	V
		I <sub>C</sub> = 30A, V <sub>GE</sub> = 15V T <sub>C</sub> = 25°C	--	1.8	--	V
		I <sub>C</sub> = 30A, V <sub>GE</sub> = 15V T <sub>C</sub> = 125°C	--	1.9	--	V
<b>Dynamic Characteristics</b>						
C <sub>ies</sub>	Input Capacitance	V <sub>CE</sub> = 30V, V <sub>GE</sub> = 0V f = 1MHz	--	685	--	pF
C <sub>oes</sub>	Output Capacitance		--	95	--	pF
C <sub>res</sub>	Reverse Transfer Capacitance		--	30	--	pF
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>CC</sub> = 200 V, I <sub>C</sub> = 20A R <sub>G</sub> = 20Ω, V <sub>GE</sub> = 15V Resistive Load, T <sub>C</sub> = 25°C	--	10	--	ns
t <sub>r</sub>	Rise Time		--	44	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	76	--	ns
t <sub>f</sub>	Fall Time		--	180	300	ns
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>CC</sub> = 200 V, I <sub>C</sub> = 20A R <sub>G</sub> = 20Ω, V <sub>GE</sub> = 15V Resistive Load, T <sub>C</sub> = 125°C	--	10	-	ns
t <sub>r</sub>	Rise Time		--	46	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	82	--	ns
t <sub>f</sub>	Fall Time		--	270	--	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>CE</sub> = 200 V, I <sub>C</sub> = 20A V <sub>GE</sub> = 15V	--	39	--	nC
Q <sub>ge</sub>	Gate-Emitter Charge		--	6	--	nC
Q <sub>gc</sub>	Gate-Collector Charge		--	16	--	nC

Typical Performance Characteristics Typical Saturation Voltage Characteristics

Figure 1. Typical Output Characteristics

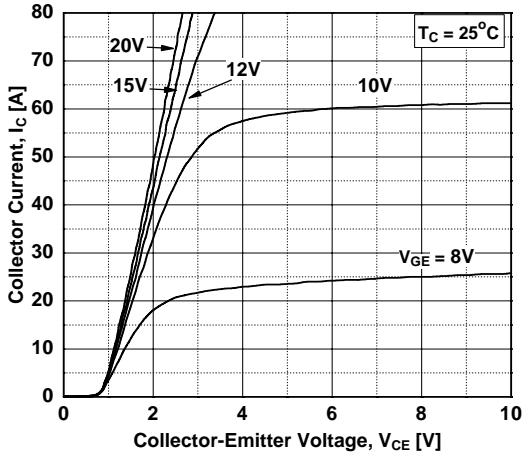


Figure 2. Typical Output Characteristics

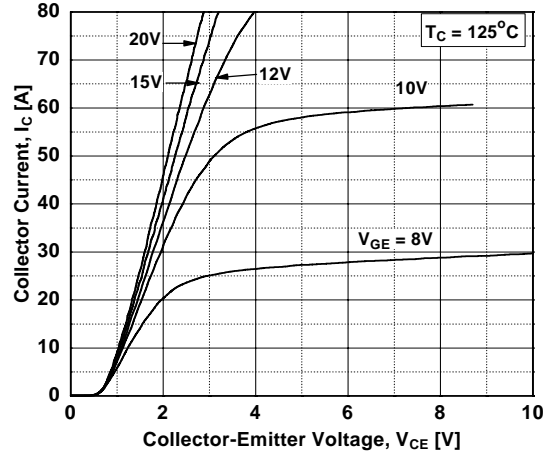


Figure 3. Saturation Voltage

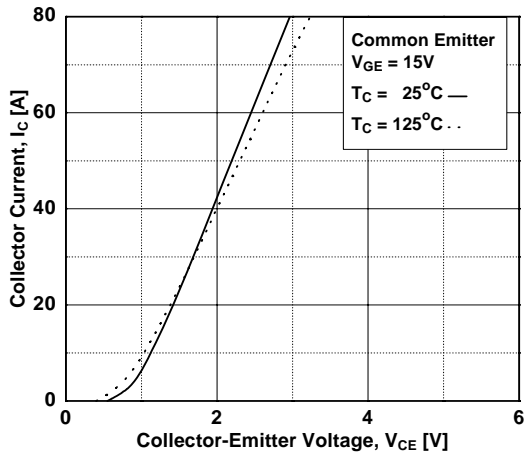


Figure 4. Transfer Characteristics

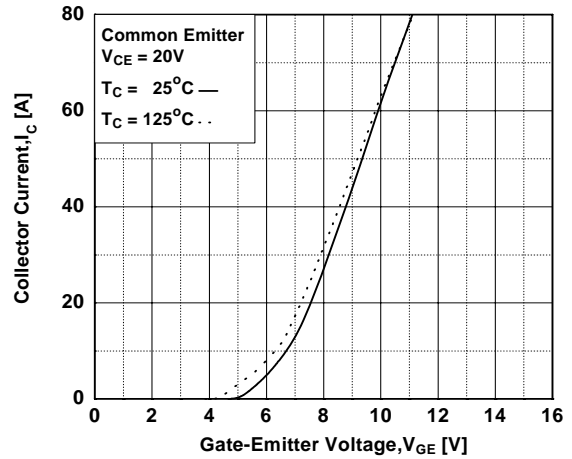


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

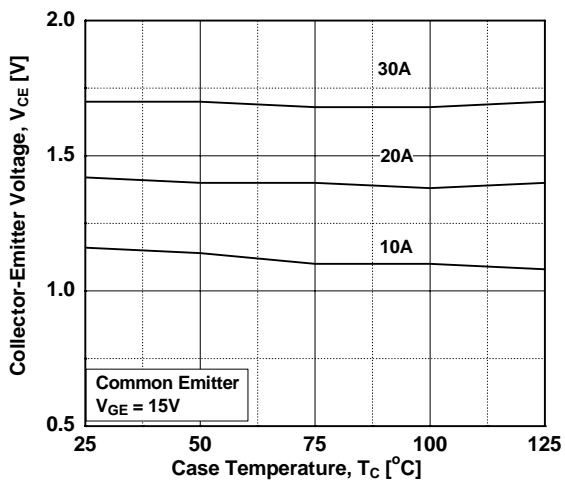
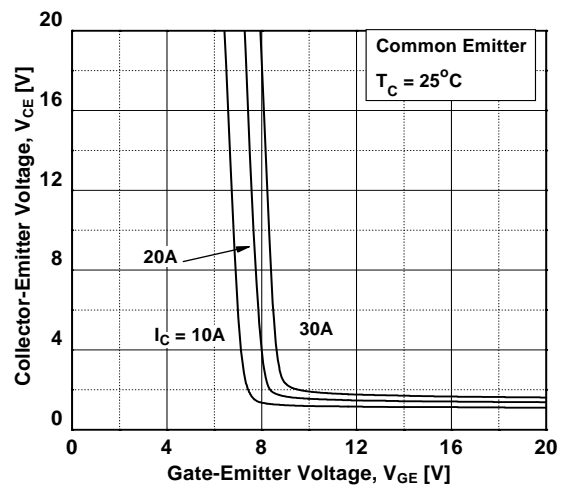
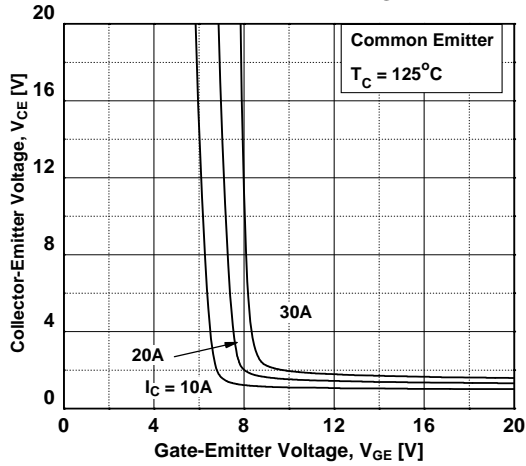


Figure 6. Saturation Voltage vs. Vge

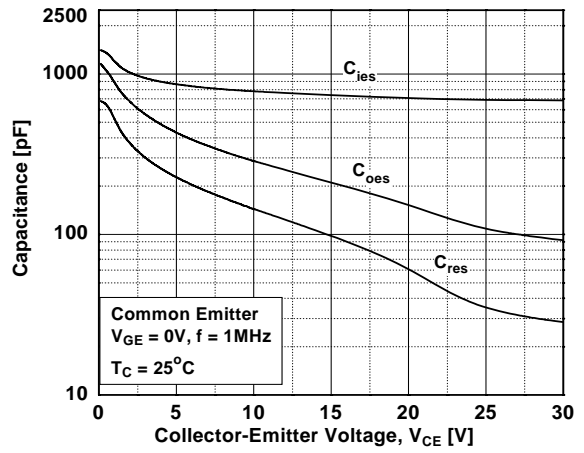


**Typical Performance Characteristics** (Continued)

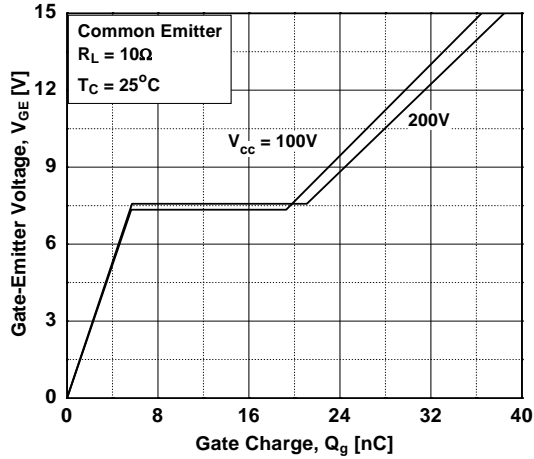
**Figure 7. Saturation Voltage vs.  $V_{GE}$**



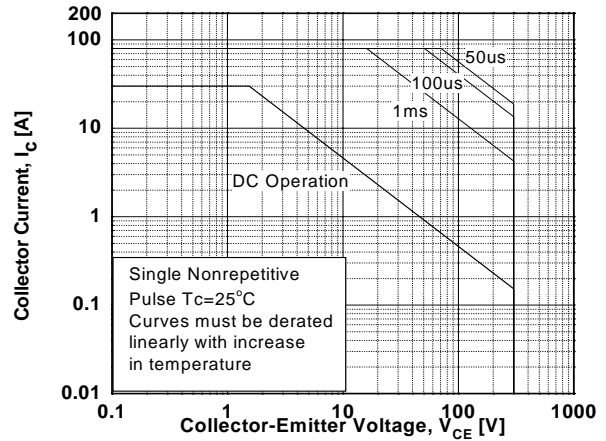
**Figure 8. Capacitance Characteristics**



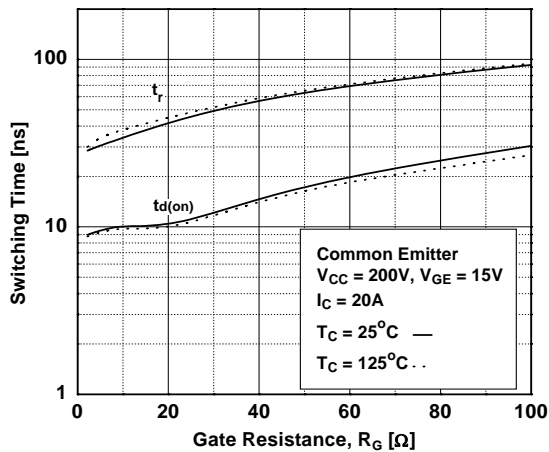
**Figure 9. Gate Charge Characteristics**



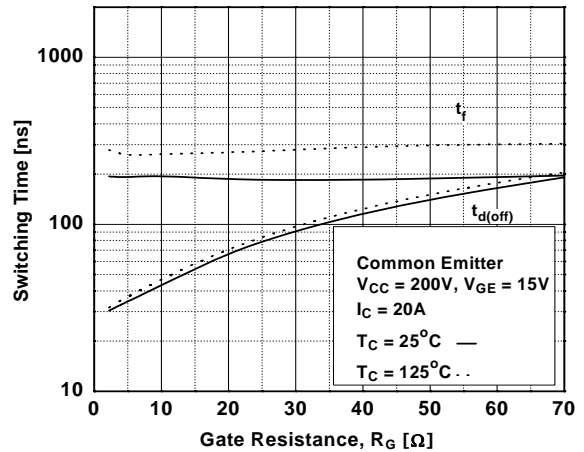
**Figure 10. SOA Characteristics**



**Figure 11. Turn-On Characteristics vs. Gate Resistance**

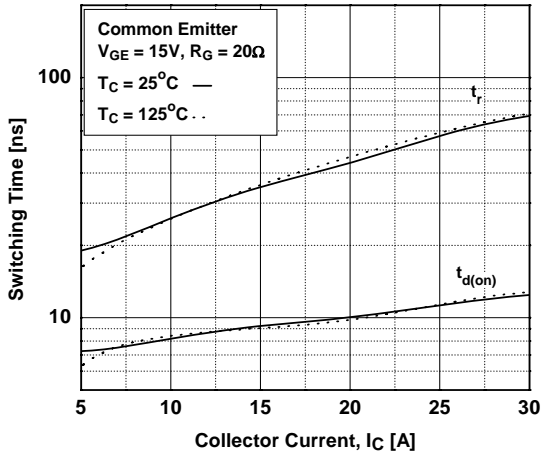


**Figure 12. Turn Off Characteristics vs. Gate Resistance**

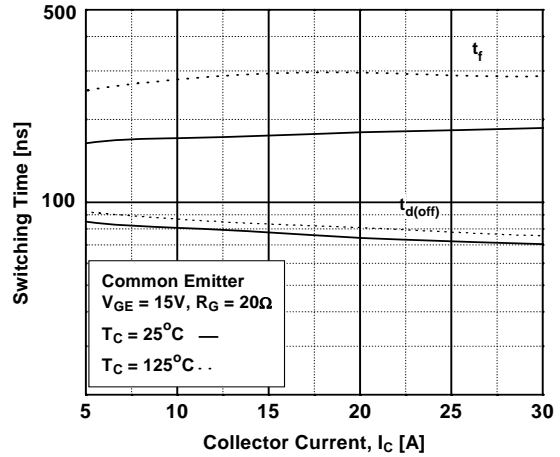


**Typical Performance Characteristics** (Continued)

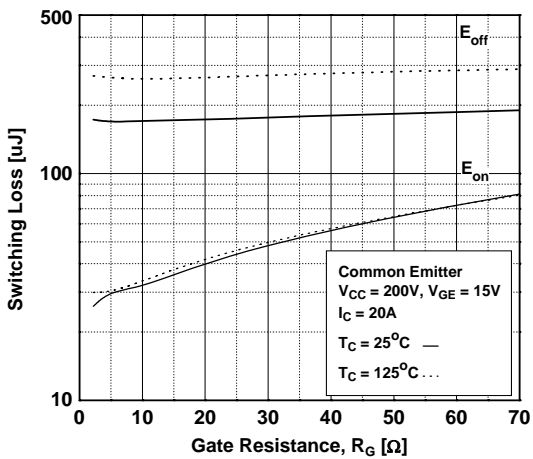
**Figure 13. Turn-On Characteristics vs. Collector Current**



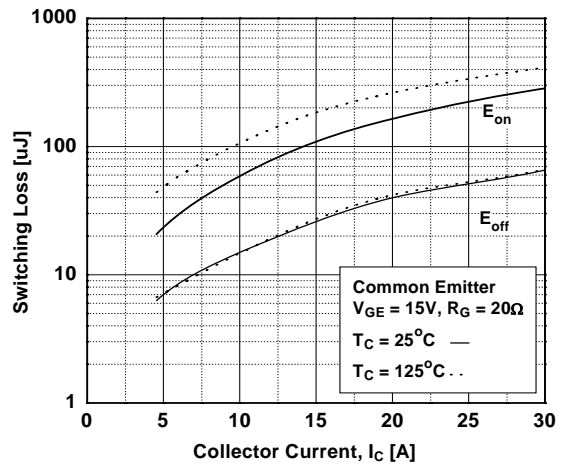
**Figure 14. Turn-Off Characteristics vs. Collector Current**



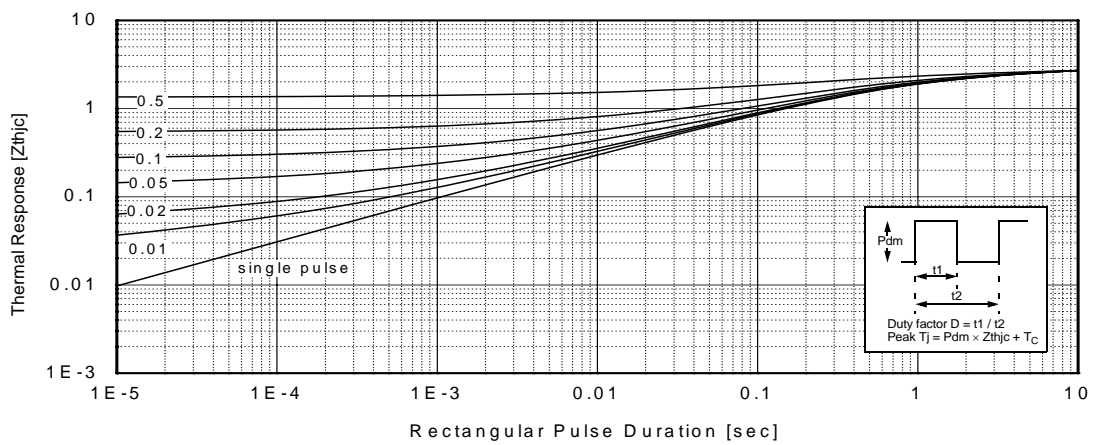
**Figure 15. Switching Loss vs Gate Resistance**



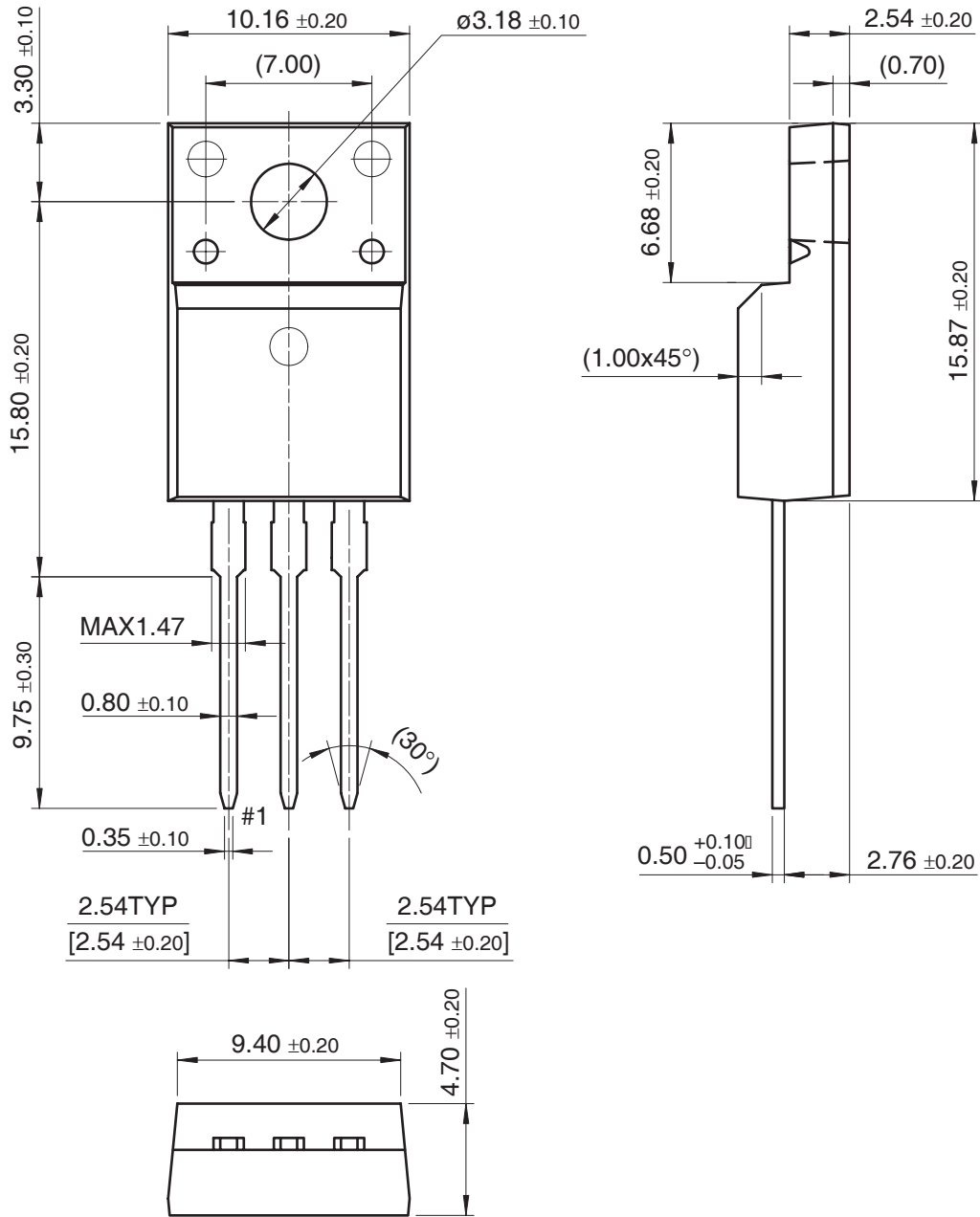
**Figure 16. Switching Loss vs Collector Current**



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



TO-220F



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