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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

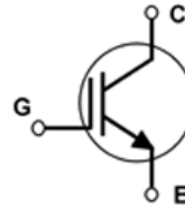
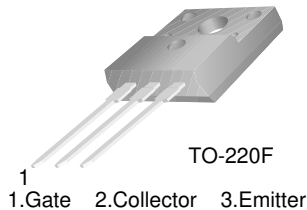


Description

Employing Unified IGBT Technology, Fairchild's PDP IGBTs provides low conduction and switching loss. FGPF90N30 offers the optimum solution for PDP applications where low-conduction 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 @ $T_C = 25^\circ C$	220	A
P_D	Maximum Power Dissipation @ $T_C = 25^\circ C$	56.8	W
	Maximum Power Dissipation @ $T_C = 100^\circ C$	22.7	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	--	2.2	$^\circ C/W$
$R_{\theta JA}$	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
FGPF90N30	FGFP90N30TU	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	$V_{GE} = 0V, I_C = 250\mu A$	300	--	--	V
$\frac{\Delta BV_{CES}}{\Delta T_J}$	Temperature Coefficient of Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	--	0.6	--	V/ $^\circ\text{C}$
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	--	--	100	μA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	--	--	± 250	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	$I_C = 250\mu A, V_{CE} = V_{GE}$	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
		$I_C = 90A, V_{GE} = 15V$ $T_C = 25^\circ\text{C}$	--	1.9	--	V
		$I_C = 90A, V_{GE} = 15V$ $T_C = 125^\circ\text{C}$	--	2.0	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE} = 30V, V_{GE} = 0V$ $f = 1\text{MHz}$	--	1690	--	pF
C_{oes}	Output Capacitance		--	240	--	pF
C_{res}	Reverse Transfer Capacitance		--	80	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 200V, I_C = 60A$ $R_G = 10\Omega, V_{GE} = 15V$ Resistive Load, $T_C = 25^\circ\text{C}$	--	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	$V_{CC} = 200V, I_C = 60A$ $R_G = 10\Omega, V_{GE} = 15V$ Resistive Load, $T_C = 125^\circ\text{C}$	--	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	$V_{CE} = 200V, I_C = 60A$ $V_{GE} = 15V$	--	93	--	nC
Q_{ge}	Gate-Emitter Charge		--	45	--	nC
Q_{gc}	Gate-Collector Charge		--	14	--	nC

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

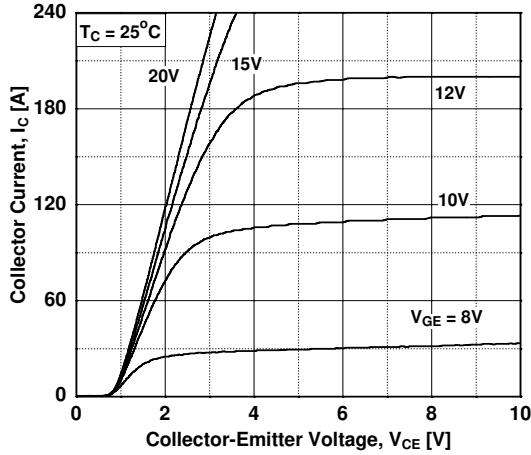


Figure 2. Typical Output Characteristics

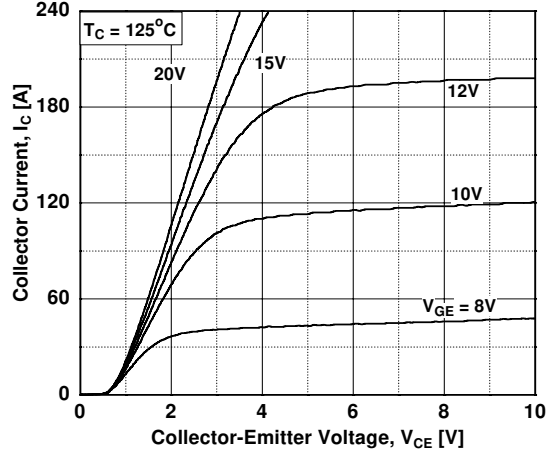


Figure 3. Saturation Voltage

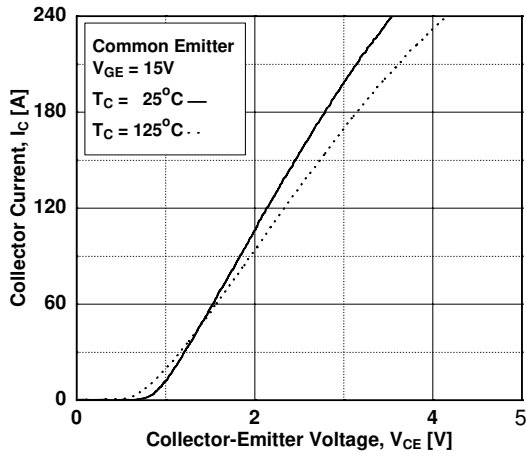


Figure 4. Transfer Characteristics

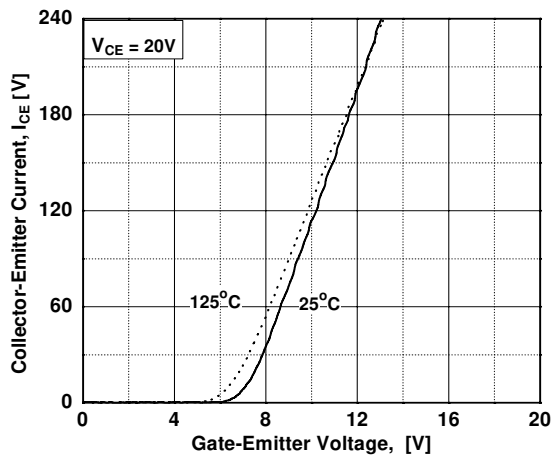


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

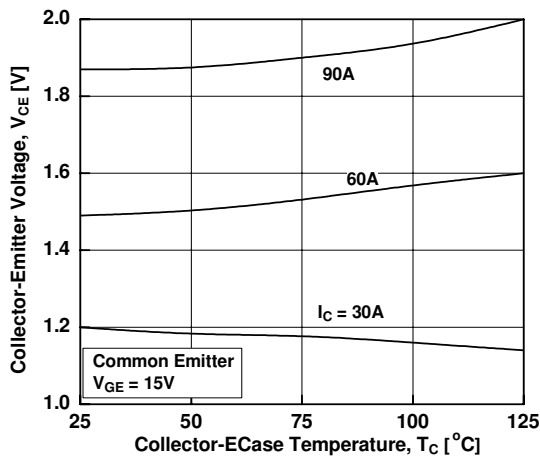
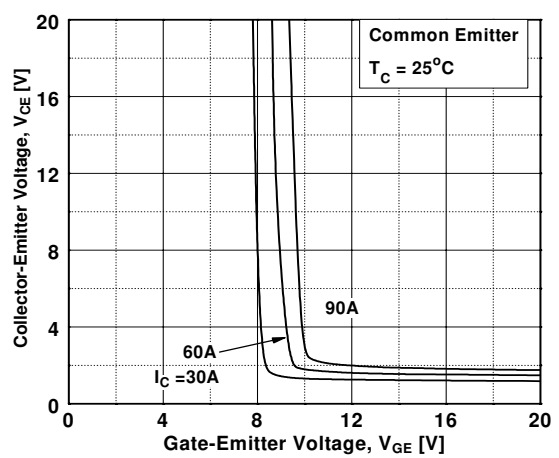


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics (Continued)

Figure 7. Saturation Voltage vs. V_{GE}

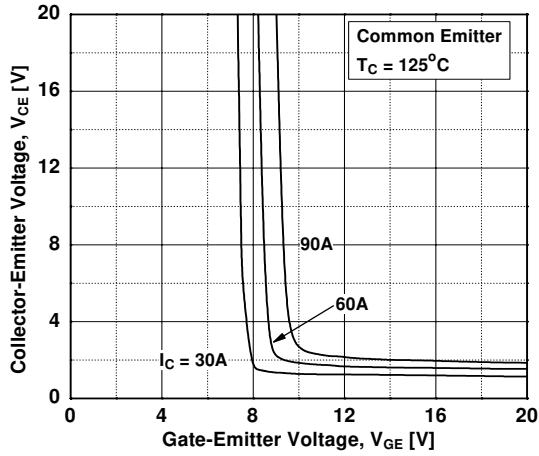


Figure 8. Capacitance Characteristics

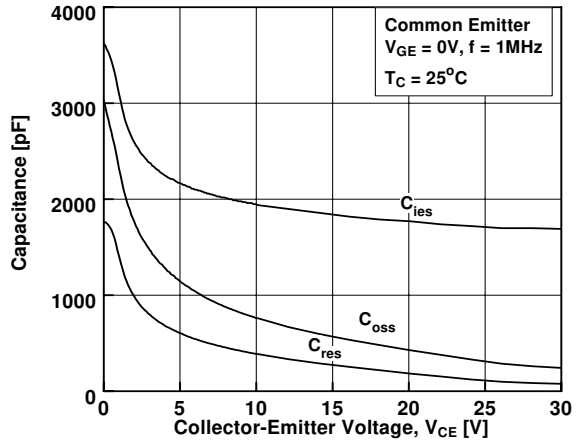


Figure 9. Gate Charge Characteristics

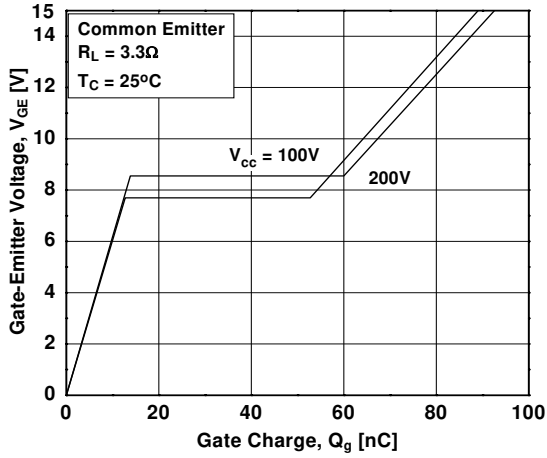


Figure 10. SOA Characteristics

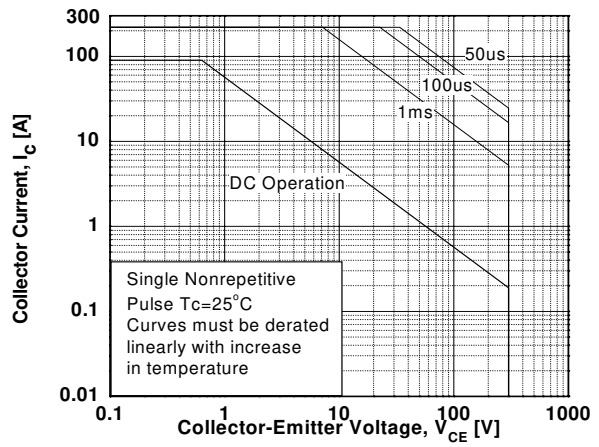


Figure 11. Turn-On Characteristics vs. Gate Resistance

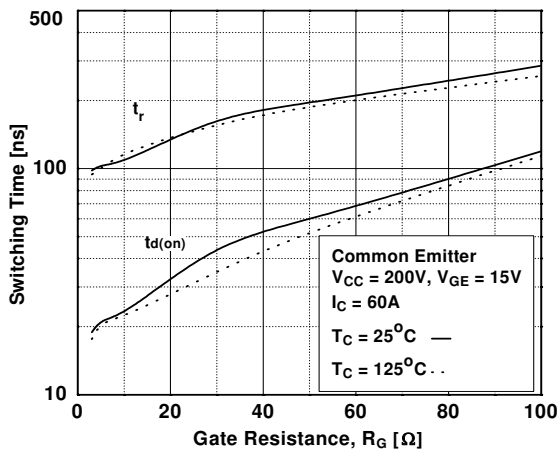
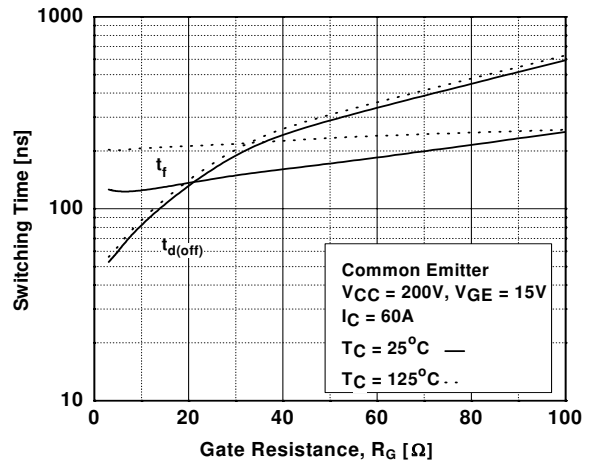


Figure 12. Turn Off Characteristics vs. Gate Resistance



Typical Performance Characteristics (Continued)

Figure 13. Turn-On Characteristics vs. Collector Current

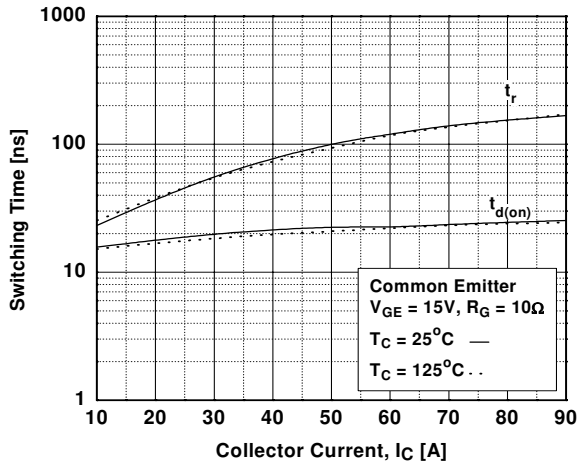


Figure 14. Turn-Off Characteristics vs. Collector Current

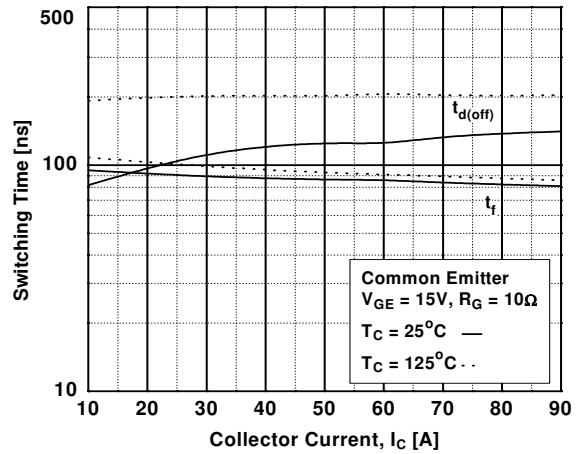


Figure 15. Switching Loss vs Gate Resistance

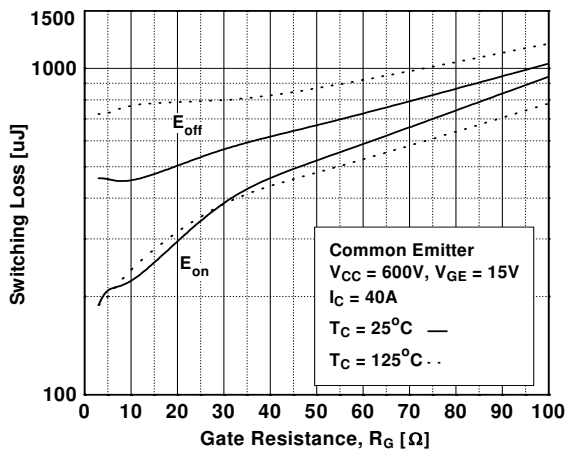


Figure 16. Switching Loss vs Collector Current

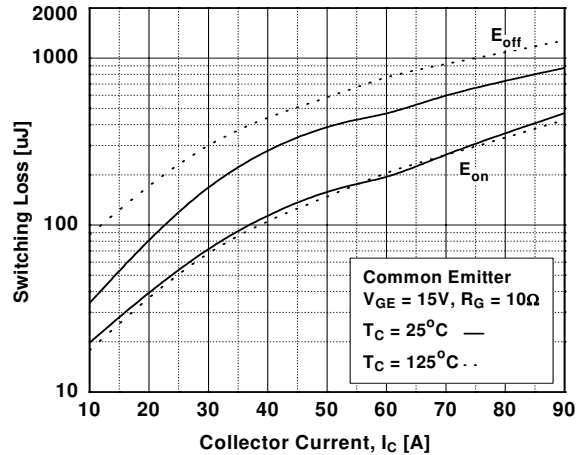
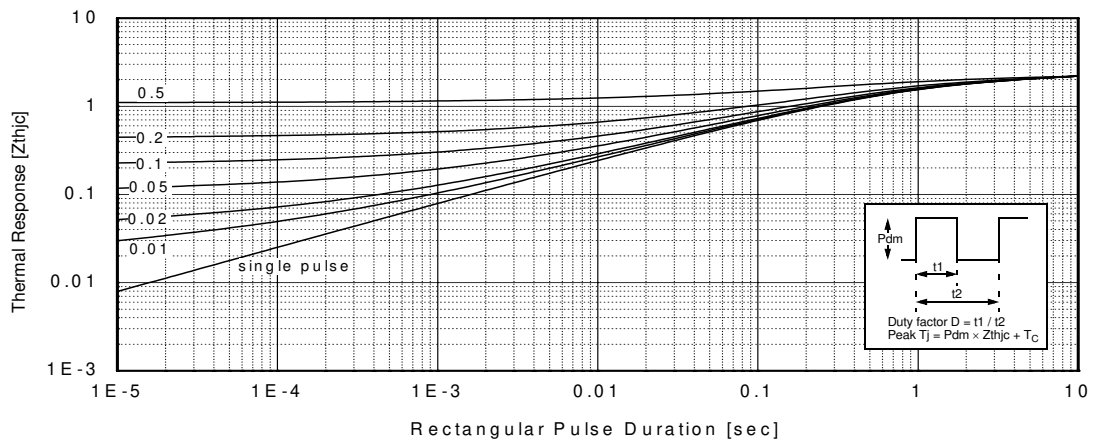
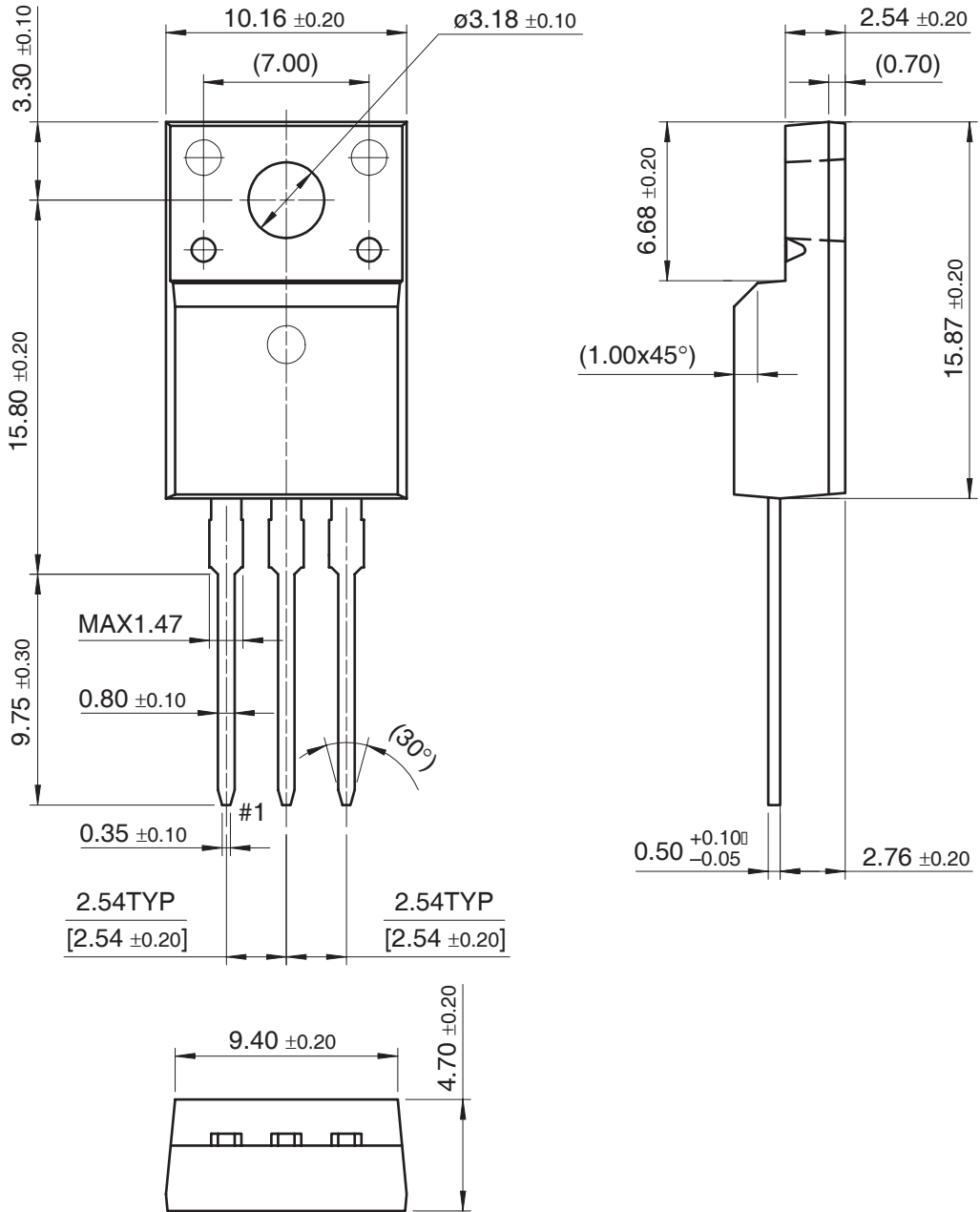


Figure 17. Transient Thermal Impedance of IGBT



TO-220F



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Rev. I20