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FGA20S140P

1400 V、20 A、短路阳极 IGBT

特性

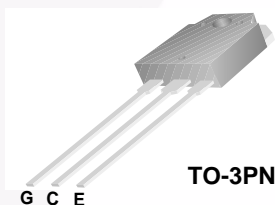
- 高速开关
- 低饱和电压: $V_{CE(sat)} = 1.9\text{ V} @ I_C = 20\text{ A}$
- 高输入阻抗
- 符合 RoHS 标准

应用

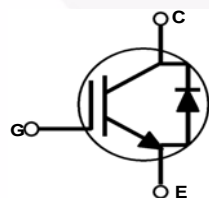
- 感应加热、微波炉

概述

飞兆半导体的短路阳极沟道 IGBT 系列采用先进的场截止沟道和短路阳极技术，为软开关应用提供卓越的导通和开关性能。该器件可并联配置，具有极佳的雪崩能力。该器件为感应加热和微波炉而设计。



TO-3PN



绝对最大额定值 $T_C = 25^\circ\text{C}$ 除非另有说明

符号	说明	额定值	单位
V_{CES}	集电极 - 发射极间电压	1400	V
V_{GES}	栅极 - 发射极间电压	± 25	V
I_C	集电极电流 @ $T_C = 25^\circ\text{C}$	40	A
	集电极电流 @ $T_C = 100^\circ\text{C}$	20	A
$I_{CM(1)}$	集电极脉冲电流	60	A
I_F	二极管正向连续电流 @ $T_C = 25^\circ\text{C}$	40	A
I_F	二极管正向连续电流 @ $T_C = 100^\circ\text{C}$	20	A
P_D	最大功耗 @ $T_C = 25^\circ\text{C}$	272	W
	最大功耗 @ $T_C = 100^\circ\text{C}$	136	W
T_J	工作结温	-55 至 +175	$^\circ\text{C}$
T_{stg}	存储温度范围	-55 至 +175	$^\circ\text{C}$
T_L	用于焊接的最大引脚温度，距离外壳 1/8"，持续 5 秒	300	$^\circ\text{C}$

热性能

符号	参数	典型值	最大值	单位
$R_{\theta JC}(\text{IGBT})$	结点 - 壳体的热阻	--	0.55	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻	--	40	$^\circ\text{C}/\text{W}$

注意:

1: 受限于 T_{jmax}

封装标识与订购信息

器件标识	器件	封装	卷尺寸	带宽	数量
FGA20S140P	FGA20S140P	TO-3PN	-	-	30

IGBT 的电气特性 $T_C=25^\circ\text{C}$ 除非另有说明

符号	参数	测试条件	最小值	典型值	最大值	单位
关断特性						
I_{CES}	集电极切断电流	$V_{CE}=1400, V_{GE}=0\text{ V}$	-	-	1	mA
I_{GES}	G-E 漏电流	$V_{GE}=V_{GES}, V_{CE}=0\text{ V}$	-	-	± 500	nA
导通特性						
$V_{GE(th)}$	G-E 阈值电压	$I_C=20\text{ mA}, V_{CE}=V_{GE}$	4.5	6.0	7.5	V
$V_{CE(sat)}$	集电极 - 发射极间饱和电压	$I_C=20\text{ A}, V_{GE}=15\text{ V}$ $T_C=25^\circ\text{C}$	-	1.9	2.4	V
		$I_C=20\text{ A}, V_{GE}=15\text{ V},$ $T_C=125^\circ\text{C}$	-	2.1	-	V
		$I_C=20\text{ A}, V_{GE}=15\text{ V},$ $T_C=175^\circ\text{C}$	-	2.2	-	V
V_{FM}	二极管正向电压	$I_F=20\text{ A}, T_C=25^\circ\text{C}$	-	1.7	2.4	V
		$I_F=20\text{ A}, T_C=175^\circ\text{C}$	-	2.1	-	V
动态特性						
C_{ies}	输入电容	$V_{CE}=30\text{ V}, V_{GE}=0\text{ V},$ $f=1\text{ MHz}$	-	1686	-	pF
C_{oes}	输出电容		-	45	-	pF
C_{res}	反向传输电容		-	32	-	pF
开关特性						
$t_{d(on)}$	导通延迟时间	$V_{CC}=600\text{ V}, I_C=20\text{ A},$ $R_G=10\ \Omega, V_{GE}=15\text{ V},$ 阻性负载, $T_C=25^\circ\text{C}$	-	20	-	ns
t_r	上升时间		-	245	-	ns
$t_{d(off)}$	关断延迟时间		-	400	-	ns
t_f	下降时间		-	130	-	ns
E_{on}	导通开关损耗		-	0.76	-	mJ
E_{off}	关断开关损耗		-	0.56	-	mJ
E_{ts}	总开关损耗	-	1.32	-	mJ	
$t_{d(on)}$	导通延迟时间	$V_{CC}=600\text{ V}, I_C=20\text{ A},$ $R_G=10\ \Omega, V_{GE}=15\text{ V},$ 阻性负载, $T_C=175^\circ\text{C}$	-	21	-	ns
t_r	上升时间		-	301	-	ns
$t_{d(off)}$	关断延迟时间		-	420	-	ns
t_f	下降时间		-	356	-	ns
E_{on}	导通开关损耗		-	0.95	-	mJ
E_{off}	关断开关损耗		-	1.39	-	mJ
E_{ts}	总开关损耗	-	2.34	-	mJ	
Q_g	总栅极电荷	$V_{CE}=600\text{ V}, I_C=20\text{ A},$ $V_{GE}=15\text{ V}$	-	203.5	-	nC
Q_{ge}	栅极 - 发射极间电荷		-	10.8	-	nC
Q_{gc}	栅极 - 发射极间电荷		-	84.6	-	nC

典型性能特征

图 1. 典型输出特性

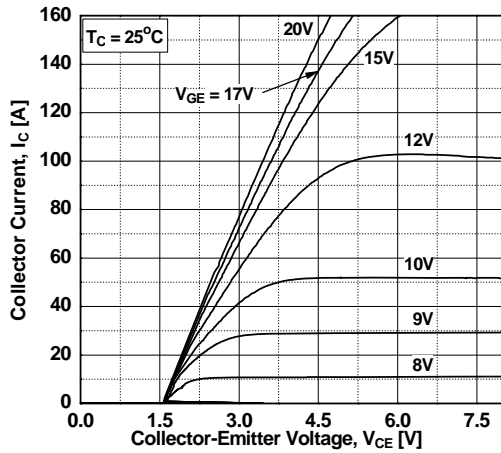


图 2. 典型输出特性

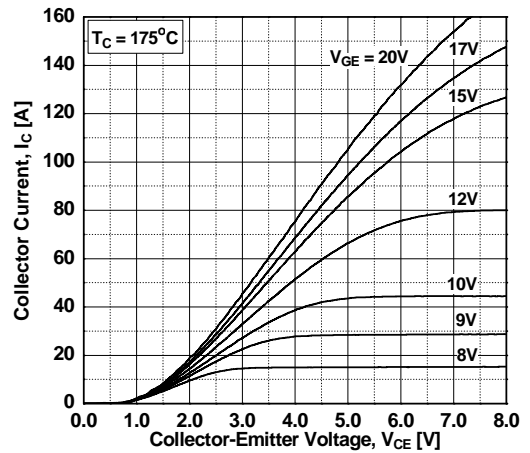


图 3. 典型饱和电压特性

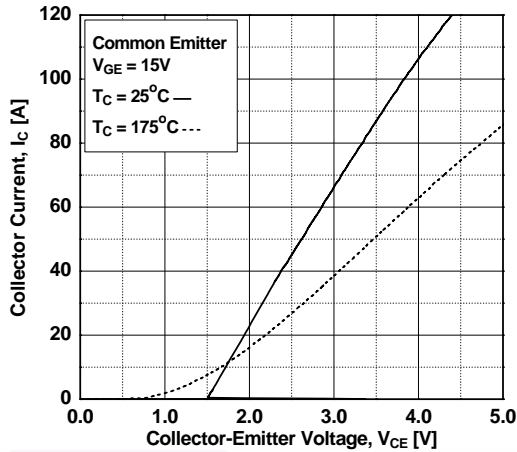


图 4. 传输特性

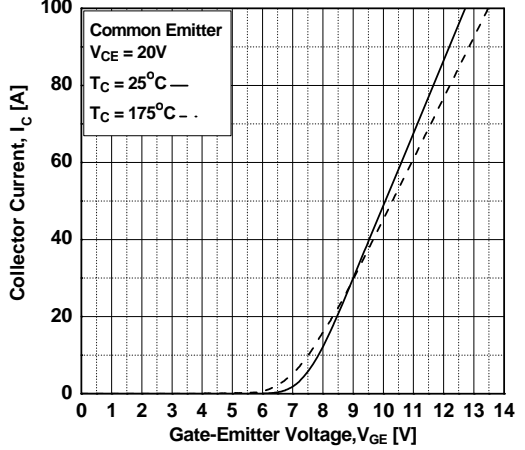


图 5. 饱和电压与外壳的关系

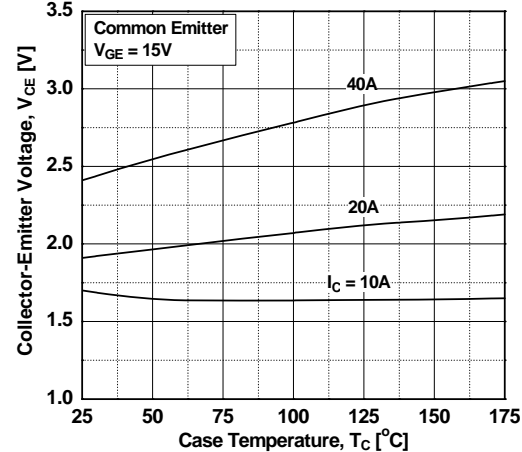
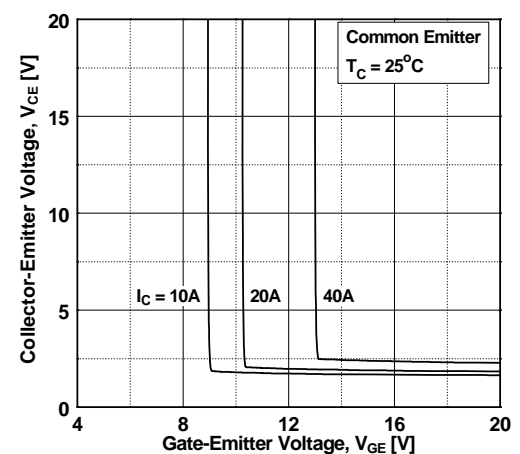


图 6. 饱和电压与 Vge 的关系



典型性能特征

图 7. 饱和电压与 V_{GE} 的关系

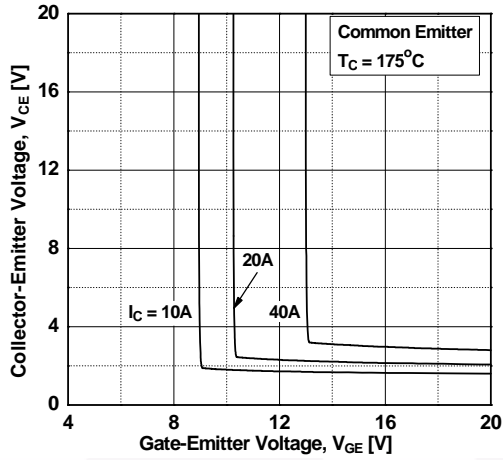


图 8. 电容特性

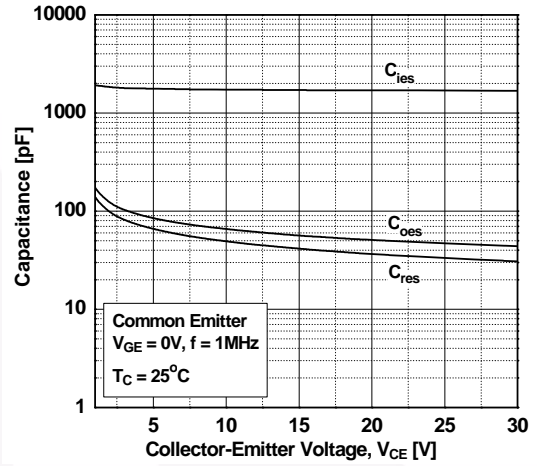


图 9. 栅极电荷特性

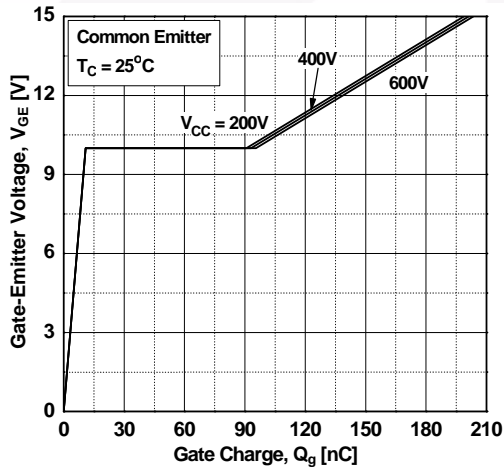


图 10. SOA 特性

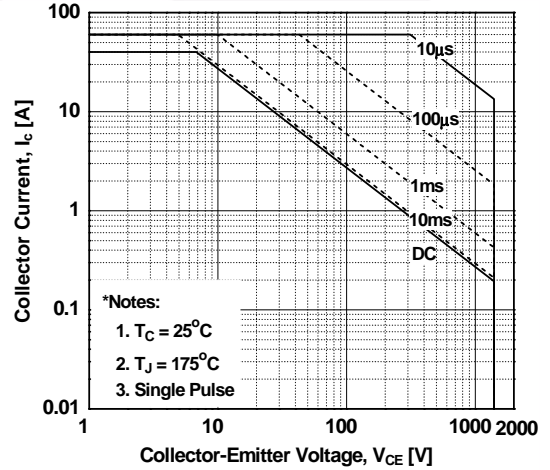


图 11. 导通特性与栅极电阻的关系

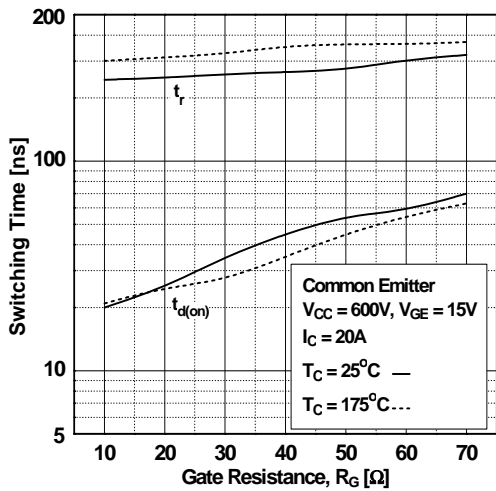
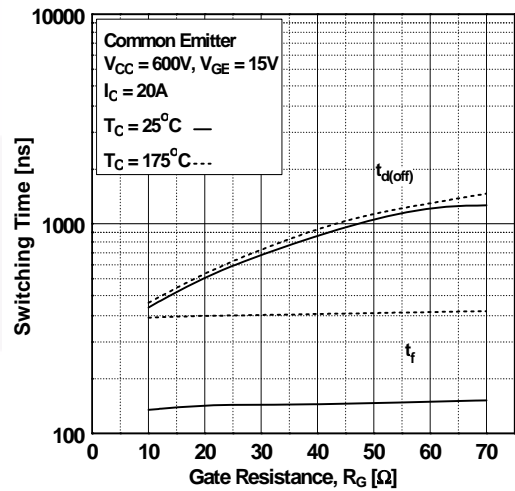


图 12. 关断特性与栅极电阻的关系



典型性能特征

图 13. 导通特性与集电极电流的关系

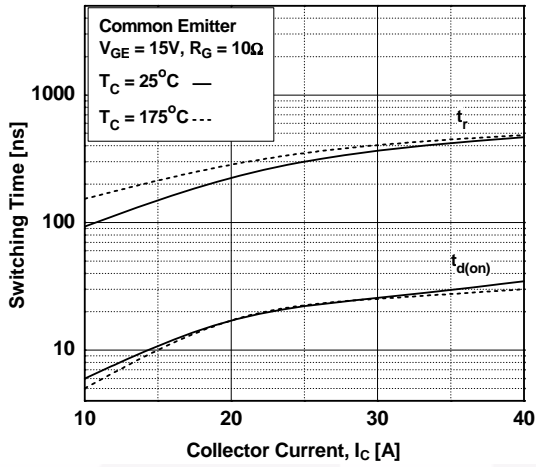


图 14. 关断特性与集电极电流的关系

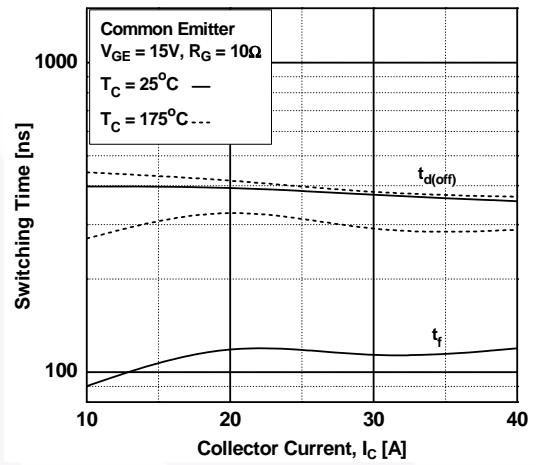


图 15. 开关损耗与栅极电阻的关系

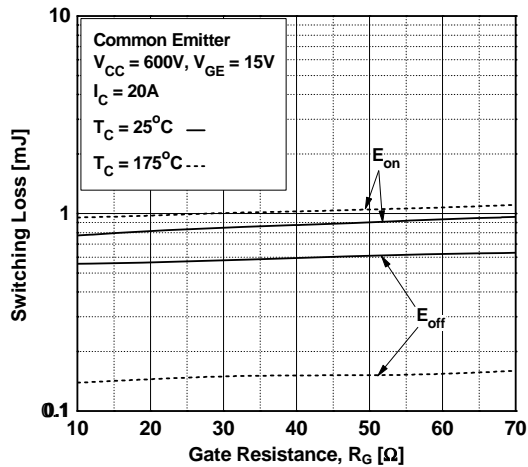


图 16. 开关损耗与栅极电阻的关系

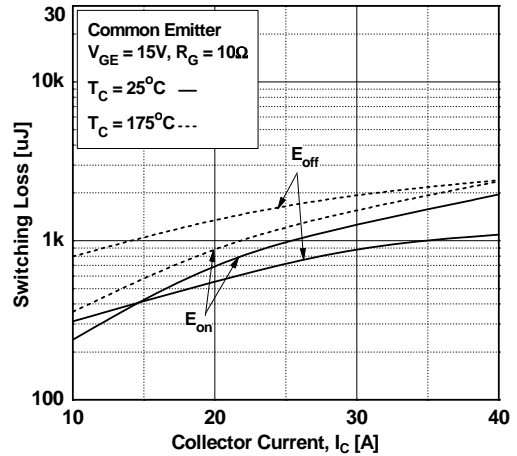


图 17. 关断开关 SOA 特性

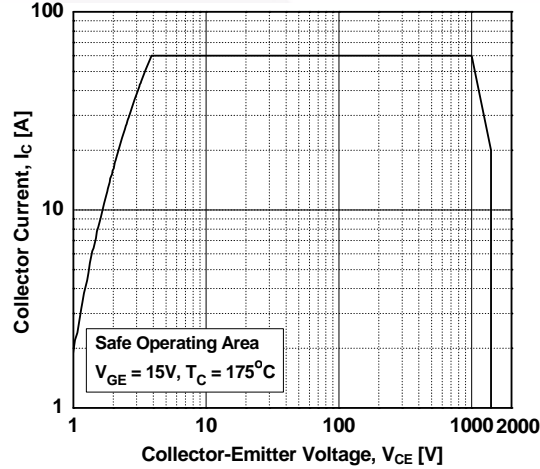


图 18. 正向特性

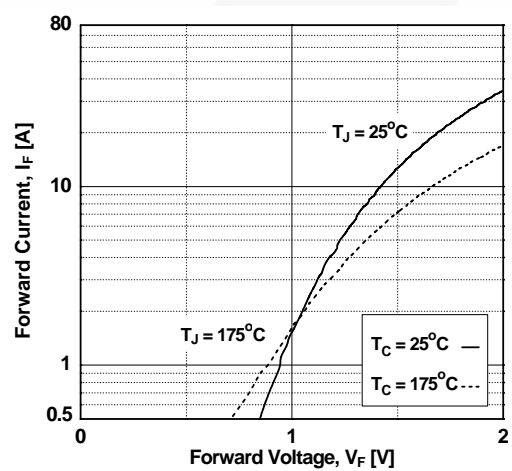
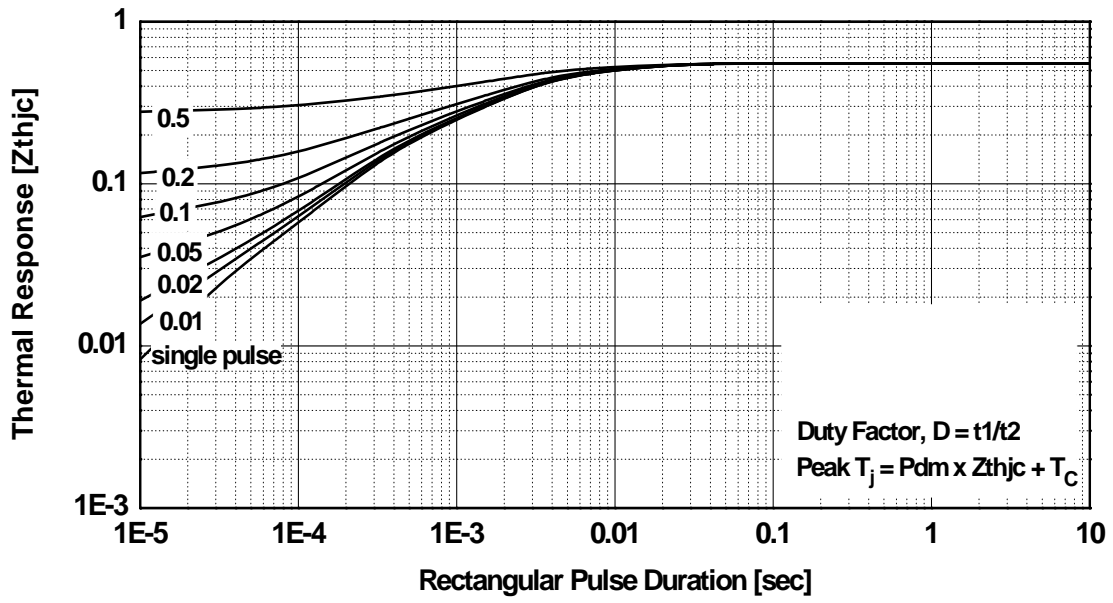
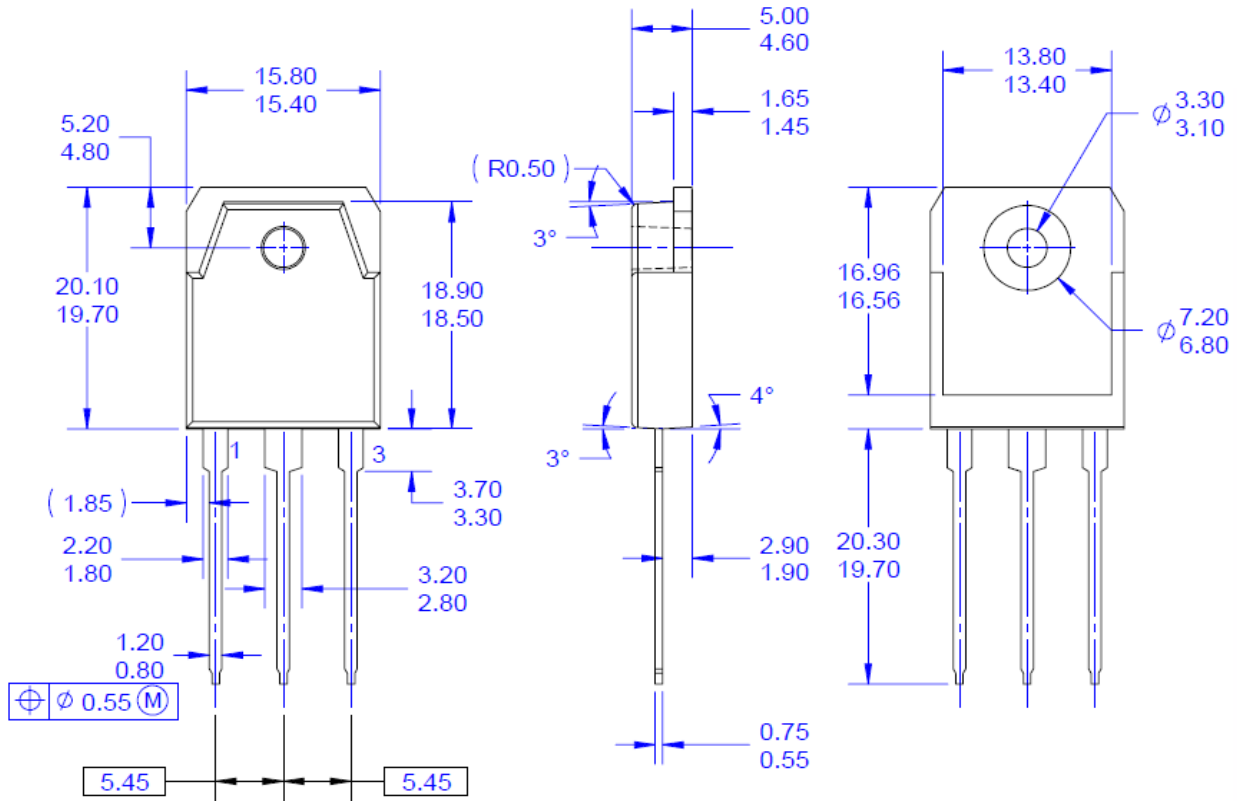


图 19. IGBT 的瞬态热阻抗



机械尺寸



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- E) THIS PACKAGE IS INTENDED ONLY FOR T03PN.
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图 20. TO-3P 3L - 3LD, T03, PLASTIC, EIAJ SC-65

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