

FGPF30N30D

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

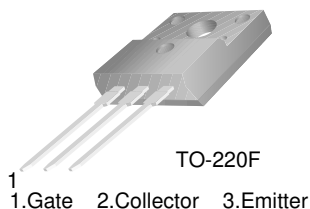
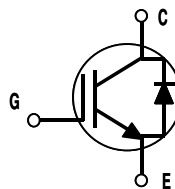


Application

. PDP System

General Description

Employing Unified IGBT Technology, Fairchild's PDP IGBTs provides low conduction and switching loss. FGPF30N30D offers the optimum solution for PDP applications where low-conduction loss is essential.



Absolute Maximum Ratings

Symbol	Description	FGPF30N30D	Units
V_{CES}	Collector-Emitter Voltage	300	V
V_{GES}	Gate-Emitter Voltage	± 30	V
$I_{C \text{ pulse}(1)}$	Pulsed Collector Current @ $T_C = 25^\circ C$	80	A
I_F	Diode Continuous Forward Current @ $T_C = 100^\circ C$	10	A
I_{FM}	Diode Maximum Forward Current	40	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
$R_{\theta JC}(\text{IGBT})$	Thermal Resistance, Junction-to-Case	--	2.7	$^\circ C/W$
$R_{\theta JC}(\text{DIODE})$	Thermal Resistance, Junction-to-Case for Diode	--	3.0	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	62.5	$^\circ C/W$

Notes:

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

* $I_{C \text{ pulse}}$ limited by max T_J

Package Marking and Ordering Information

Device Marking	Device	Package	Packaging Type	Qty per Tube	Max Qty per Box
FGPF30N30D	FGFP30N30DTU	TO-220F	Rail / Tube	50ea	-

Electrical Characteristics $T_C = 25^\circ\text{C}$ 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
ΔB _{V_{CES}} / ΔT _J	Temperature Coefficient of Breakdown Voltage	V _{GE} = 0V, I _C = 250uA	--	0.6	--	V/°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°C	--	1.8	--	V
		I _C = 30A, V _{GE} = 15V T _C = 125°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°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°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

Electrical Characteristics of DIODE $T_C = 25^\circ\text{C}$ 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	T _C = 25°C	--	21	--	ns
			T _C = 125°C	--	35	--	
I _{rr}	Diode Peak Reverse Recovery Current		T _C = 25°C	--	2.8	--	A
			T _C = 125°C	--	5.6	--	
Q _{rr}	Diode Reverse Recovery Charge		T _C = 25°C	--	29.4	--	nC
			T _C = 125°C	--	98	--	

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

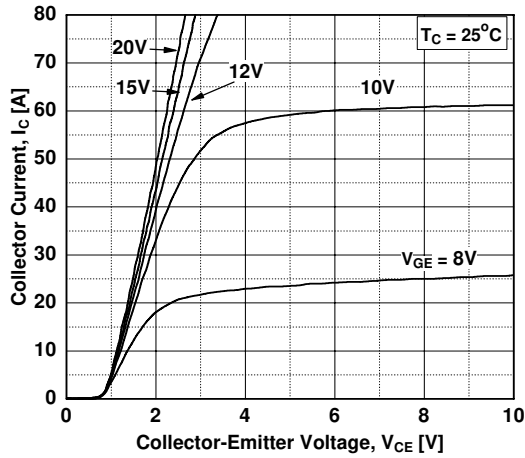


Figure 2. Typical Output Characteristics

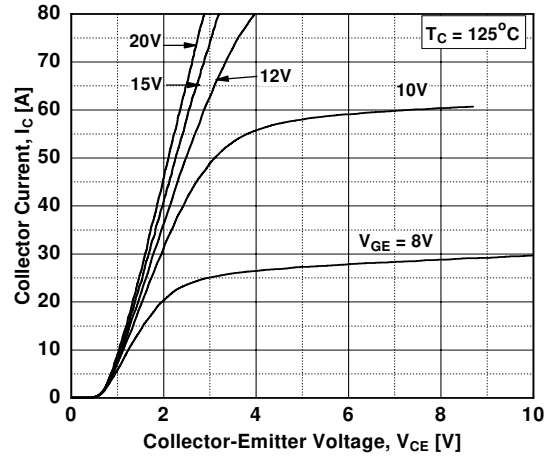


Figure 3. Saturation Voltage

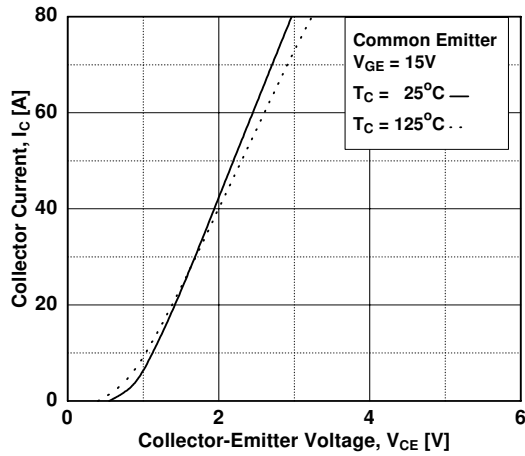


Figure 4. Transfer Characteristics

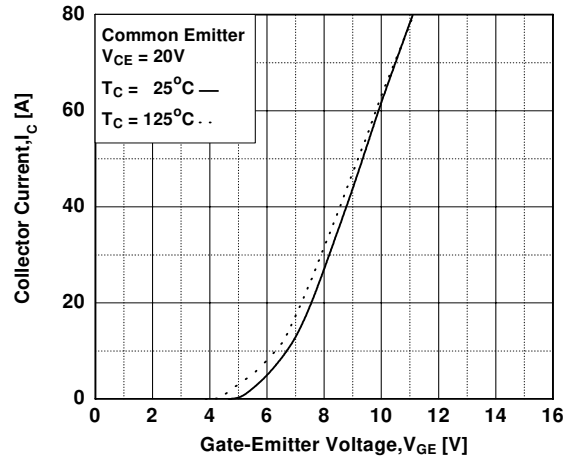


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

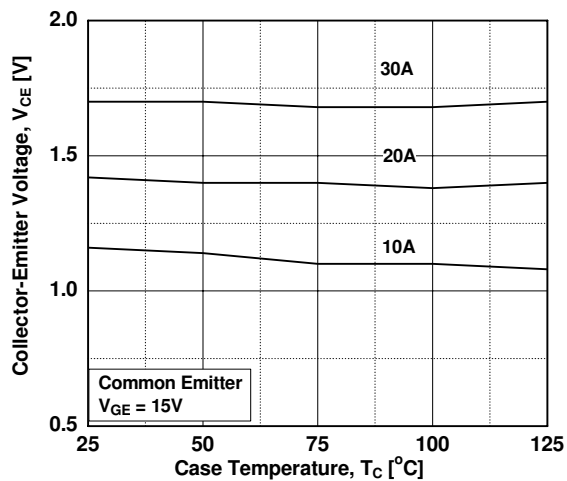
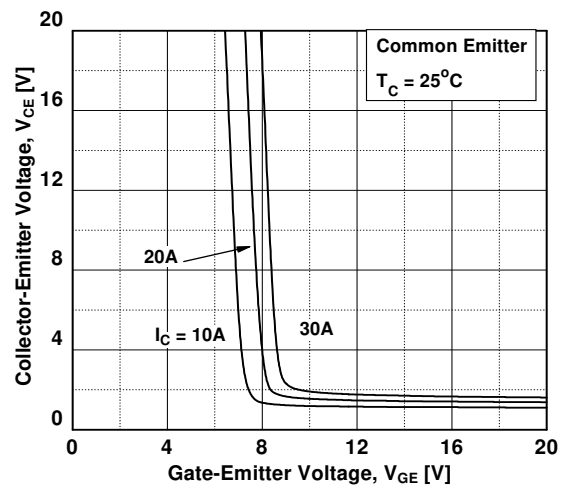


Figure 6. Saturation Voltage vs. Vge



Typical Performance Characteristics (Continued)

Figure 7. Saturation Voltage vs. V_{GE}

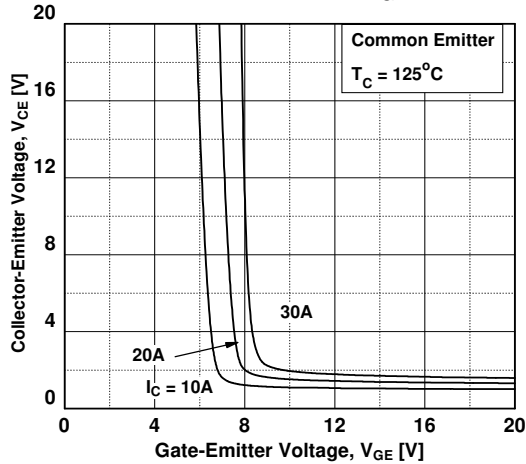


Figure 8. Capacitance Characteristics

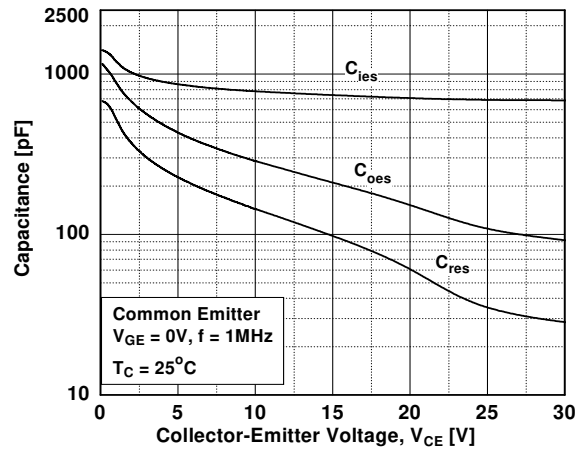


Figure 9. Gate Charge Characteristics

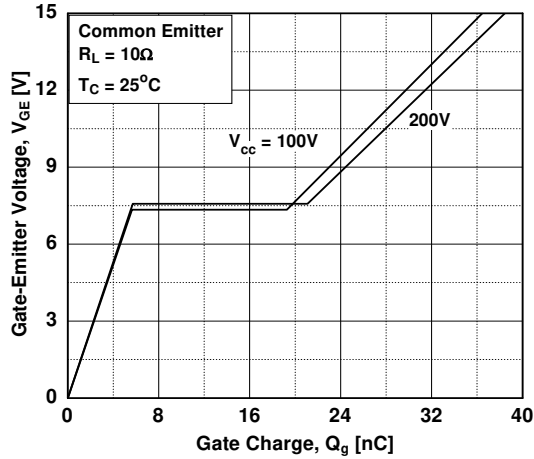


Figure 10. SOA Characteristics

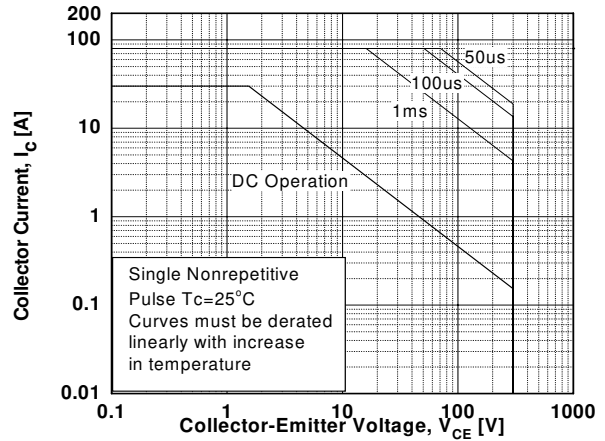


Figure 11. Turn-On Characteristics vs. Gate Resistance

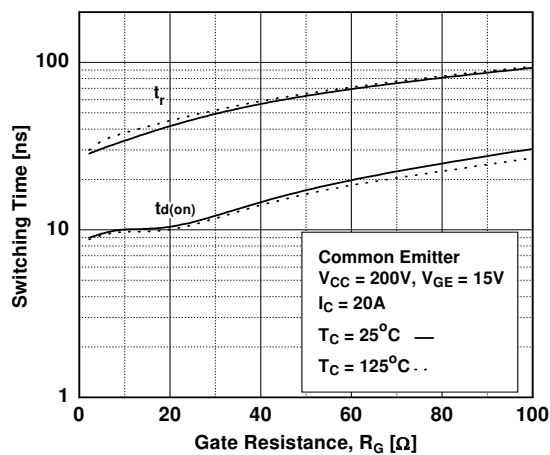
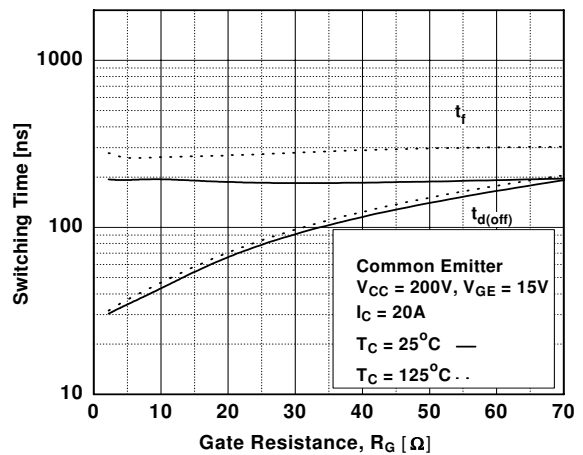


Figure 12. Turn Off Characteristics vs. Gate Resistance



Typical Performance Characteristics (Continued)

Figure 13. Turn-On Characteristics vs. Collector Current

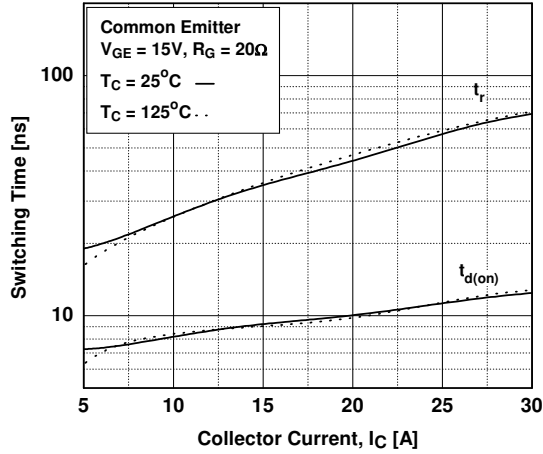


Figure 14. Turn-Off Characteristics vs. Collector Current

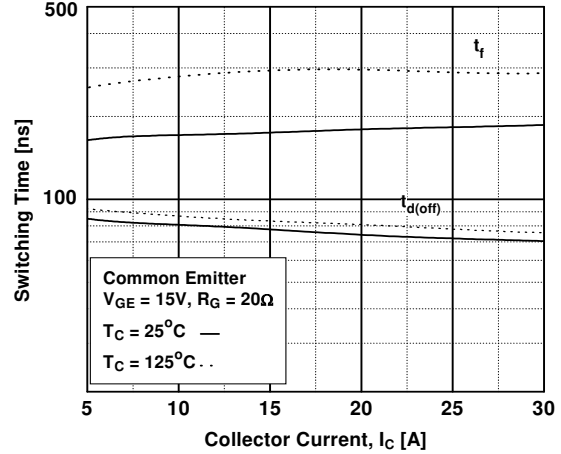


Figure 15. Switching Loss vs. Gate Resistance

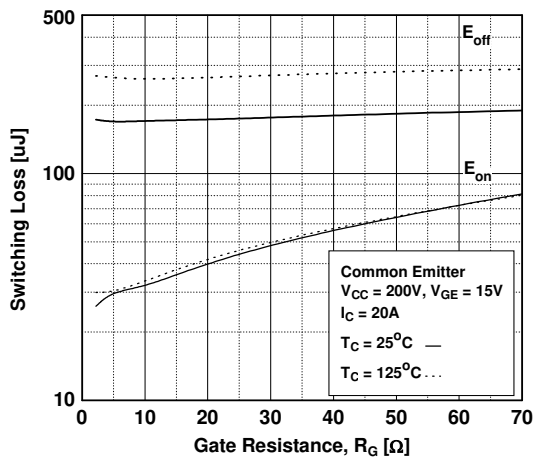


Figure 16. Switching Loss vs. Collector Current

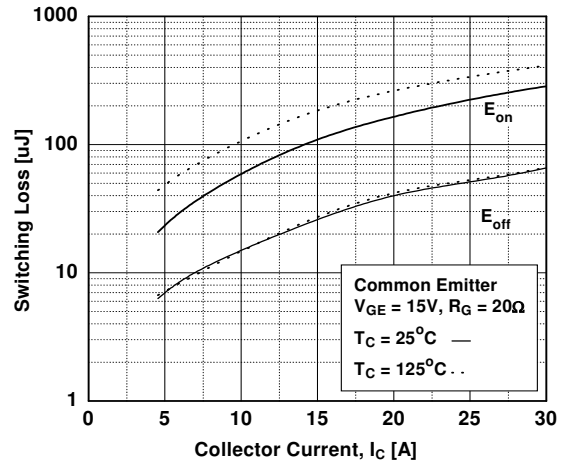


Figure 17. Transient Thermal Impedance of IGBT

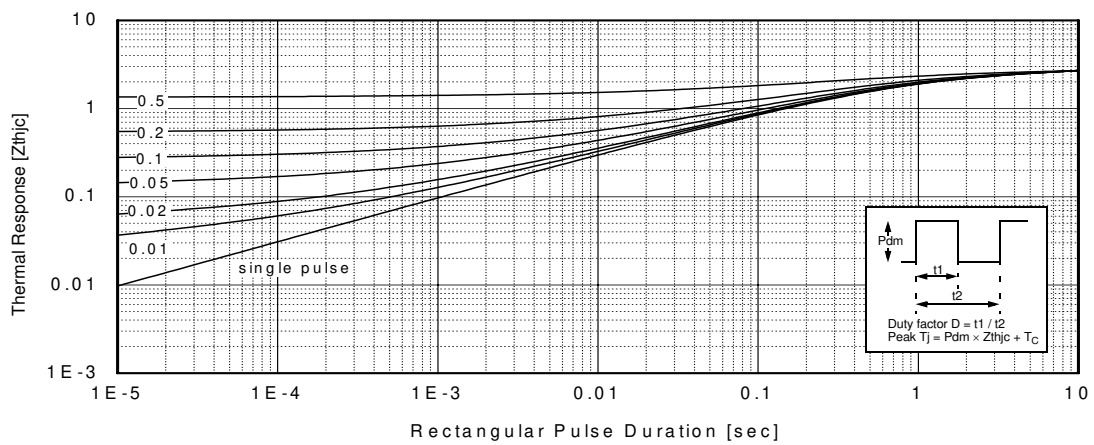


Figure 18. Forward Characteristics

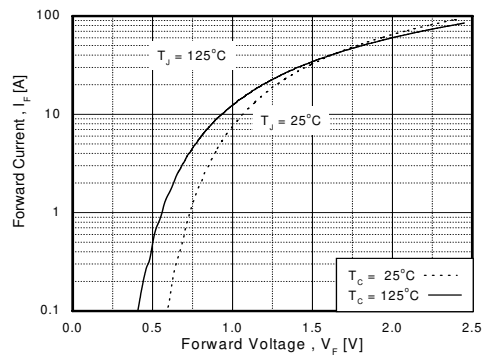


Figure 19. Typical Reverse Recovery Current

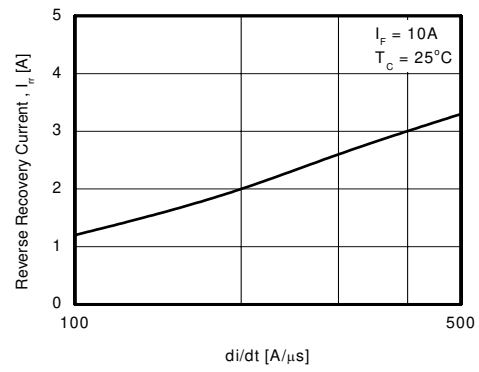
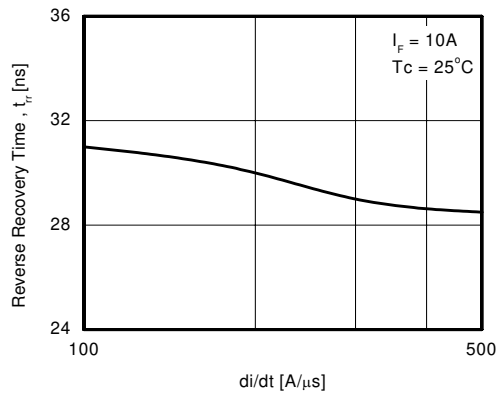
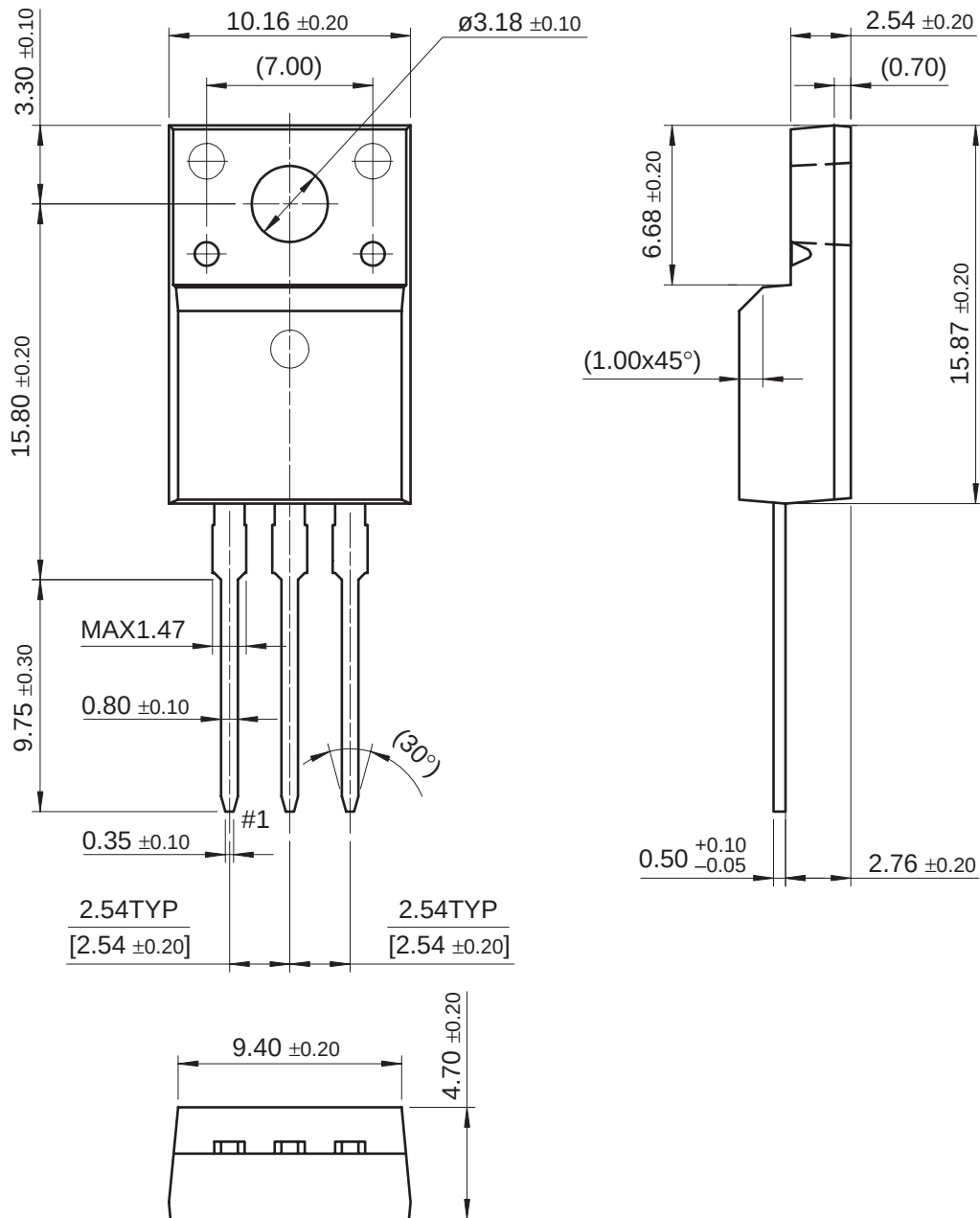


Figure 20. Typical Reverse Recovery Time



TO-220F





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Rev. I26