FAIRCHILD SEMICONDUCTOR®

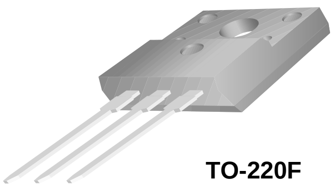
September 2007

FGPF30N30TD
300V, 30A PDP Trench IGBT

Features
- High current capability
- Low saturation voltage: $V_{CE(sat)}$ =1.4V @ I_C = 20A
- High input impedance
- Fast switching
- RoHS complaint

Applications
- PDP System

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



TO-220F

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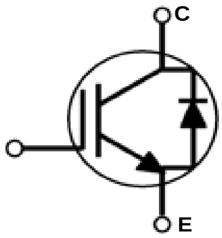
1.Gate 2.Collector 3.Emitter



Absolute Maximum Ratings

Symbol	Description		Ratings	Units
V_{CES}	Collector to Emitter Voltage		300	V
V_{GES}	Gate to Emitter Voltage		± 30	V
$I_{C\ pulse\ (1)}$	Pulsed Collector Current	@ T_C = 25^{o}C	80	A
I_F	Diode Continuous Forward Current	@ T_C = 100°C	10	A
I_{FM}	Diode Maximum Forward Current		40	A
P_D	Maximum Power Dissipation	@ T_C = 25^{o}C	44.6	W
	Maximum Power Dissipation	@ T_C = 100^{o}C	17.8	W
T_J	Operating Junction Temperature		-55 to +150	^{o}C
T_{stg}	Storage Temperature Range		-55 to +150	^{o}C
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds		300	^{o}C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction to Case	-	2.8	^{o}C/W
$R_{\theta JC}$(DIODE)	Thermal Resistance, Junction-to-Case for Diode	--	3.0	^{o}C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	62.5	^{o}C/W

Notes :
(1) Repetitive tese, Pulse 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
FGPF30N30TD	FGPF30N30TDTU	TO-220F	Rail / Tube	50ea	-

Electrical Characteristics of the IGBT

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 250μA	300	-	-	V
$\Delta BV_{CES}/\Delta T_J$	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0V, I_C = 250μA	-	0.26	-	V/°C
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}$, V_{GE} = 0V	-	-	100	μA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}$, V_{CE} = 0V	-	-	±400	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 250μA, $V_{CE} = V_{GE}$	3.0	4.5	5.5	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°C	-	1.7	-	V
		I_C = 30A, V_{GE} = 15V, T_C = 125°C	-	1.6	-	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	-	1540	--	pF
C_{oes}	Output Capacitance		-	65	--	pF
C_{res}	Reverse Transfer Capacitance		-	55	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200V, I_C = 20A, R_G = 20Ω, V_{GE} = 15V, Inductive Load, T_C = 25°C	-	22	--	ns
t_r	Rise Time		-	33	--	ns
$t_{d(off)}$	Turn-Off Delay Time		-	130	--	ns
t_f	Fall Time		-	180	300	ns
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200V, I_C = 20A, R_G = 20Ω, V_{GE} = 15V, Inductive Load, T_C = 125°C	-	21	--	ns
t_r	Rise Time		-	34	--	ns
$t_{d(off)}$	Turn-Off Delay Time		-	140	--	ns
t_f	Fall Time		-	260	--	ns
Q_g	Total Gate Charge	V_{CE} = 200V, I_C = 20A, V_{GE} = 15V	-	65	--	nC
Q_{ge}	Gate to Emitter Charge		-	10	--	nC
Q_{gc}	Gate to Collector Charge		-	26	--	nC

Electrical Characteristics of DIODE T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	I_F = 10A	T_C = 25°C	--	1.1	1.4	V
			T_C = 125°C	--	0.9	--	
t_{rr}	Diode Reverse Recovery Time	I_F = 10A dI/dt = 200A/μs Diode Forward Voltage	T_C = 25°C	--	22	--	ns
			T_C = 125°C	--	35	--	
I_{rr}	Diode Peak Reverse Recovery Current		T_C = 25°C	--	2.7	--	A
			T_C = 125°C	--	5.6	--	
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25°C	--	29.7	--	nC
			T_C = 125°C	--	98	--	

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

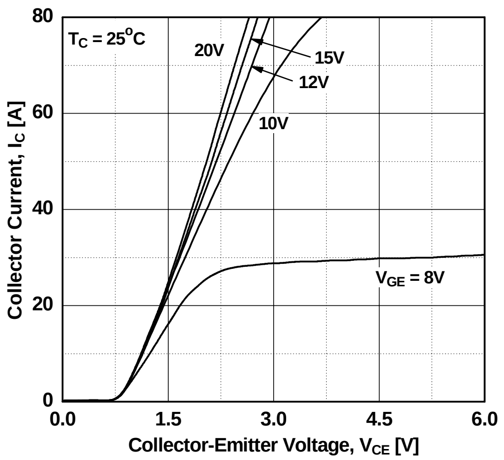


Figure 2. Typical Saturation Voltage Characteristics

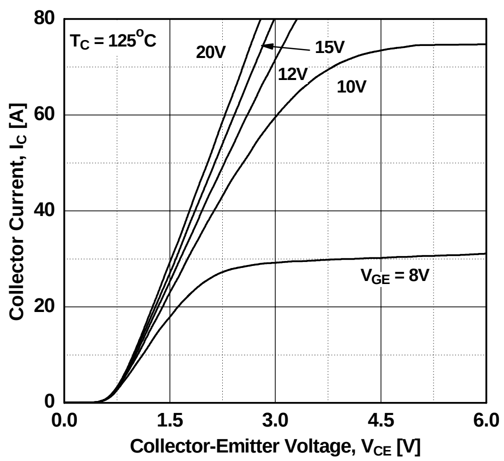


Figure 3. Typical Saturation Voltage Characteritics

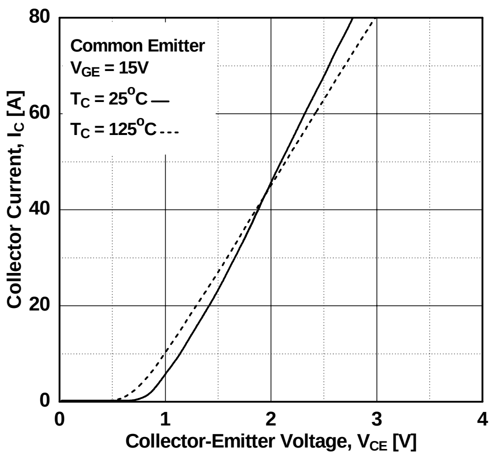


Figure 4. Transfer Characteristics

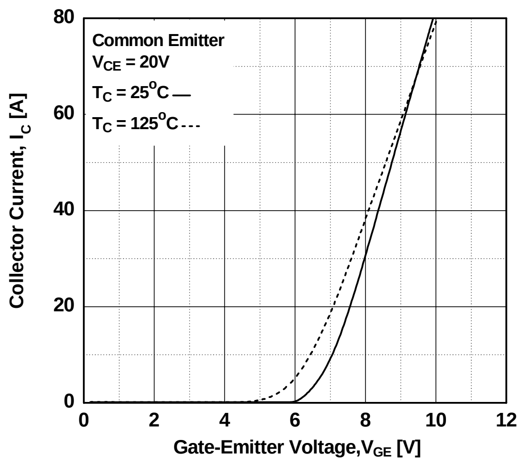


Figure 5. Saturation Voltage vs. Case

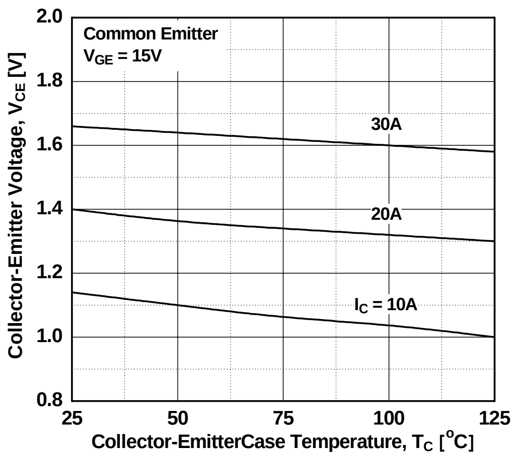
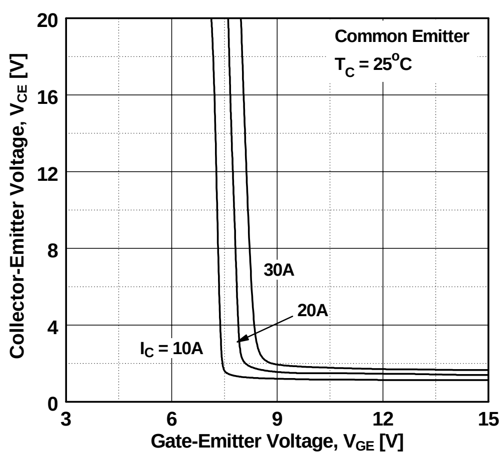


Figure 6. Saturation Voltage vs. Vge



Typical Performance Characteristics (Continued)

Figure 7. Saturation Voltage vs. Vge

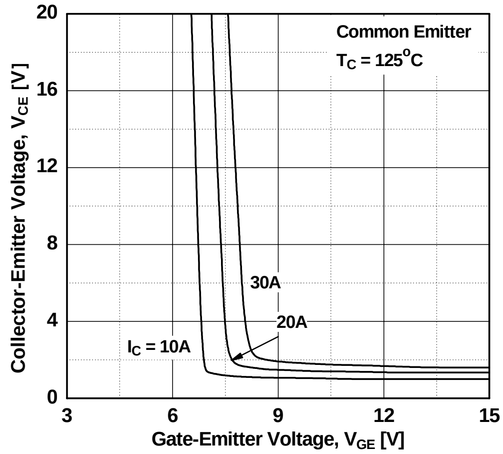


Figure 8. Capacitance Characteristics

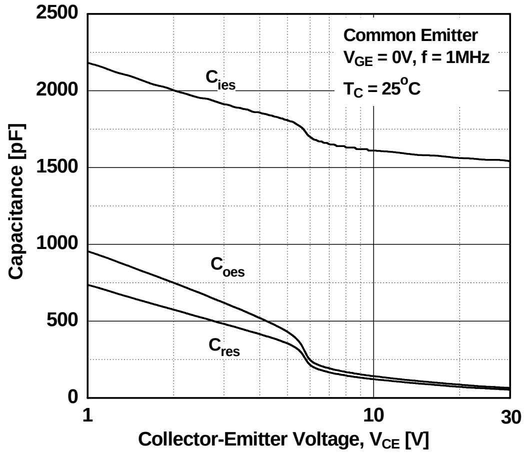


Figure 9. Gate Charge Characteristics

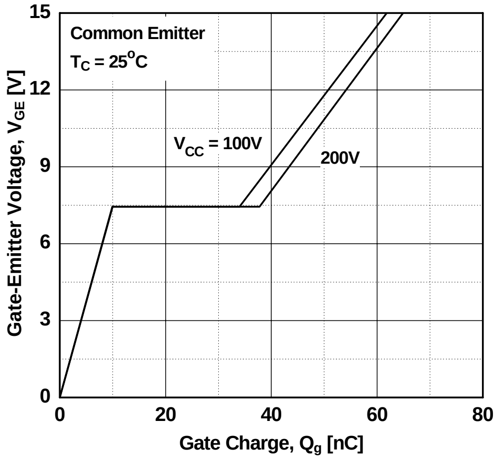


Figure 10. SOA Characteristics

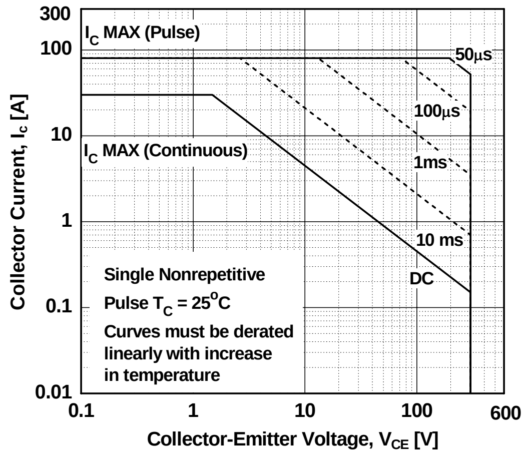


Figure 11. Turn-On Characteristics vs. Gate Resistance

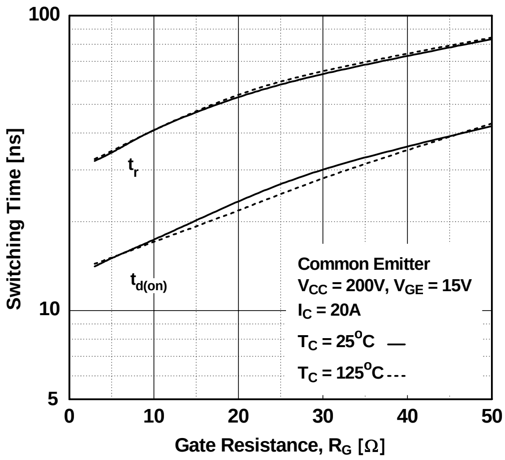
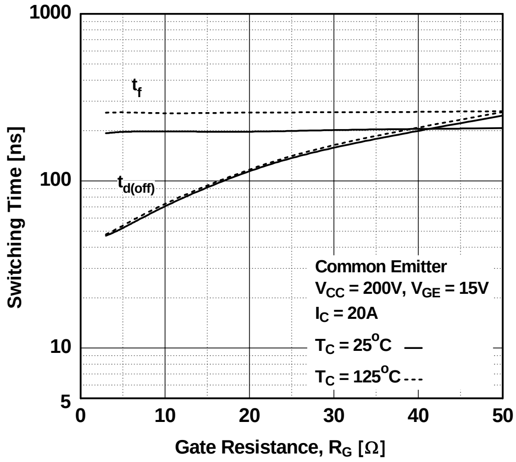


Figure 12. Turn-Off Characteristics vs. Gate Resistance



Typical Performance Characteristics (Continued)

Figure 13. Turn-On Characteristics vs. Collector Current

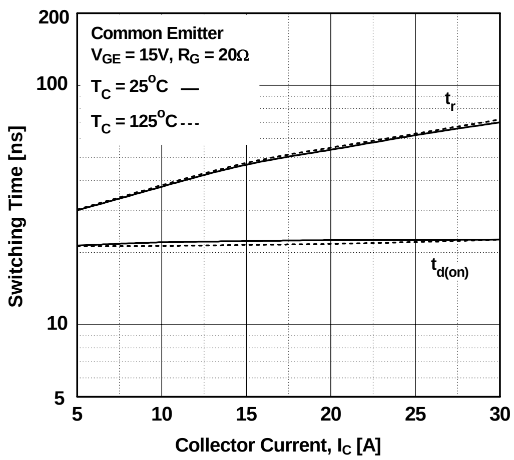


Figure 14. Turn-Off Characteristics vs. Collector Current

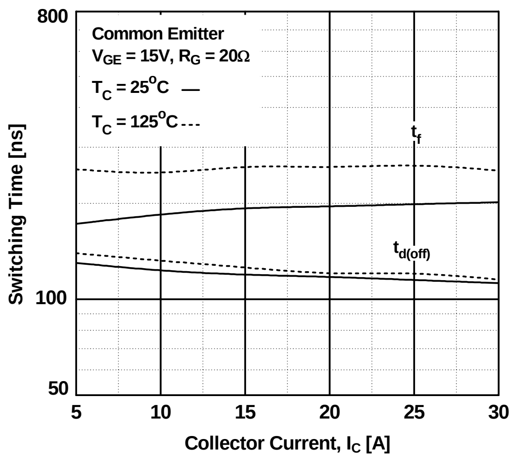


Figure 15. Switching Loss vs Gate Resistance

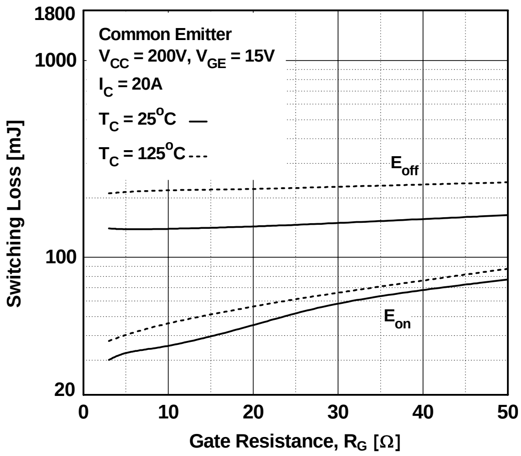


Figure 16. Switching Loss vs Collector Current

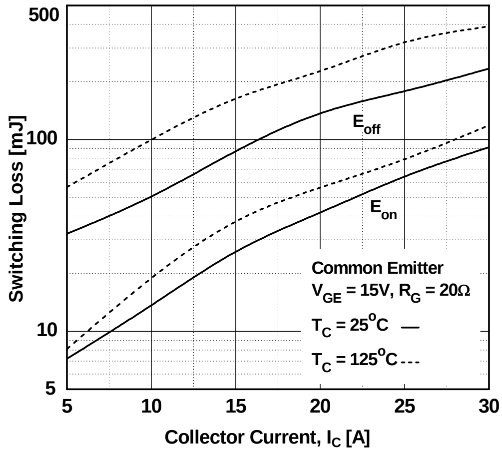
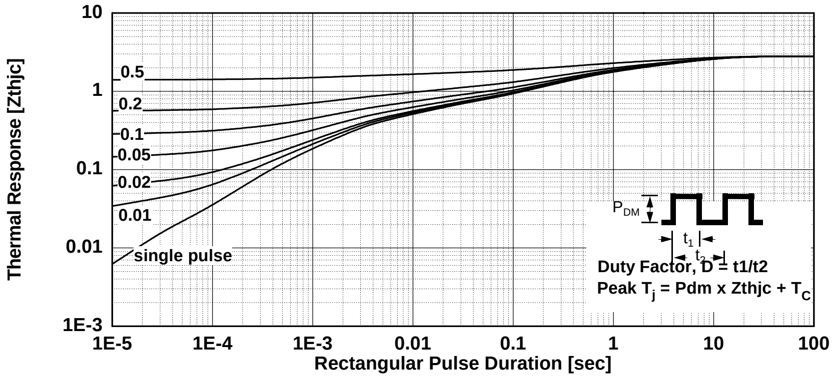


Figure 17. Transient Thermal Impedance of IGBT



Typical Performance Characteristics (Continued)

Figure 18. Forward Characteristics

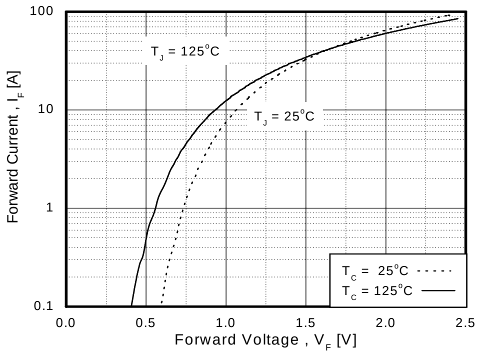
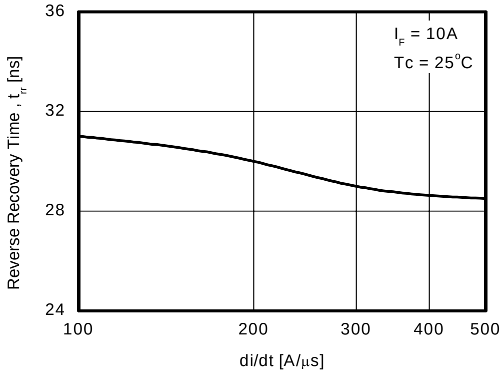
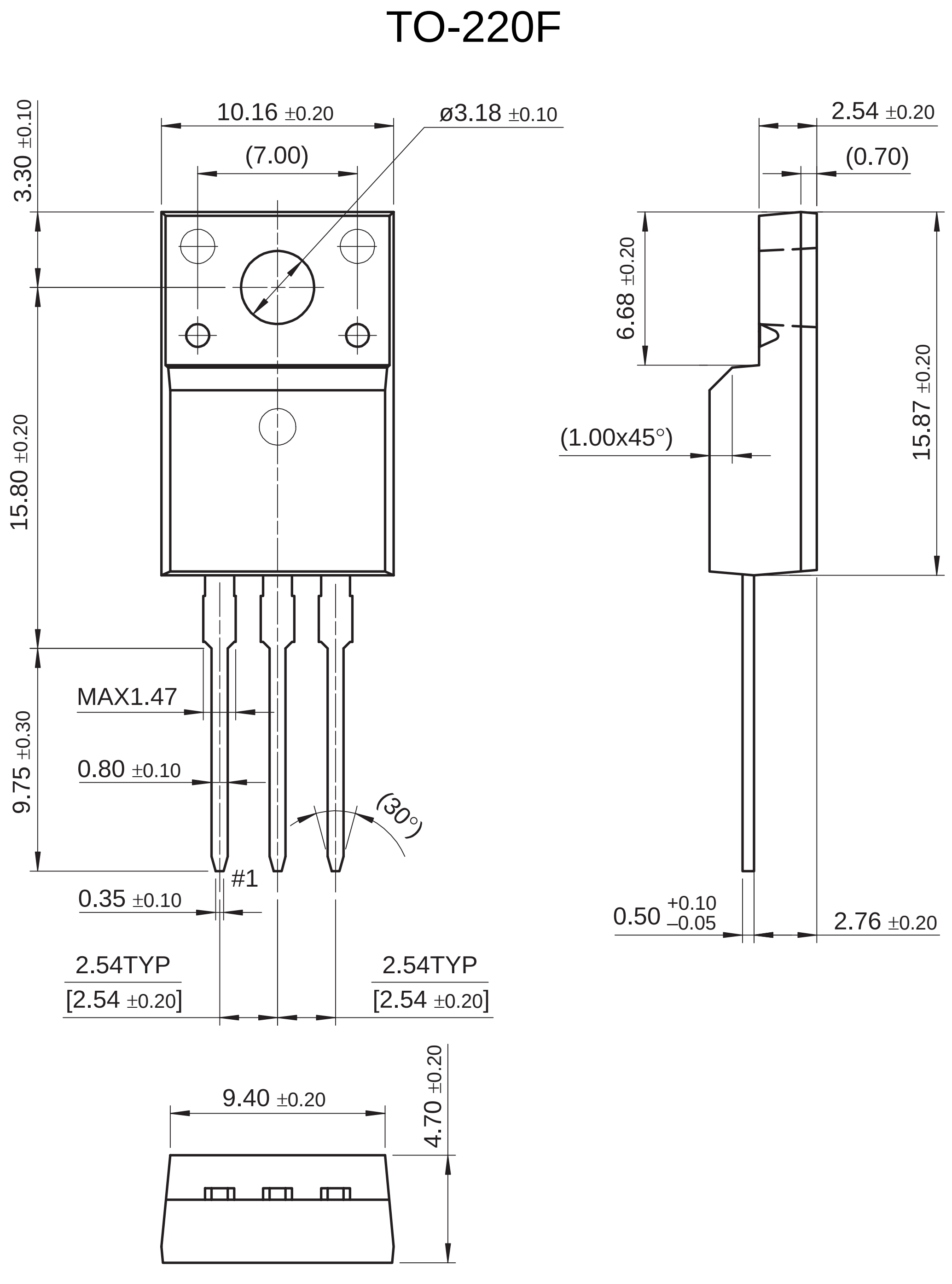


Figure 19. Typical Reverse Recovery Time



Mechanical Dimensions



Dimensions in Millimeters

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MicroPak™
Motion-SPM™
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SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
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Datasheet Identification	Product Status	Definition
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