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FGH25T120SMD

1200 V、25 A 场截止沟道 IGBT

特性

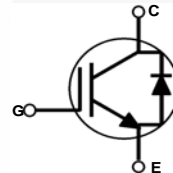
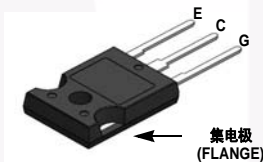
- FS 沟道技术，正温度系数
- 高速开关
- 低饱和电压： $V_{CE(sat)} = 1.8\text{ V}$ @ $I_C = 25\text{ A}$
- $I_{LM}(1)$ 部件 100% 检测
- 高输入阻抗
- 符合 RoHS 标准

概述

通过采用创新的场截止沟道 IGBT 技术，飞兆半导体新型系列的场截止沟道 IGBT 可为光伏逆变器、UPS、焊机和 PFC 等硬开关应用提供最佳性能。

应用

- 光伏逆变器、焊机、UPS 和 PFC 应用



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 - 发射极之间电压	1200	V
V_{GES}	栅极 - 发射极间电压	± 25	V
	瞬态栅极 - 发射极间电压	± 30	V
I_C	集电极电流 @ $T_C = 25^\circ\text{C}$	50	A
	集电极电流 @ $T_C = 100^\circ\text{C}$	25	A
$I_{LM}(1)$	箝位感性负载电流 @ $T_C = 25^\circ\text{C}$	100	A
$I_{CM}(2)$	集电极脉冲电流	100	A
I_F	二极管正向连续电流 @ $T_C = 25^\circ\text{C}$	50	A
	二极管正向连续电流 @ $T_C = 100^\circ\text{C}$	25	A
I_{FM}	二极管最大正向电流	200	A
P_D	最大功耗 @ $T_C = 25^\circ\text{C}$	428	W
	最大功耗 @ $T_C = 100^\circ\text{C}$	214	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	--	0.35	$^\circ\text{C}/\text{W}$
$R_{\theta JC}(\text{二极管})$	结点 - 壳体的热阻	--	1.4	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻	--	40	$^\circ\text{C}/\text{W}$

注意:

1. $V_{CE} = 600\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 100\text{ A}$, $R_G = 23\ \Omega$, 感性负载
2. 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
FGH25T120SMD	FGH25T120SMD_F155	TO-247G03	-	-	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						
BV_{CES}	集电极 - 发射极击穿电压	$V_{GE} = 0\text{ V}, I_C = 250\ \mu\text{A}$	1200	-	-	V
I_{CES}	集电极切断电流	$V_{CE} = V_{CES}, V_{GE} = 0\text{ V}$	-	-	250	μA
I_{GES}	G-E 漏电流	$V_{GE} = V_{GES}, V_{CE} = 0\text{ V}$	-	-	± 400	nA
导通特性						
$V_{GE(th)}$	G-E 阈值电压	$I_C = 25\text{ mA}, V_{CE} = V_{GE}$	4.9	6.2	7.5	V
$V_{CE(sat)}$	集电极 - 发射极间饱和电压	$I_C = 25\text{ A}, V_{GE} = 15\text{ V}$ $T_C = 25^\circ\text{C}$	-	1.8	2.4	V
		$I_C = 25\text{ A}, V_{GE} = 15\text{ V},$ $T_C = 175^\circ\text{C}$	-	1.9	-	V
动态特性						
C_{ies}	输入电容	$V_{CE} = 30\text{ V}, V_{GE} = 0\text{ V},$ $f = 1\text{ MHz}$	-	2800	-	pF
C_{oes}	输出电容		-	105	-	pF
C_{res}	反向传输电容		-	60	-	pF
开关特性						
$t_{d(on)}$	导通延迟时间	$V_{CC} = 600\text{ V}, I_C = 25\text{ A},$ $R_G = 23\ \Omega, V_{GE} = 15\text{ V},$ 感性负载, $T_C = 25^\circ\text{C}$	-	40	-	ns
t_r	上升时间		-	45	-	ns
$t_{d(off)}$	关断延迟时间		-	490	-	ns
t_f	下降时间		-	12	-	ns
E_{on}	导通开关损耗		-	1.74	-	mJ
E_{off}	关断开关损耗		-	0.56	-	mJ
E_{ts}	总开关损耗		-	2.30	-	mJ
$t_{d(on)}$	导通延迟时间	$V_{CC} = 600\text{ V}, I_C = 25\text{ A},$ $R_G = 23\ \Omega, V_{GE} = 15\text{ V},$ 感性负载, $T_C = 175^\circ\text{C}$	-	40	-	ns
t_r	上升时间		-	48	-	ns
$t_{d(off)}$	关断延迟时间		-	520	-	ns
t_f	下降时间		-	64	-	ns
E_{on}	导通开关损耗		-	2.94	-	mJ
E_{off}	关断开关损耗		-	1.09	-	mJ
E_{ts}	总开关损耗		-	4.03	-	mJ
Q_g	总栅极电荷	$V_{CE} = 600\text{ V}, I_C = 25\text{ A},$ $V_{GE} = 15\text{ V}$	-	225	-	nC
Q_{ge}	栅极 - 发射极间电荷		-	20	-	nC
Q_{gc}	栅极 - 发射极间电荷		-	128	-	nC

二极管电气特性 T_C = 25°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
V _{FM}	二极管正向电压	I _F = 25 A, T _C = 25°C	-	2.8	3.7	V
		I _F = 25 A, T _C = 175°C	-	2.1	-	V
t _{rr}	二极管反向恢复时间	V _R = 600 V, I _F = 25 A, di _F /dt = 200 A/μs, T _C = 25°C	-	60	-	ns
I _{rr}	二极管反向恢复峰值电流		-	6.6	-	A
Q _{rr}	二极管反向恢复电荷		-	197	-	nC
E _{rec}	反向恢复电能	V _R = 600 V, I _F = 25 A, di _F /dt = 200 A/μs, T _C = 175°C	-	330	-	μJ
t _{rr}	二极管反向恢复时间		-	325	-	ns
I _{rr}	二极管反向恢复峰值电流		-	13	-	A
Q _{rr}	二极管反向恢复电荷		-	2113	-	nC



典型性能特征

图 1. 典型输出特性

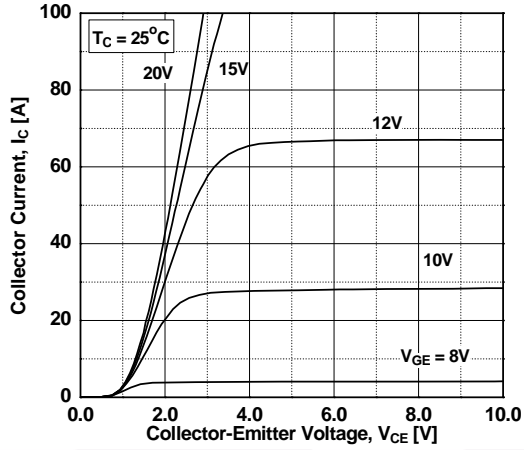


图 2. 典型输出特性

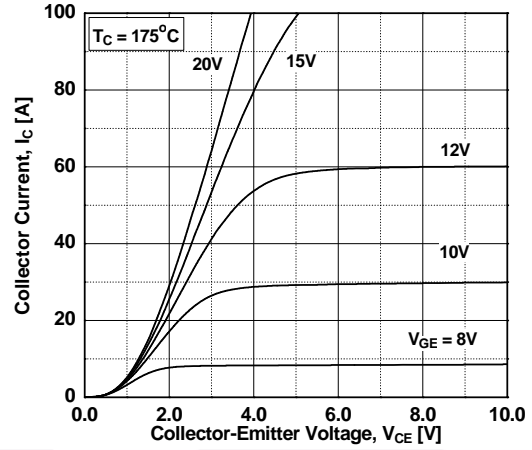


图 3. 典型饱和电压特性

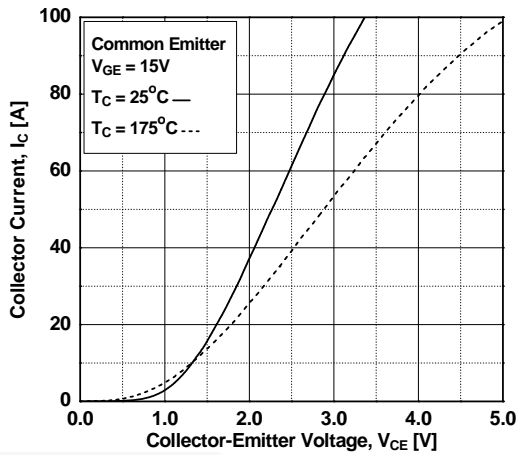


图 4. 饱和电压与壳温的关系 (在可变电流强度下)

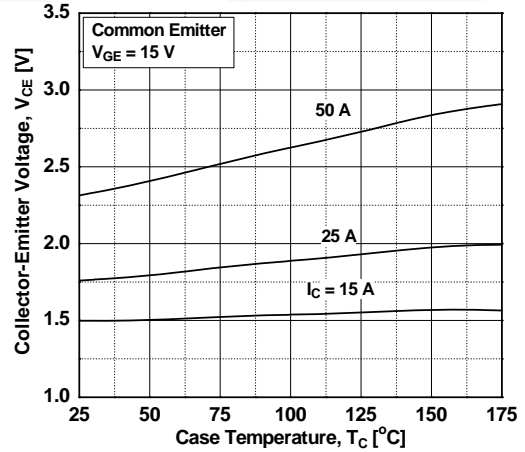


图 5. 饱和电压与 V_{GE} 的关系

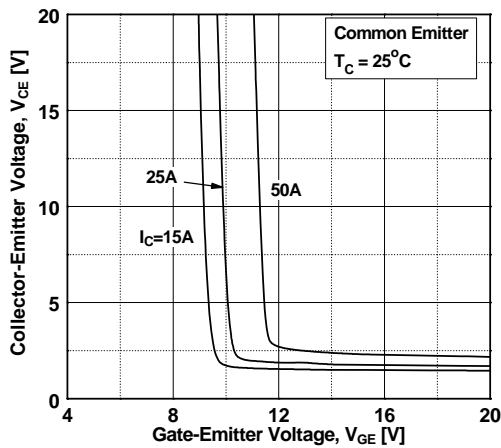
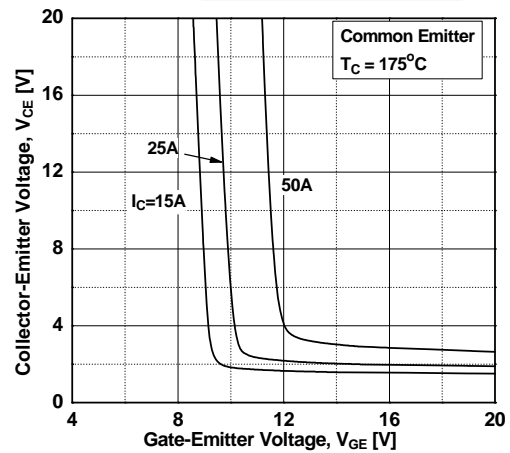


图 6. 饱和电压与 V_{GE} 的关系



典型性能特征

图 7. 电容特性

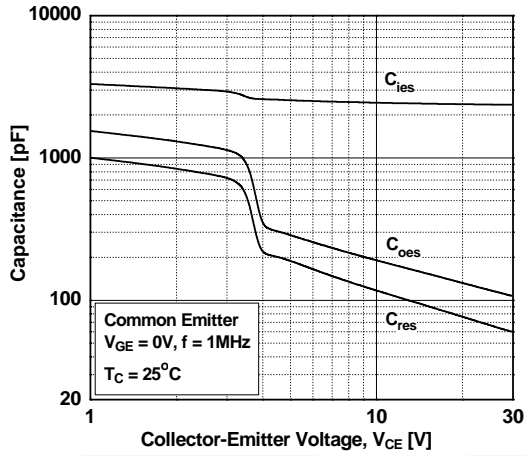


图 8. 栅极电荷特性

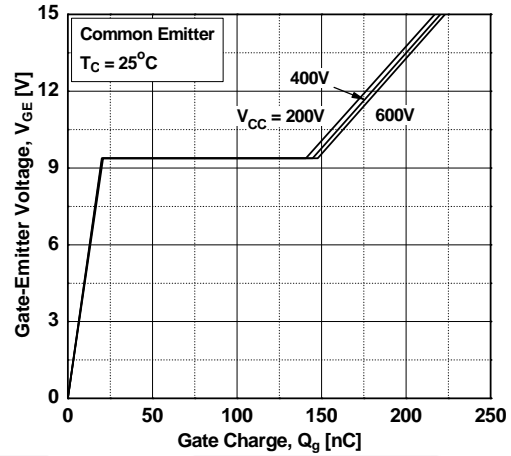


图 9. 导通特性与栅极电阻的关系

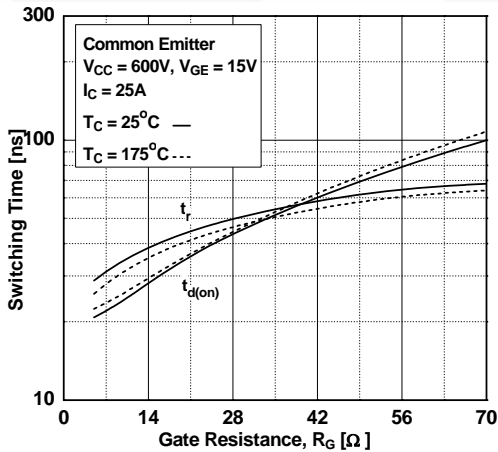


图 10. 关断特性与栅极电阻的关系

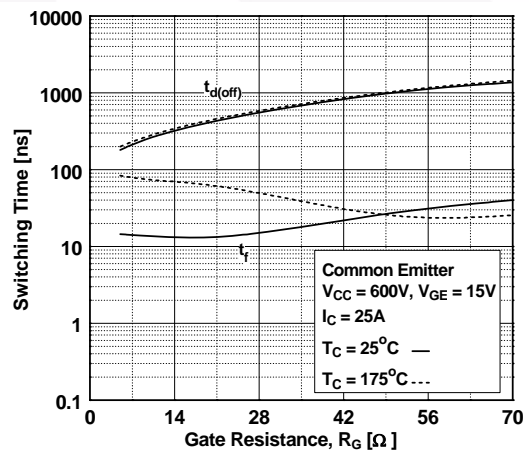


图 11. 开关损耗与栅极电阻的关系

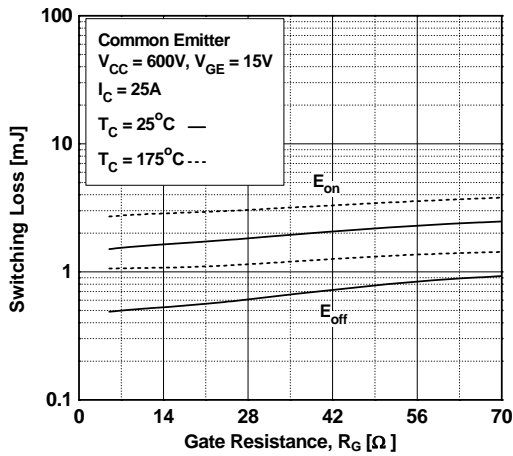
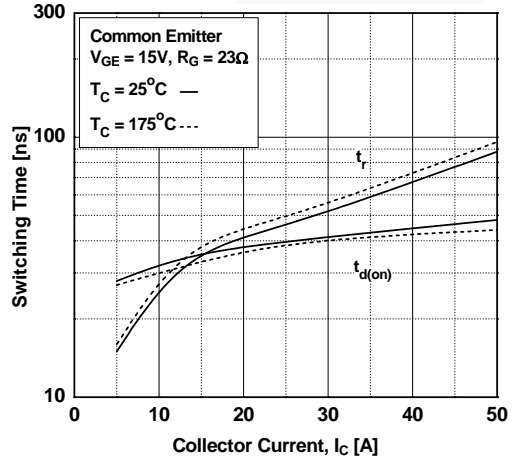


图 12. 导通特性与集电极电流的关系



典型性能特征

图 13. 关断特性与集电极电流的关系

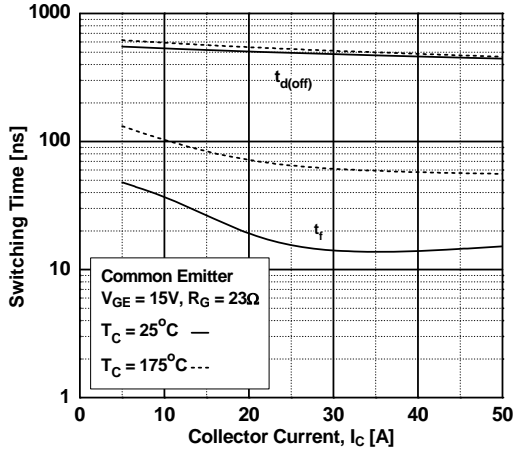


图 14. 开关损耗与集电极电流的关系

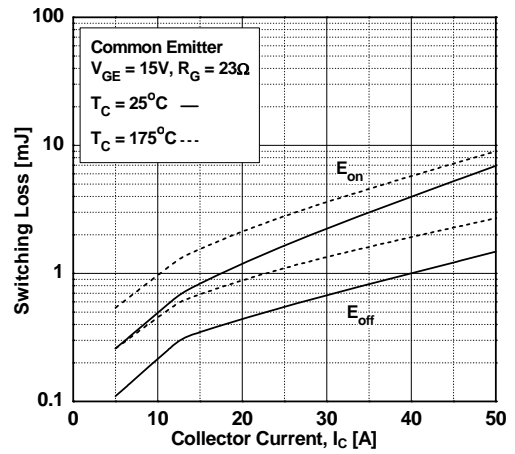


图 15. 负载电流与频率的关系

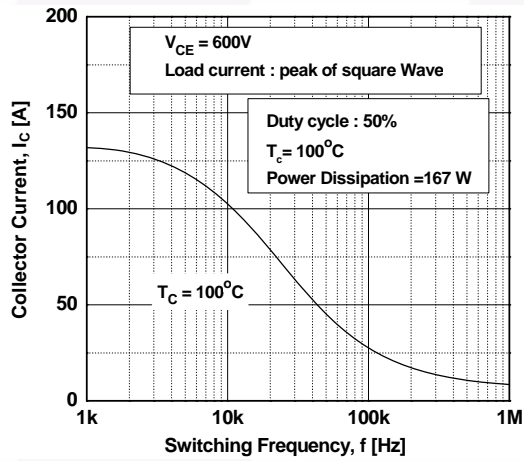


图 16. SOA 特性

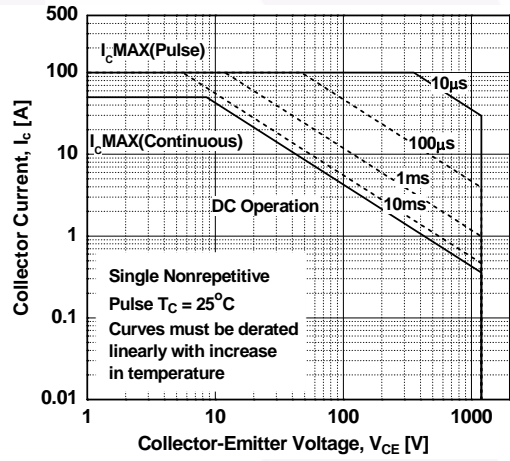


图 17. 正向特性

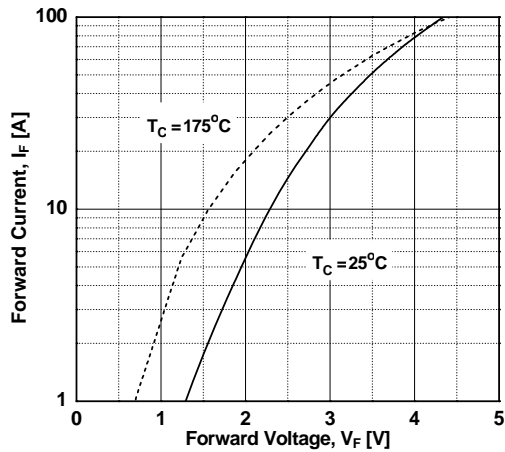
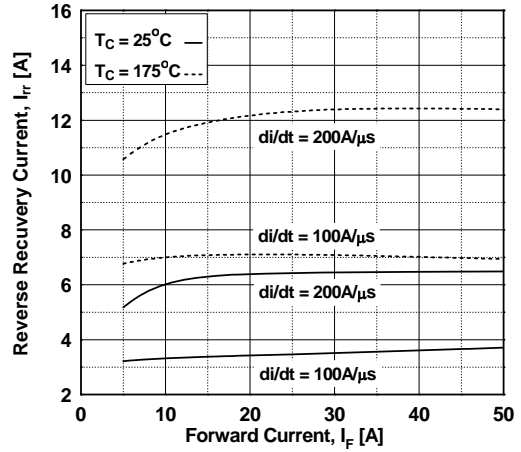


图 18. 反向恢复电流



典型性能特征

图 19. 反向恢复时间

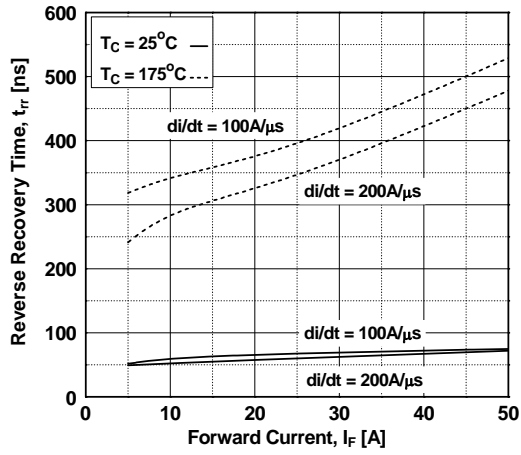


图 20. 存储电荷

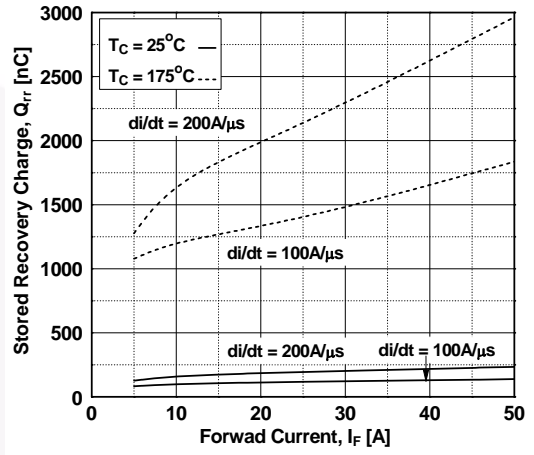


图 21. IGBT 瞬态热阻抗

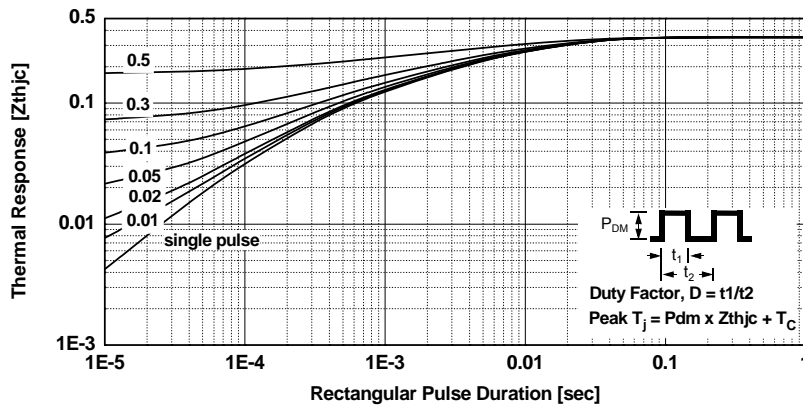
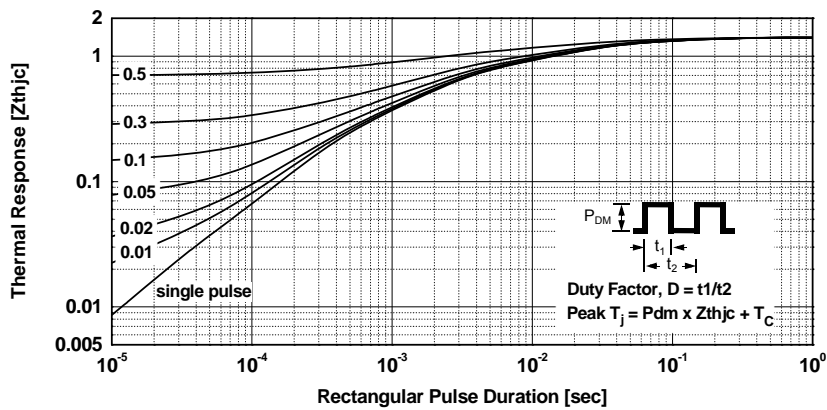
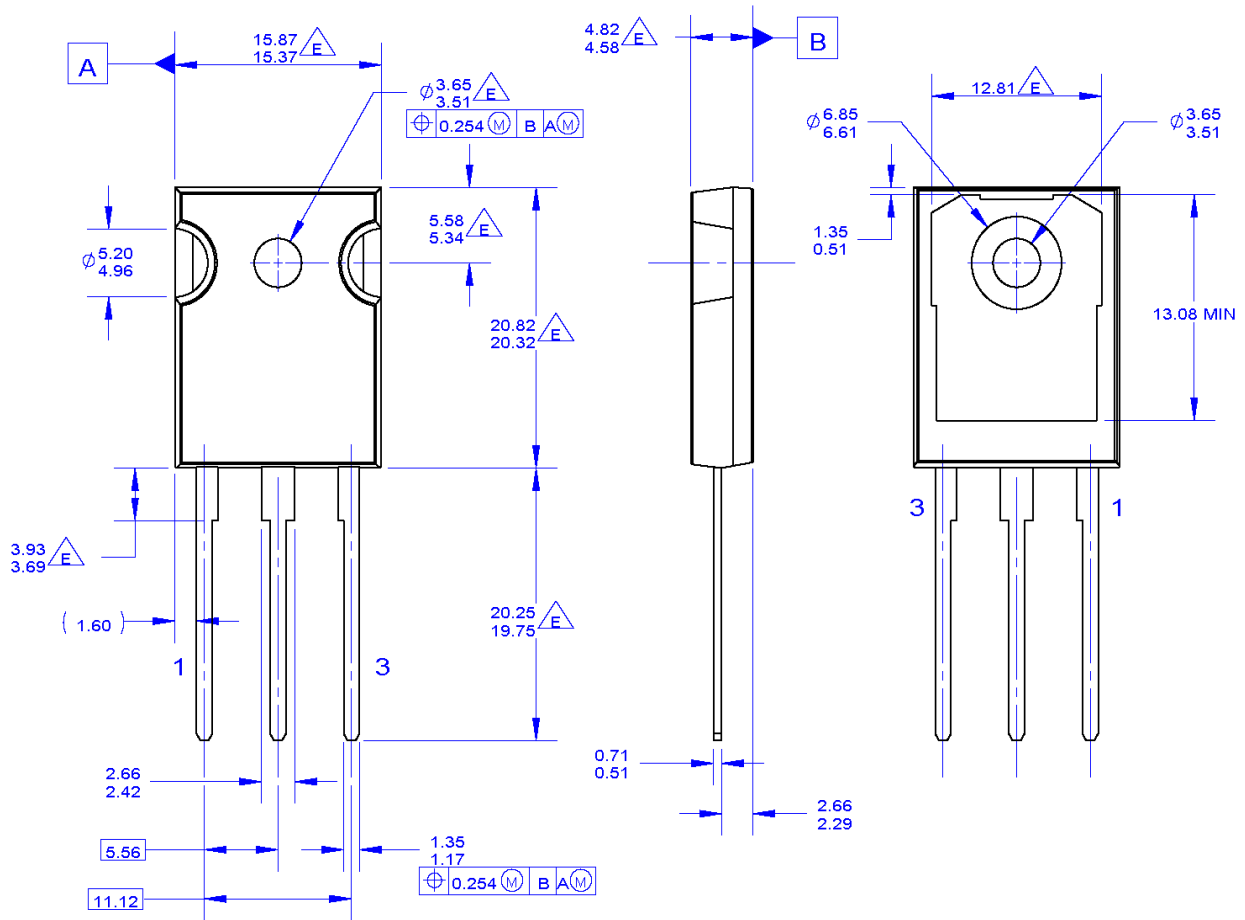


图 22. 二极管瞬态热阻抗



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$\triangle E$ DOES NOT COMPLY JEDEC STANDARD VALUE
 F. DRAWING FILENAME: MKT-TO247G03_REV01

图 23. TO-247，模塑，3 引脚，JEDEC 变体 AB（有效）

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