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2015年3月

FGA20S125P 1250 V, 20 A 阳极短路 IGBT

特性

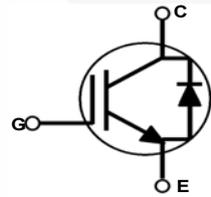
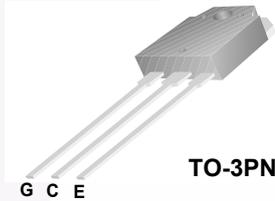
- 高速开关
- 低饱和电压: $V_{CE(sat)} = 2.0\text{ V @ } I_C = 20\text{ A}$
- 高输入阻抗
- 符合 RoHS 标准

应用

- 感应加热、微波炉

概述

Fairchild 阳极短路 IGBT 采用先进的场截止沟槽和阳极短路技术, 可以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。



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

符号	描述	FGA20S125P_SN00336	单位
V_{CES}	集电极-发射极之间电压	1250	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 @ $T_C = 25^\circ\text{C}$	250	W
	最大功耗 @ $T_C = 100^\circ\text{C}$	125	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
$R_{\theta JC}(\text{IGBT})$	结至外壳热阻	--	0.6	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻	--	40	$^\circ\text{C}/\text{W}$

注:
1: 受限于最大结温

FGA20S125P — 1250 V, 20 A 阳极短路 IGBT

封装标识与订购信息

器件标识	器件	封装	卷尺寸	带宽	数量
FGA20S125P	FGA20S125P _SN00336	TO-3PN	-	-	30

IGBT 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	$V_{GE} = 0\text{ V}, I_C = 1\text{ mA}$	1250	-	-	V
$\frac{\Delta BV_{CES}}{\Delta T_J}$	击穿电压温度系数电压	$V_{GE} = 0\text{ V}, I_C = 1\text{ mA}$	-	1.2	-	V/ $^\circ\text{C}$
I_{CES}	集电极切断电流	$V_{CE} = 1250, V_{GE} = 0\text{ V}$	-	-	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	$I_C = 20\text{ A}, V_{GE} = 15\text{ V}$ $T_C = 25^\circ\text{C}$	-	2.0	2.5	V
		$I_C = 20\text{ A}, V_{GE} = 15\text{ V}$ $T_C = 125^\circ\text{C}$	-	2.22	-	V
		$I_C = 20\text{ A}, V_{GE} = 15\text{ V}$ $T_C = 175^\circ\text{C}$	-	2.44	-	V
V_{FM}	二极管正向电压	$I_F = 20\text{ A}, T_C = 25^\circ\text{C}$	-	1.75	2.4	V
		$I_F = 20\text{ A}, T_C = 175^\circ\text{C}$	-	2.22	-	V
动态特性						
C_{ies}	输入电容	$V_{CE} = 30\text{ V}, V_{GE} = 0\text{ V},$ $f = 1\text{ MHz}$	-	1360	-	pF
C_{oes}	输出电容		-	40	-	pF
C_{res}	反向传输电容		-	26	-	pF
开关特性						
$t_{d(on)}$	导通延迟时间	$V_{CC} = 600\text{ V}, I_C = 20\text{ A},$ $R_G = 10\ \Omega, V_{GE} = 15\text{ V},$ 感性负载, $T_C = 25^\circ\text{C}$	-	10	-	ns
t_r	上升时间		-	260	-	ns
$t_{d(off)}$	关断延迟时间		-	400	-	ns
t_f	下降时间		-	100	-	ns
E_{on}	导通开关损耗		-	0.74	-	mJ
E_{off}	关断开关损耗		-	0.50	-	mJ
E_{ts}	总开关损耗		-	1.24	-	mJ
$t_{d(on)}$	导通延迟时间	$V_{CC} = 600\text{ V}, I_C = 20\text{ A},$ $R_G = 10\ \Omega, V_{GE} = 15\text{ V},$ 感性负载, $T_C = 175^\circ\text{C}$	-	11	-	ns
t_r	上升时间		-	320	-	ns
$t_{d(off)}$	关断延迟时间		-	420	-	ns
t_f	下降时间		-	250	-	ns
E_{on}	导通开关损耗		-	0.94	-	mJ
E_{off}	关断开关损耗		-	1.23	-	mJ
E_{ts}	总开关损耗		-	2.17	-	mJ
Q_g	总栅极电荷	$V_{CE} = 600\text{ V}, I_C = 20\text{ A},$ $V_{GE} = 15\text{ V}$	-	153	-	nC
Q_{ge}	栅极 - 发射极间电荷		-	12	-	nC
Q_{gc}	栅极 - 集电极间电荷		-	98	-	nC

典型性能特征

图 1. 典型输出特性

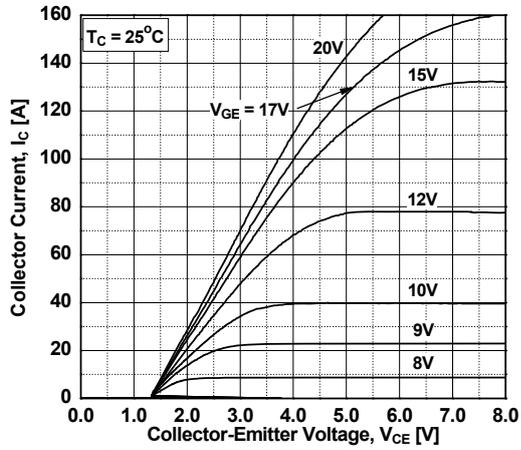


图 2. 典型输出特性

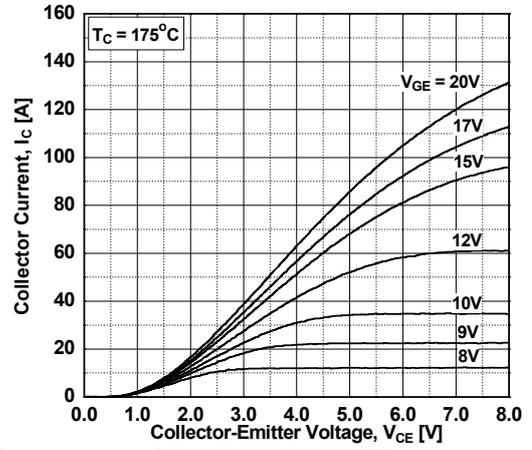


图 3. 典型饱和电压

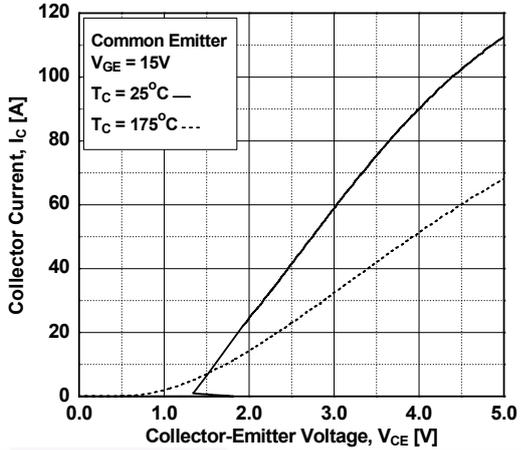


图 4. 传输特性

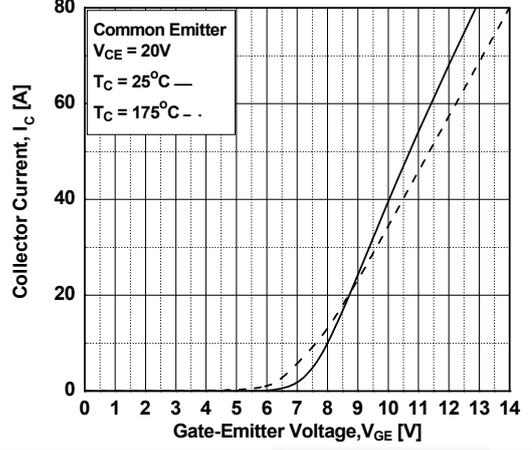


图 5. 饱和电压与外壳的关系

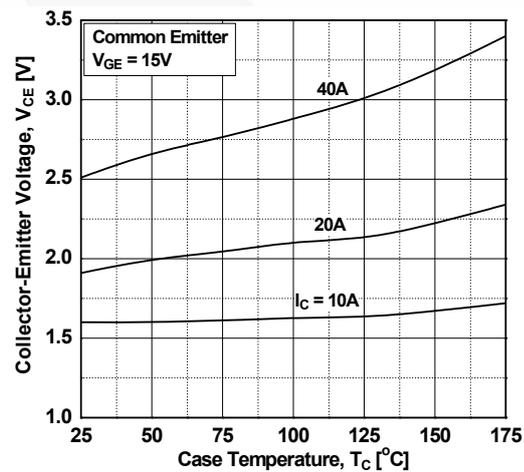
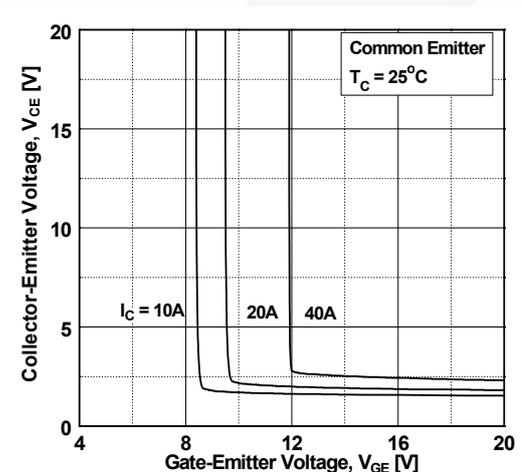


图 6. 饱和电压与 Vge 的关系



典型性能特征

图 7. 饱和电压与 V_{GE} 的关系

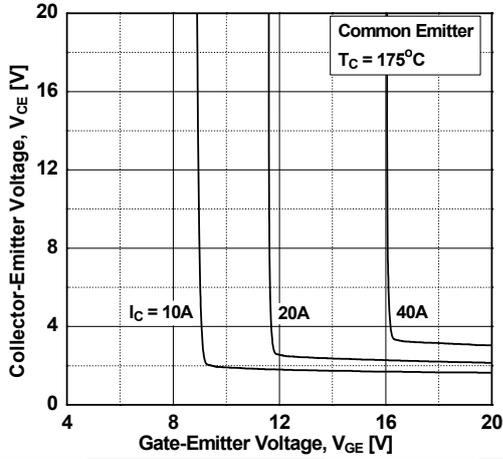


图 8. 电容特性

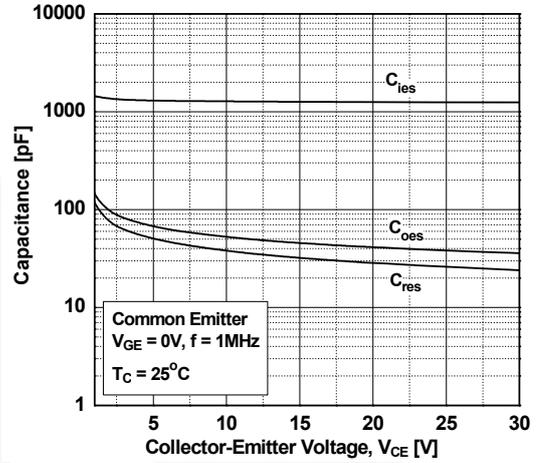


图 9. 栅极电荷特性

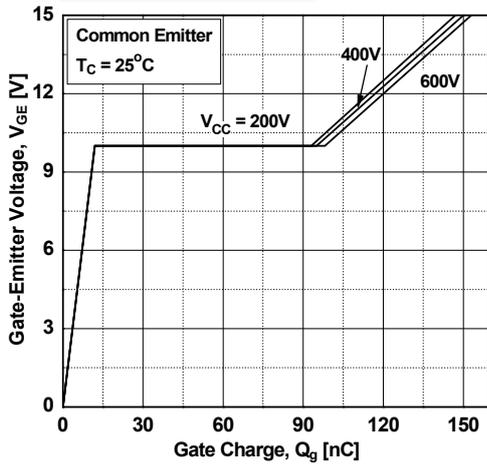


图 10. SOA 特性

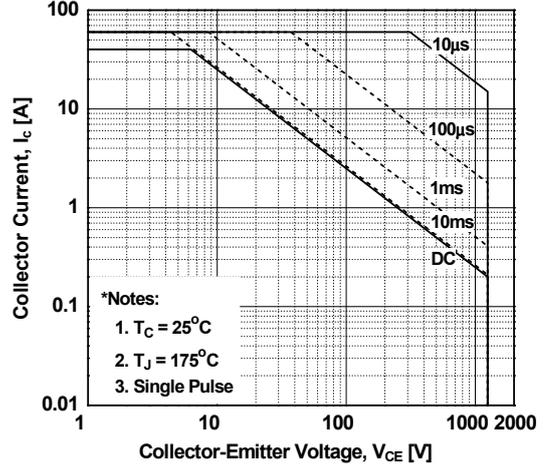


图 11. 导通特性与栅极电阻的关系

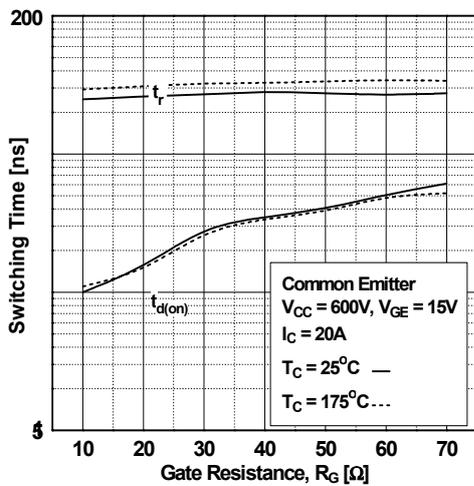
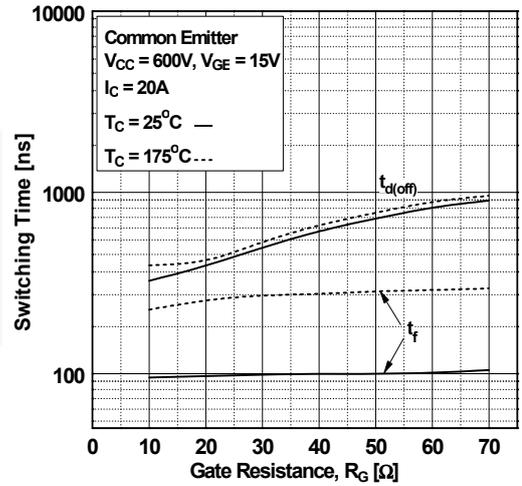


图 12. 关断特性与栅极电阻的关系



典型性能特征

图 13. 导通特性与集电极电流的关系

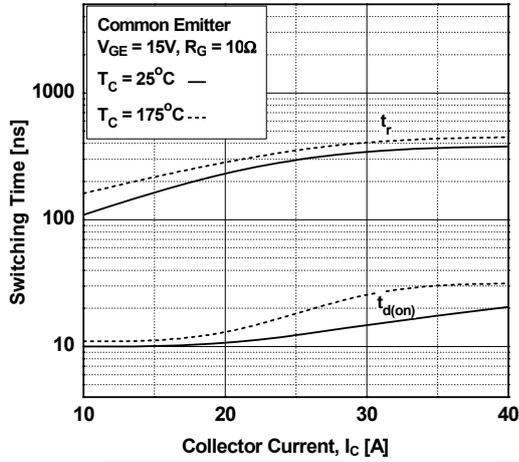


图 14. 关断特性与集电极电流的关系

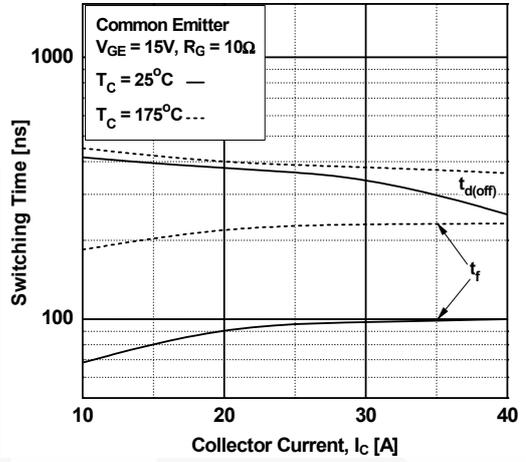


图 15. 开关损耗与栅极电阻的关系

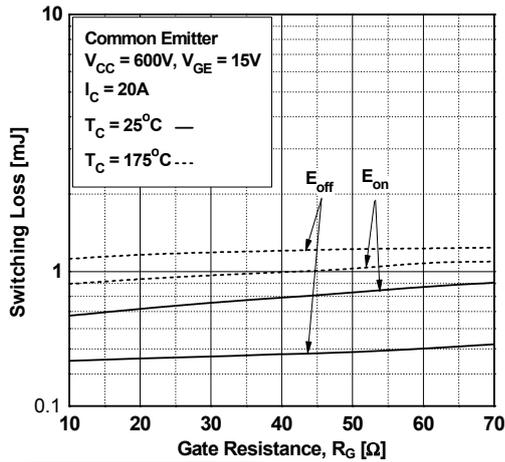


图 16. 开关损耗与集电极电流的关系

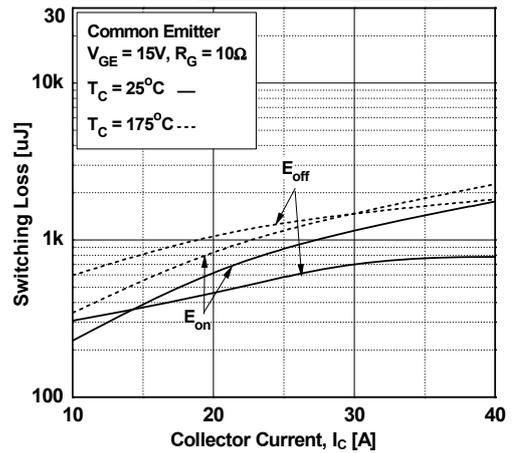


图 17. 关断开关 SOA 特性

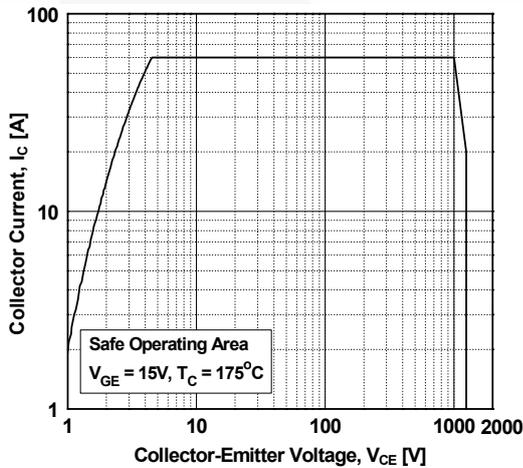


图 18. 正向特性

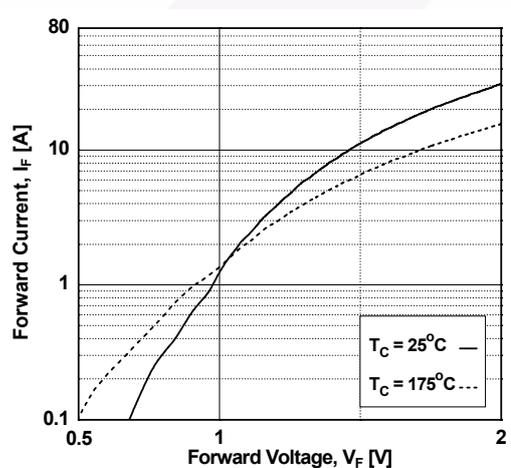
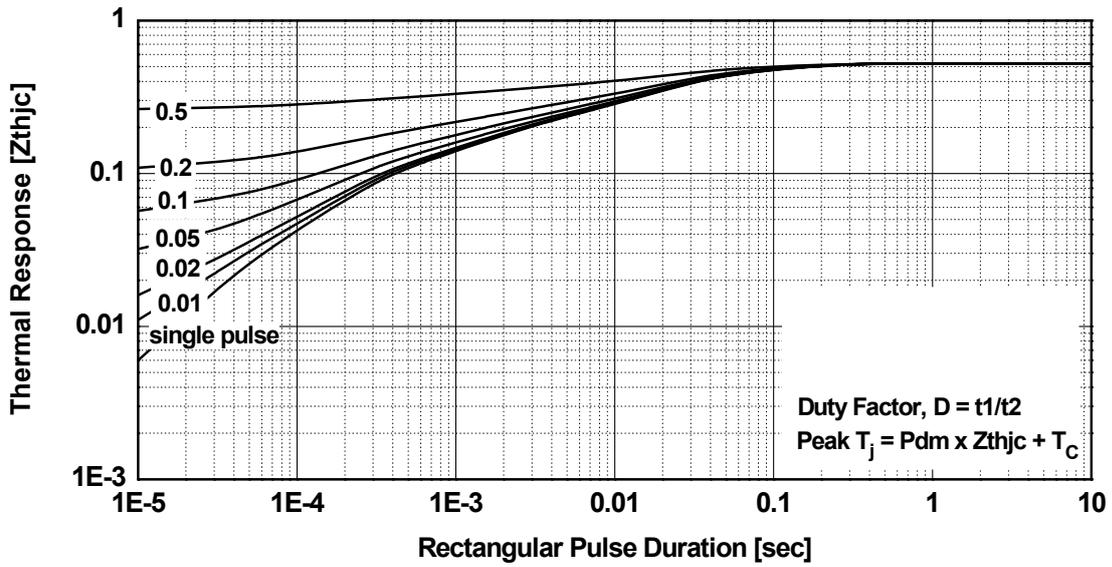


图 19. IGBT 的瞬态热阻抗





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