FAIRCHILD
SEMICONDUCTOR®

October 2006

FGPF90N30
300V, 90A PDP IGBT

Features

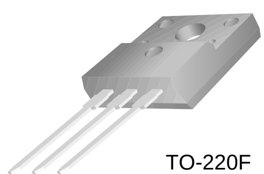
- High Current Capability
- Low saturation voltage: $V_{CE(sat)}$ =1.5V @ I_C = 60A
- High Input Impedance
- Fast switch
- RoHS Complaint

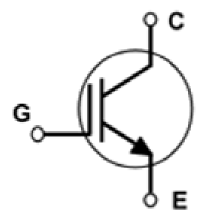
Description

Employing Unified IGBT Technology, Fairchild's PDP IGBTs provides low conduction and switching loss. FGPF90N30 offers the optimum solution for PDP applications where low-condution loss is essential.

Application

. PDP System





Absolute Maximum Ratings

Symbol	Description		FGPF90N30	Units
V_{CES}	Collector-Emitter Voltage		300	V
V_{GES}	Gate-Emitter Voltage		± 30	V
$I_{C\ pulse(1)}$	Pulsed Collector Current	@ T_C = 25°C	220	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	56.8	W
	Maximum Power Dissipation	@ T_C = 100°C	22.7	W
T_J	Operating Junction Temperature		-55 to +150	°C
T_{stg}	Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds		300	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction-to-Case	--	2.2	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	62.5	°C/W

Notes:
(1)Repetitive test , pluse width = 100usec , Duty = 0.1
* Ic_pluse limited by max Tj

Package Marking and Ordering Information

Device Marking	Device	Package	Packaging Type	Qty per Tube	Max Qty per Box
FGPF90N30	FGFP90N30TU	TO-220F	Rail / Tube	50ea	-

Electrical Characteristics $T_C = 25^oC$ 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
$\frac{\Delta B_{VCES}}{\Delta T_J}$	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0V, I_C = 250uA	--	0.6	--	V/^{o}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 =30A, V_{GE} = 15V	--	1.25	1.55	V
		I_C =60A, V_{GE} = 15V	--	1.5	--	V
		I_C = 90A, V_{GE} = 15V $T_C = 25^oC$	--	1.9	--	V
		I_C = 90A, V_{GE} = 15V $T_C = 125^oC$	--	2.0	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V f = 1MHz	--	1690	--	pF
C_{oes}	Output Capacitance		--	240	--	pF
C_{res}	Reverse Transfer Capacitance		--	80	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200 V, I_C = 60A R_G = 10Ω, V_{GE} = 15V Resistive Load, $T_C = 25^oC$	--	22	--	ns
t_r	Rise Time		--	106	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	86	--	ns
t_f	Fall Time		--	130	300	ns
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200 V, I_C = 60A R_G = 10Ω, V_{GE} = 15V Resistive Load, $T_C = 125^oC$	--	22	--	ns
t_r	Rise Time		--	119	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	91	--	ns
t_f	Fall Time		--	210	--	ns
Q_g	Total Gate Charge	V_{CE} = 200 V, I_C = 60A V_{GE} = 15V	--	93	--	nC
Q_{ge}	Gate-Emitter Charge		--	45	--	nC
Q_{gc}	Gate-Collector Charge		--	14	--	nC

Typical Performance CharacteristicsTypical Saturation VoltageCharacteristics

Figure 1. Typical Output Characteristics

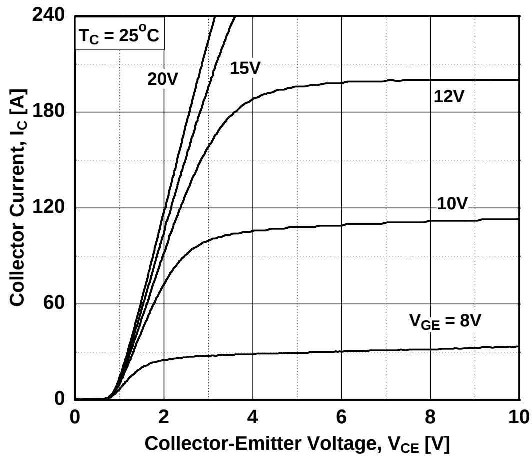


Figure 2. Typical Output Characteristics

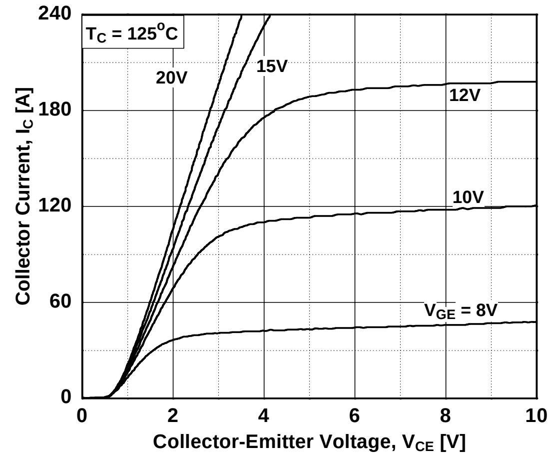


Figure 3. Saturation Voltage

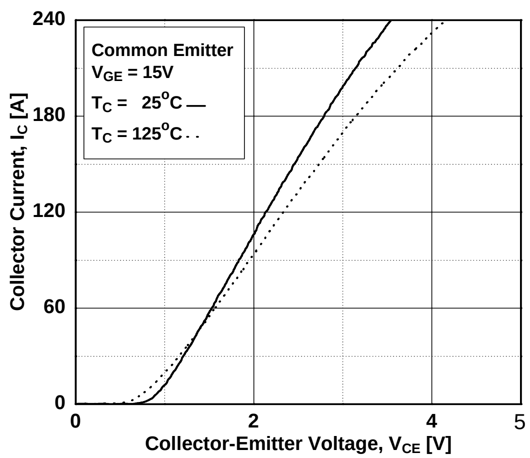


Figure 4. Transfer Characteristics

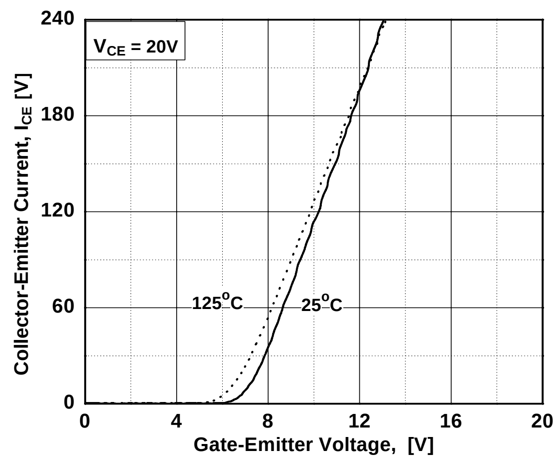


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

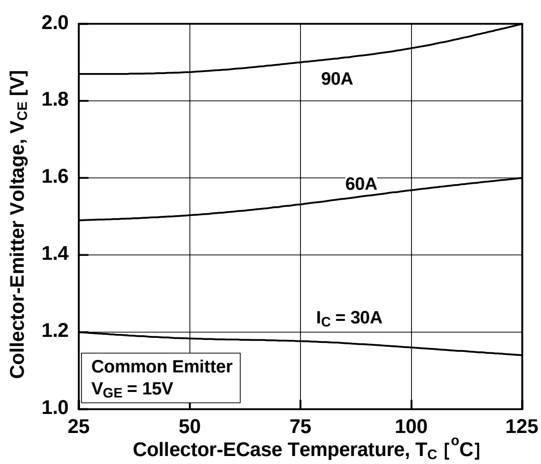
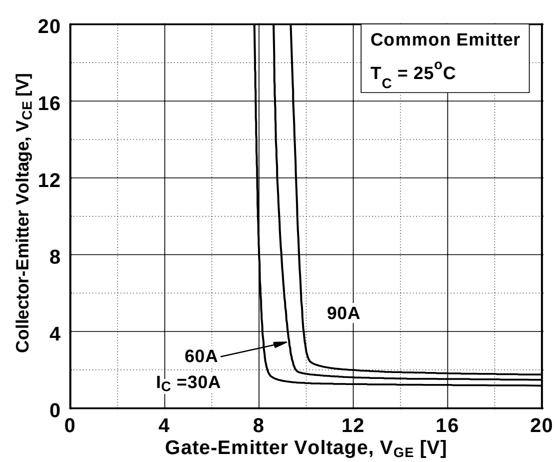


Figure 6. Saturation Voltage vs.V_{GE}



Typical Performance Characteristics (Continued)

Figure 7. Saturation Voltage vs. V_{GE}

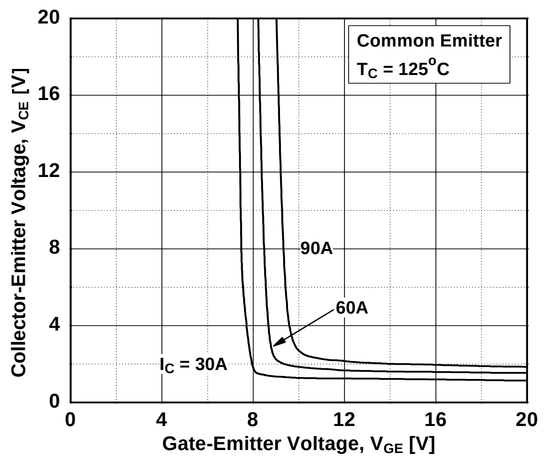


Figure 8. Capacitance Characteristics

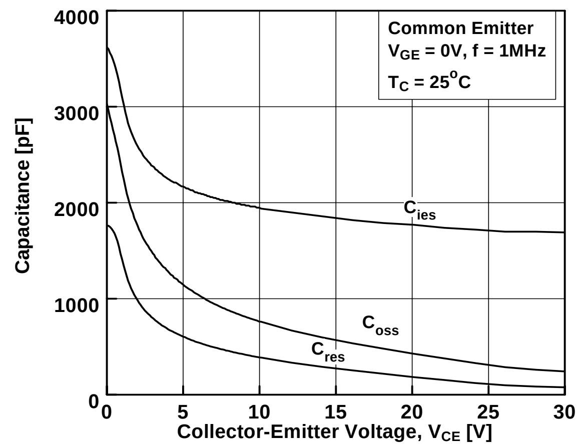


Figure 9. Gate Charge Characteristics

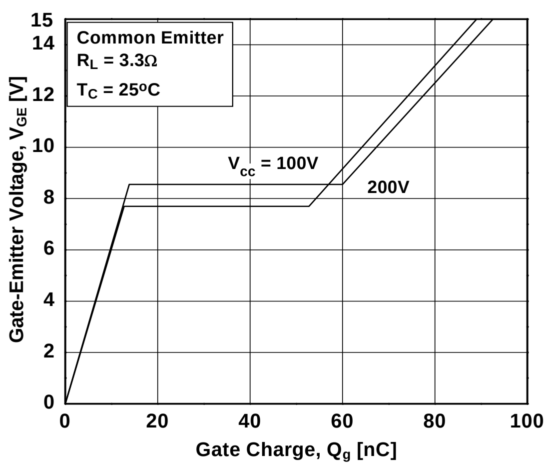


Figure 10. SOA Characteristics

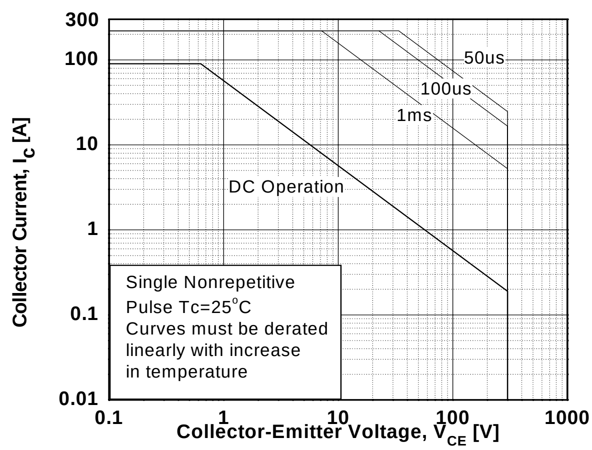


Figure 11. Turn-On Characteristics vs Gate Resistance

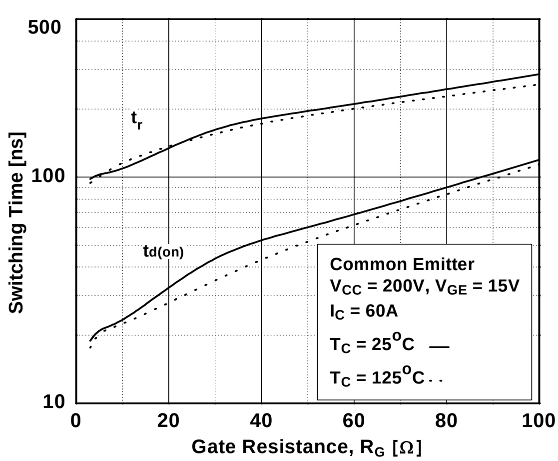
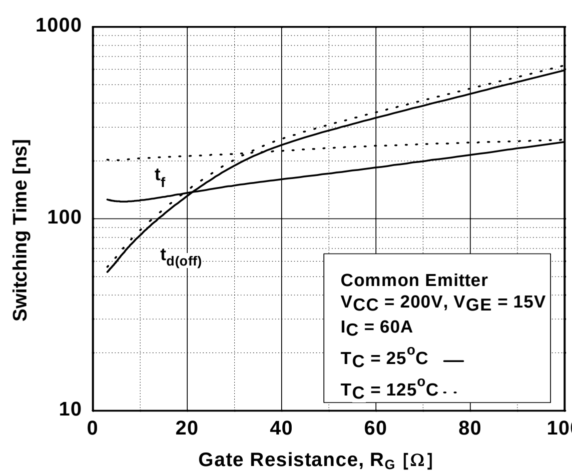


Figure 12. Turn Off Characteristics vs. Gate Resistance



Typical Performance Characteristics (Continued)

Figure 13. Turn-On Characteristics vs. Collector Current

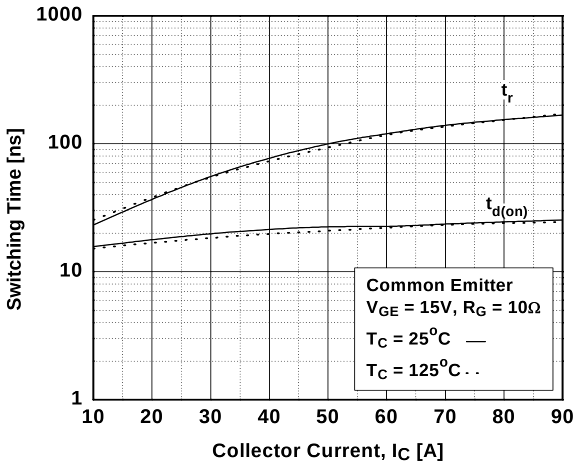


Figure 14. Turn-Off Characteristics vs. Collector Current

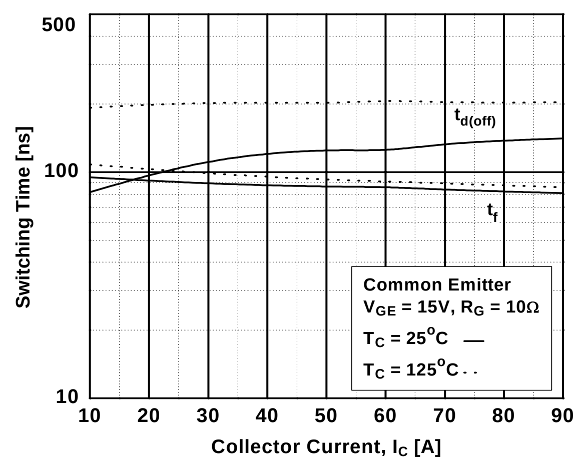


Figure 15. Switching Loss vs Gate Resistance

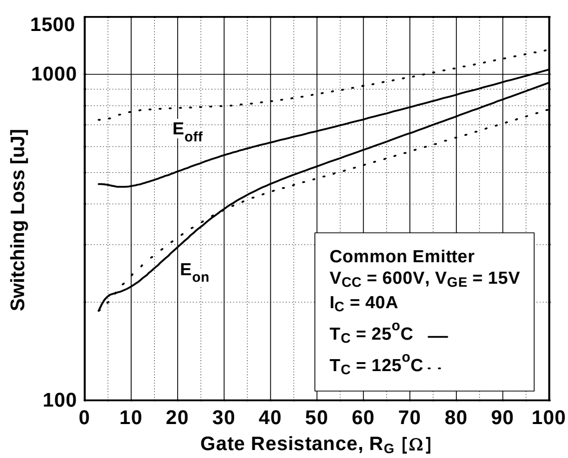


Figure 16. Switching Loss vs Collector Current

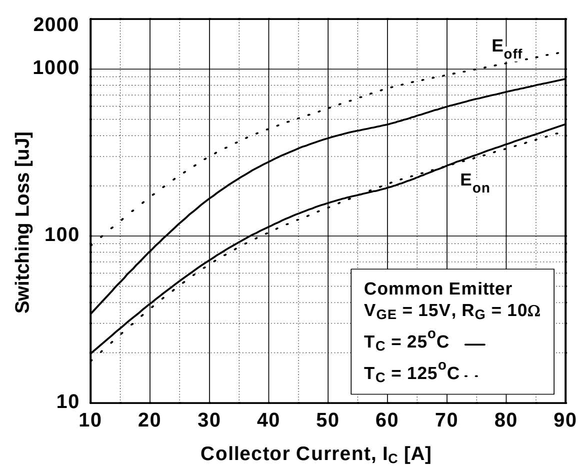
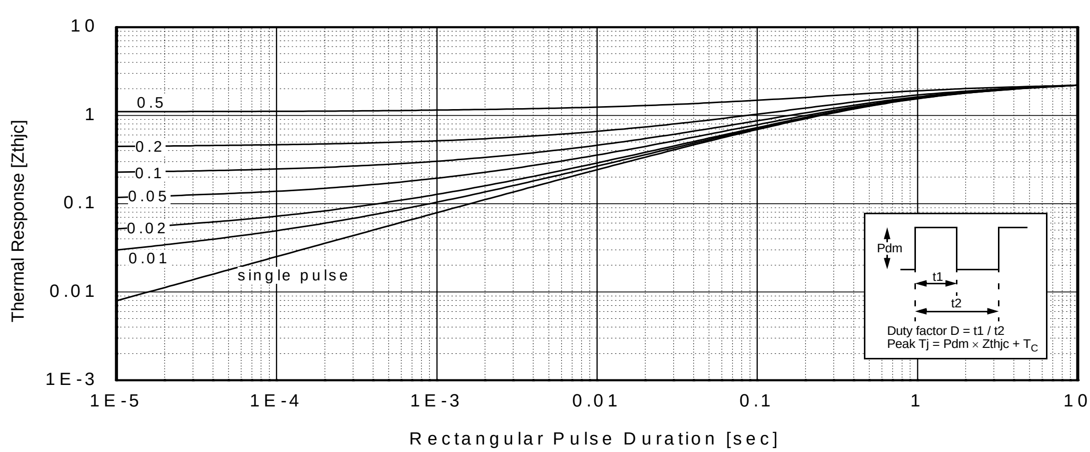
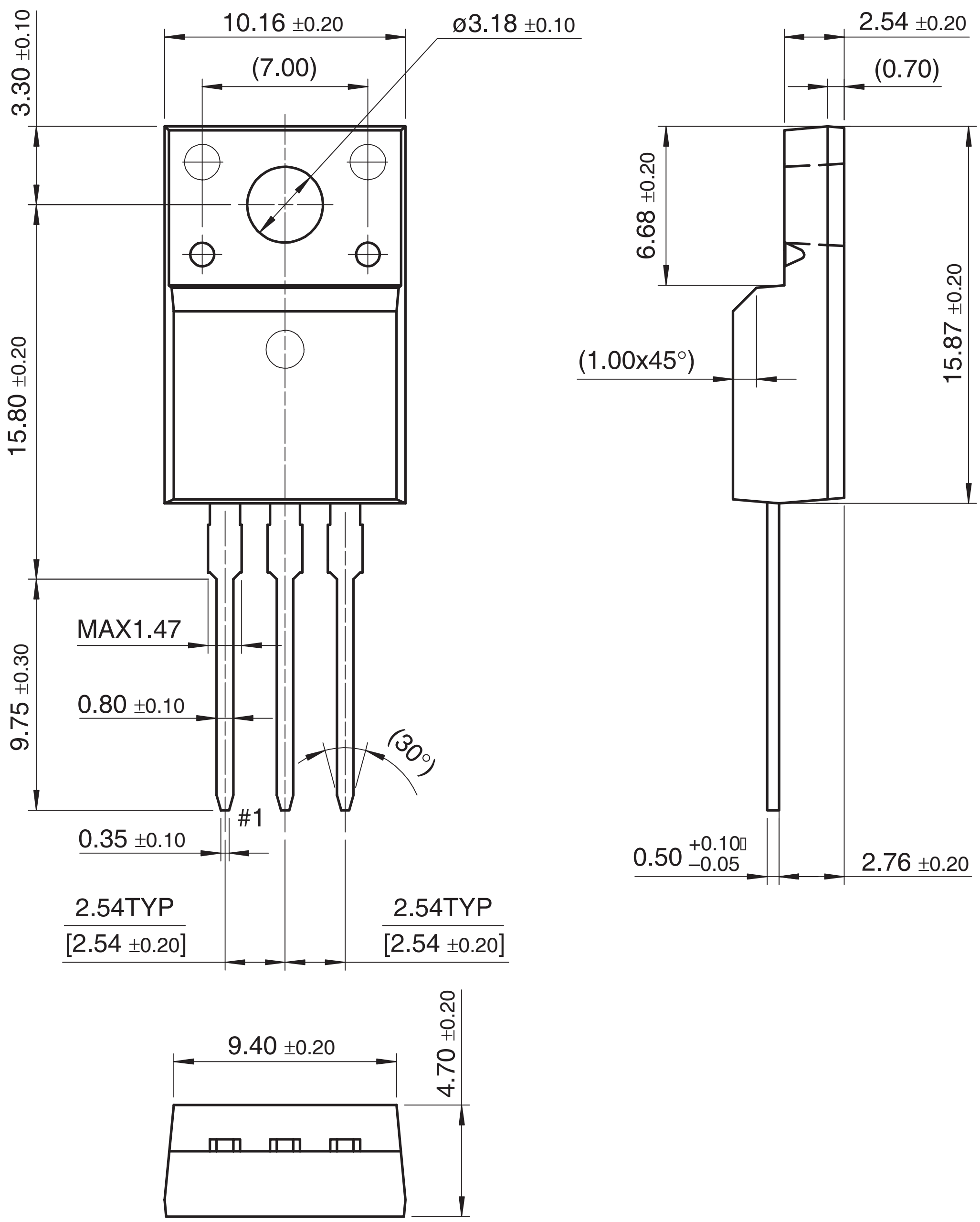


Figure 17. Transient Thermal Impedance of IGBT



TO-220F


10.16 ±0.20
ø3.18 ±0.10
(7.00)
3.30 ±0.10
15.80 ±0.20
9.75 ±0.30
MAX1.47
0.80 ±0.10
(30°)
#1
0.35 ±0.10
2.54TYP
[2.54 ±0.20]
2.54TYP
[2.54 ±0.20]
2.54 ±0.20
(0.70)
6.68 ±0.20
15.87 ±0.20
(1.00x45°)
0.50 +0.10 −0.05
2.76 ±0.20
9.40 ±0.20
4.70 ±0.20

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SyncFET™
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