FAIRCHILD SEMICONDUCTOR®

February 2009

FGPF30N30
300V, 30A PDP IGBT

Features

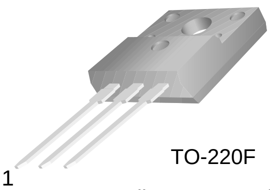
- High Current Capability
- Low saturation voltage: $V_{CE(sat)}$ =1.4V @ I_C = 20A
- High Input Impedance
- Fast switching
- RoHS Complaint

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-condution loss is essential.

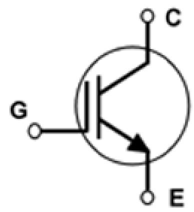
Application

. PDP System



TO-220F

1.Gate 2.Collector 3.Emitter



Absolute Maximum Ratings

Symbol	Description		FGPF30N30	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	80	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	46	W
	Maximum Power Dissipation	@ T_C = 100°C	18.5	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	--	2.7	°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
FGPF30N30	FGPF30N30TU	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
$\Delta B_{VCES}/\Delta T_J$	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 =10A, V_{GE} = 15V	--	1.2	1.5	V
		I_C =20A, V_{GE} = 15V	--	1.4	--	V
		I_C = 30A, V_{GE} = 15V T_C = 25^{o}C	--	1.8	--	V
		I_C = 30A, V_{GE} = 15V T_C = 125^{o}C	--	1.9	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V f = 1MHz	--	685	--	pF
C_{oes}	Output Capacitance		--	95	--	pF
C_{res}	Reverse Transfer Capacitance		--	30	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200 V, I_C = 20A R_G = 20Ω, V_{GE} = 15V Resistive Load, T_C = 25^{o}C	--	10	--	ns
t_r	Rise Time		--	44	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	76	--	ns
t_f	Fall Time		--	180	300	ns
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200 V, I_C = 20A R_G = 20Ω, V_{GE} = 15V Resistive Load, T_C = 125^{o}C	--	10	-	ns
t_r	Rise Time		--	46	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	82	--	ns
t_f	Fall Time		--	270	--	ns
Q_g	Total Gate Charge	V_{CE} = 200 V, I_C = 20A V_{GE} = 15V	--	39	--	nC
Q_{ge}	Gate-Emitter Charge		--	6	--	nC
Q_{gc}	Gate-Collector Charge		--	16	--	nC

Typical Performance CharacteristicsTypical Saturation VoltageCharacteristics

Figure 1. Typical Output Characteristics

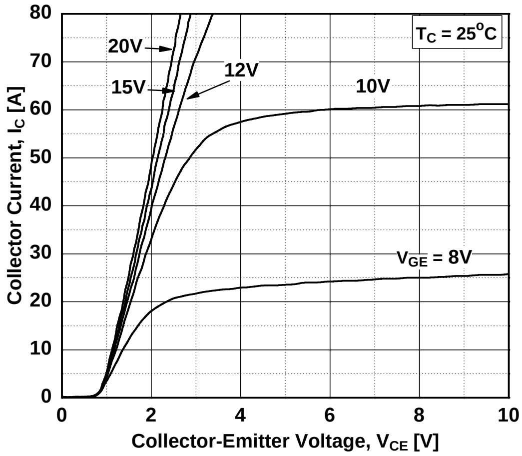


Figure 2. Typical Output Characteristics

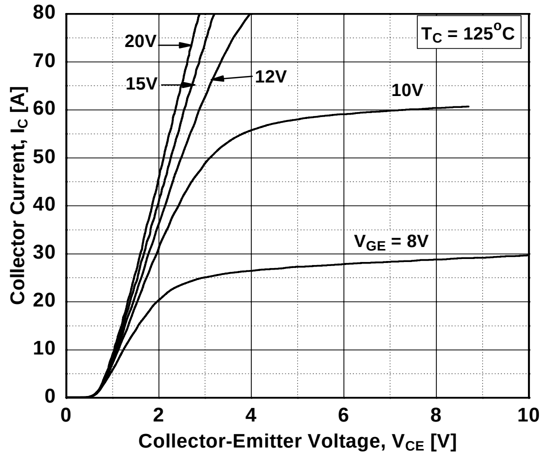


Figure 3. Saturation Voltage

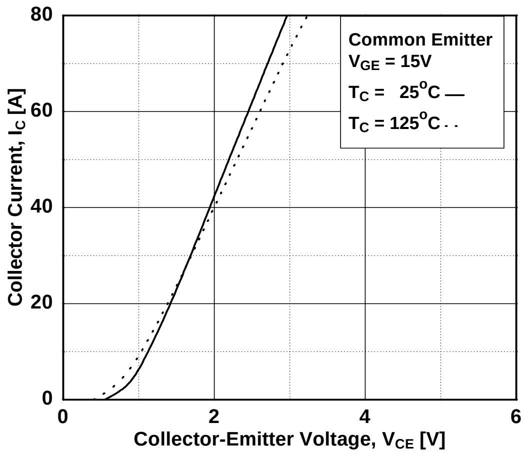


Figure 4. Transfer Characteristics

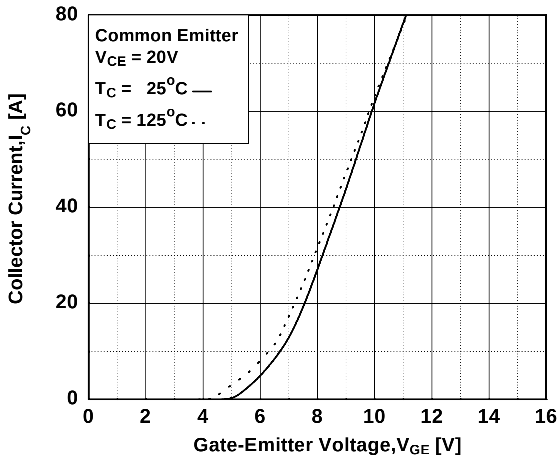


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

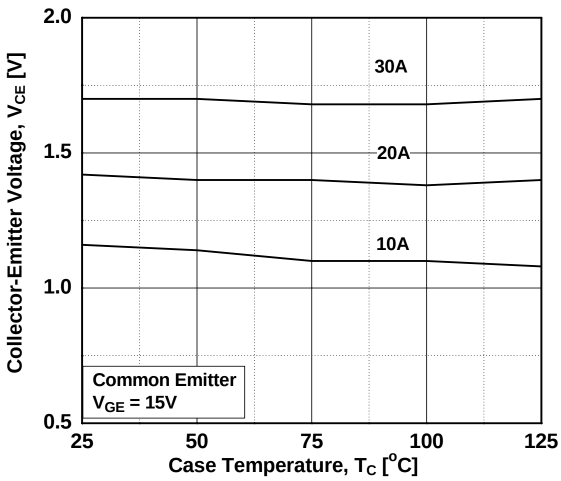
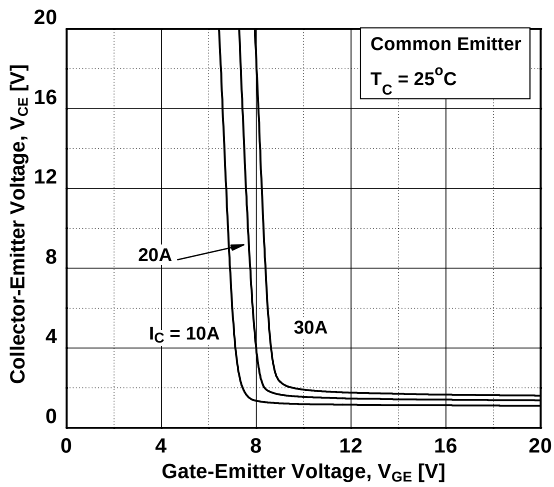


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics (Continued)

Figure 7. Saturation Voltage vs.V_{GE}

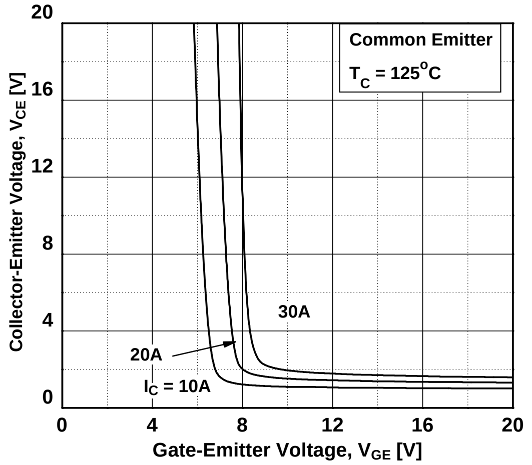


Figure 8. Capacitance Characteristics

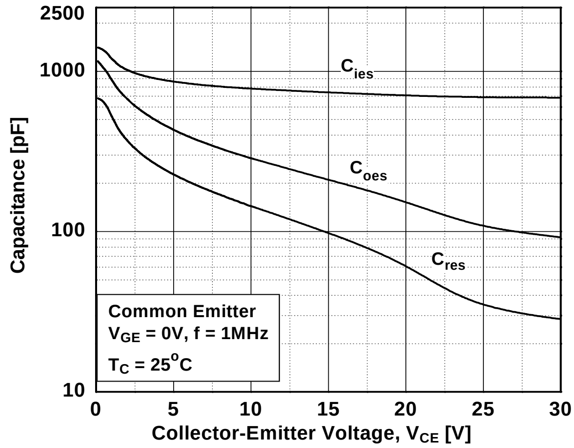


Figure 9. Gate Charge Characteristics

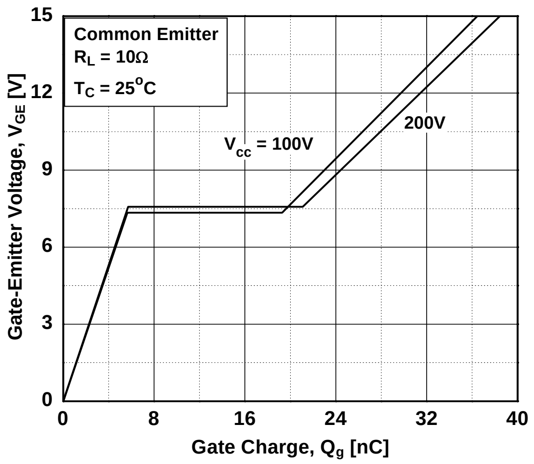


Figure 10. SOA Characteristics

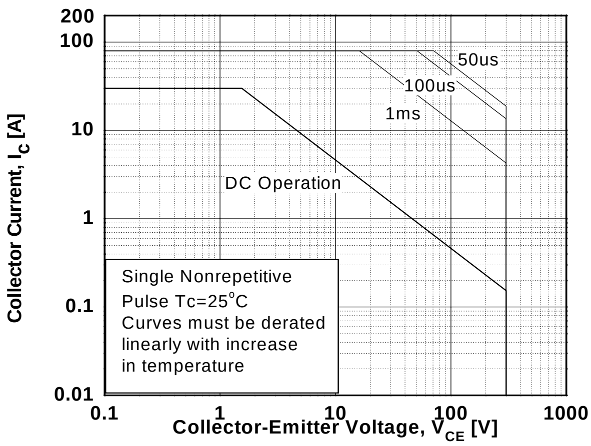


Figure 11. Turn-On Characteristics vs. Gate Resistance

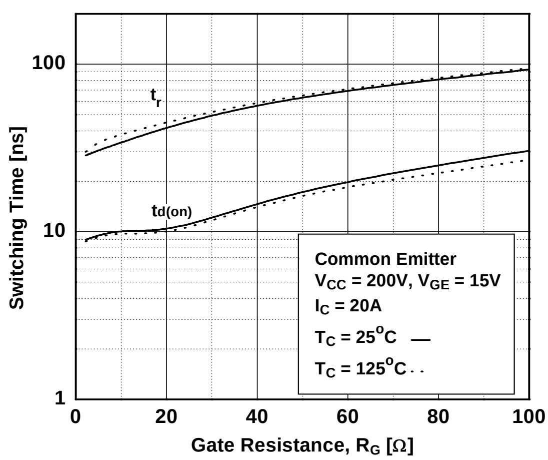
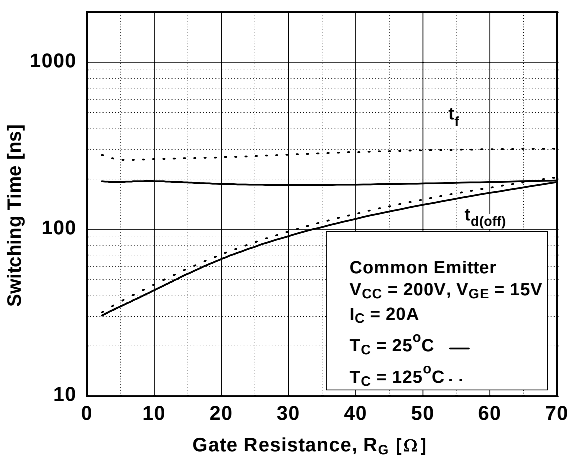


Figure 12. Turn Off Characteristics vs. Gate Resistance



Typical Performance Characteristics (Continued)

Figure 13. Turn-On Characteristics vs. Collector Current

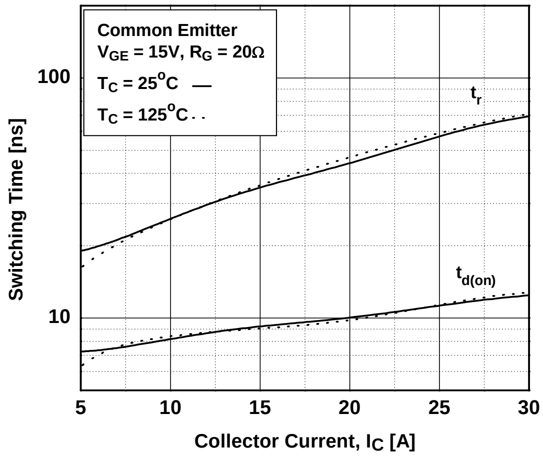


Figure 14. Turn-Off Characteristics vs. Collector Current

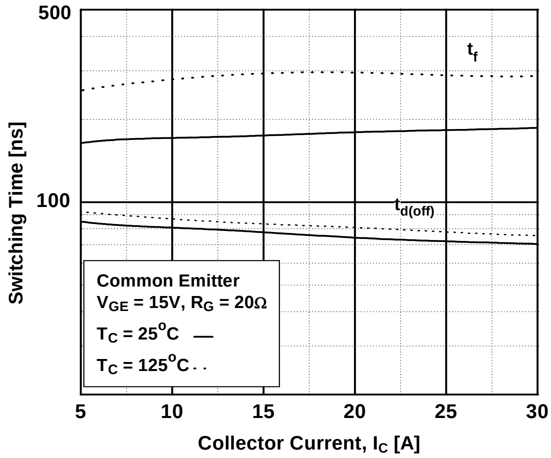


Figure 15. Switching Loss vs Gate Resistance

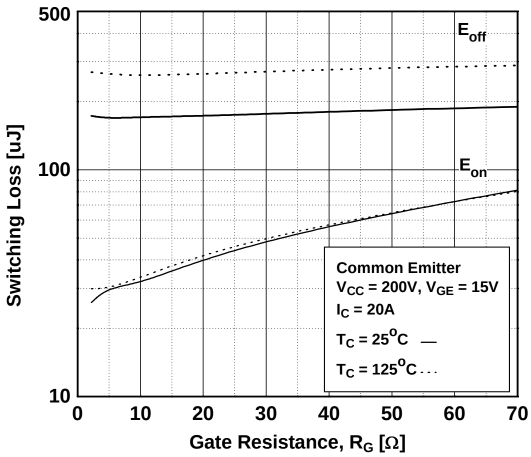


Figure 16. Switching Loss vs Collector Current

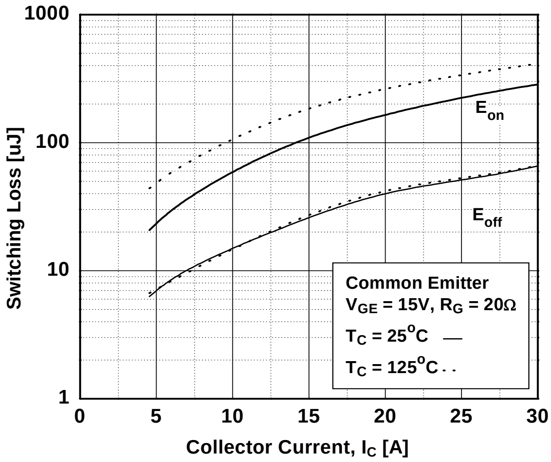
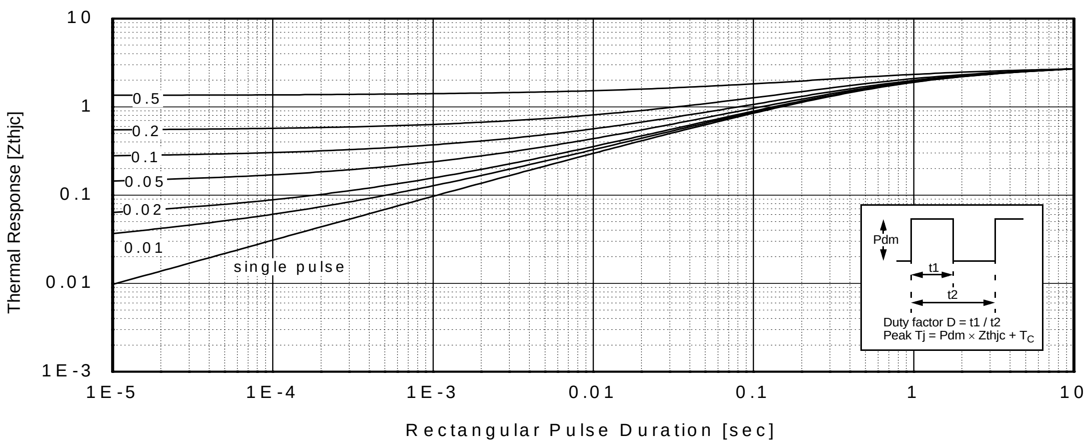
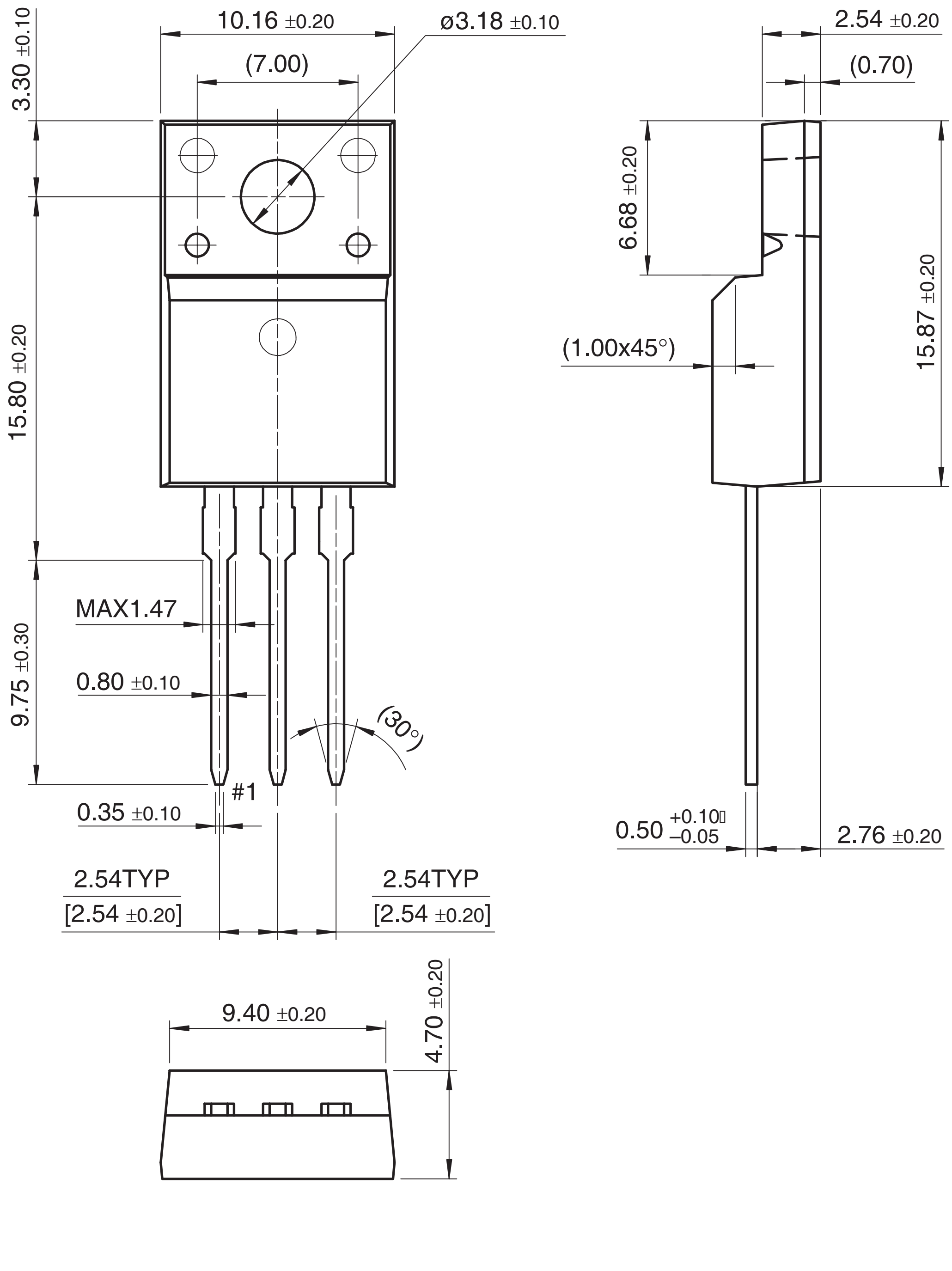


Figure 17. Transient Thermal Impedance of IGBT



TO-220F



10.16 ±0.20
(7.00)
ø3.18 ±0.10
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
(1.00x45°)
15.87 ±0.20
0.50 +0.10 −0.05
2.76 ±0.20
9.40 ±0.20
4.70 ±0.20

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™
ActiveArray™
Bottomless™
Build it Now™
CoolFET™
CROSSVOLT™
DOME™
EcoSPARK™
E^2CMOS™
EnSigna™
FACT™
FAST®
FASTr™
FPS™
FRFET™
FACT Quiet Series™
GlobalOptoisolator™
GTO™
HiSeC™
I^2C™
i-Lo™
ImpliedDisconnect™
IntelliMAX™
ISOPLANAR™
LittleFET™
MICROCOUPLER™
MicroFET™
MicroPak™
MICROWIRE™
MSX™
MSXPro™
Across the board. Around the world.™
The Power Franchise®
Programmable Active Droop™
OCX™
OCXPro™
OPTOLOGIC®
OPTOPLANAR™
PACMAN™
POP™
Power247™
PowerEdge™
PowerSaver™
PowerTrench®
QFET®
QS™
QT Optoelectronics™
Quiet Series™
RapidConfigure™
RapidConnect™
µSerDes™
ScalarPump™
SILENT SWITCHER®
SMART START™
SPM™
Stealth™
SuperFET™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SyncFET™
TCM™
TinyBoost™
TinyBuck™
TinyPWM™
TinyPower™
TinyLogic®
TINYOPTO™
TruTranslation™
UHC™
UniFET™
UltraFET®
VCX™
Wire™

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

Rev. I20