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2014 年 9 月

FCH170N60

N 沟道 SuperFET® II MOSFET

600 V, 22 A, 170 mΩ

特性

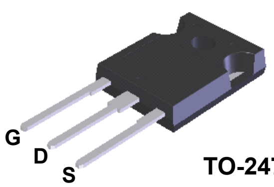
- 650 V @T_J = 150°C
- 典型值 $R_{DS(on)}$ = 150 mΩ
- 超低栅极电荷 （典型值 Q_g = 42 nC)
- 低有效输出电容 （典型值 $C_{oss(eff.)}$=190 pF）
- 100% 经过雪崩测试
- 符合 RoHS 标准

应用

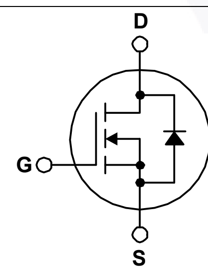
- 通信 / 服务器电源
- 工业电源
- AC-DC 电源

描述

SuperFET® II MOSFET 是 飞兆半导体 利用电荷平衡技术实现出色的低导通电阻和更低栅极电荷性能的全新高压超级结 (SJ) MOSFET 系列产品。这项先进技术专用于最小化传导损耗，提供卓越的开关性能，并能够承受极端 dv/dt 额定值和更高雪崩能量。因此， SuperFET II MOSFET 适用于系统小型化和高效化的各种各样的 AC-DC 功率转换的应用中。



TO-247



绝对最大额定值 T_C = 25°C 除非另有说明。

符号	参数		FCH170N60	单位
V_{DSS}	漏极一源极电压		600	V
V_{GSS}	栅极一源极电压	- DC	±20	V
		- AC	±30	
I_D	漏极电流	- 连续 (T_C = 25°C)	22	A
		- 连续 (T_C = 100°C)	14	
I_{DM}	漏极电流	- 脉冲 （注 1）	66	A
E_{AS}	单脉冲雪崩能量	（注 2）	525	mJ
I_{AR}	雪崩电流	（注 1）	5	A
E_{AR}	重复雪崩能量	（注 1）	2.27	mJ
dv/dt	MOSFET dv/dt	（注 3）	100	V/ns
	二极管恢复 dv/dt 峰值		20	
P_D	功耗	(T_C = 25°C)	227	Ω
		- 高于 25°C 的功耗系数	1.82	W/°C
T_J, T_{STG}	工作和存储温度范围		-55 至 +150	°C
T_L	用于焊接的最高引脚温度， 距离外壳 1/8”，持续 5 秒		300	°C

热性能

符号	参数	FCH170N60	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.55	°C/W
$R_{\theta JA}$	结至环境热阻最大值	40	

封装标识与定购信息

器件标识	器件	封装	卷尺寸	带宽	数量
FCH170N60	FCH170N60	TO-247	-	-	30

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

关断特性

符号	参数	测试条件	最小值	典型值	最大值	单位
BV_{DSS}	漏极一源极击穿电压	I_D = 10 mA,V_{GS} = 0 V,T_J = 25°C	600	-	-	V
		I_D = 10 mA,V_{GS} = 0 V, T_J = 150°C	650	-	-	V
ΔBV_{DSS} / ΔT_J	击穿电压温度系数	I_D = 10 mA, 参考 25°C 数值	-	0.67	-	V/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 600 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 480 V, V_{GS} = 0 V, T_C = 125°C	-	1.2	-	
I_{GSS}	栅极 - 体漏电流	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±100	nA

导通特性

符号	参数	测试条件	最小值	典型值	最大值	单位
$V_{GS(th)}$	栅极阈值电压	V_{GS} = V_{DS}, I_D = 250 μA	2.5	-	3.5	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 11 A	-	150	170	mΩ
g_{FS}	正向跨导	V_{DS} = 20 V, I_D = 11 A	-	17	-	S

动态特性

符号	参数	测试条件	最小值	典型值	最大值	单位
C_{iss}	输入电容	V_{DS} = 380 V, V_{GS} = 0 V f = 1 MHz	-	2150	2860	pF
C_{oss}	输出电容		-	60	80	pF
C_{rss}	反向传输电容		-	2.65	-	pF
$C_{oss\ (eff.)}$	有效输出电容	V_{DS} = 0 V 至 480 V, V_{GS} = 0 V	-	190	-	pF
$Q_{g(tot)}$	10 V 电压的栅极电荷总量	V_{DS} = 380 V, I_D = 11 A, V_{GS} = 10 V （注 4）	-	42	55	nC
Q_{gs}	栅极 - 源极栅极电荷		-	9	-	nC
Q_{gd}	栅极 - 漏极 “ 米勒 ” 电荷		-	11	-	nC
ESR	等效串联电阻	f = 1 MHz	-	0.95	-	Ω

开关特性

符号	参数	测试条件	最小值	典型值	最大值	单位
$t_{d(on)}$	导通延迟时间	V_{DD} = 380 V, I_D = 11 A, V_{GS} = 10 V, R_G = 4.7 Ω （注 4）	-	21	50	ns
t_r	导通上升时间		-	12	35	ns
$t_{d(off)}$	关断延迟时间		-	55	120	ns
t_f	关断下降时间		-	3.8	18	ns

漏极 - 源极二极管特性

符号	参数	测试条件	最小值	典型值	最大值	单位
I_S	漏极 - 源极二极管最大正向连续电流		-	-	22	A
I_{SM}	漏极 - 源极二极管最大正向脉冲电流		-	-	66	A
V_{SD}	漏极 - 源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 11 A	-	-	1.2	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, I_{SD} = 11 A dI_F/dt = 100 A/μs	-	346	-	ns
Q_{rr}	反向恢复电荷		-	6.2	-	μC

注：

1. 重复额定值：脉冲宽度受限于最大结温
2. I_{AS} = 5 A, R_G = 25 Ω, 开始于 T_J = 25°C
3. I_{SD} ≤ 11 A, di/dt ≤ 200 A/μs, V_{DD} ≤ 380 V, 开始于 T_J = 25°C
4. 本质上独立于操作温度的典型特性

典型性能特征

图 1. 导通区域特性

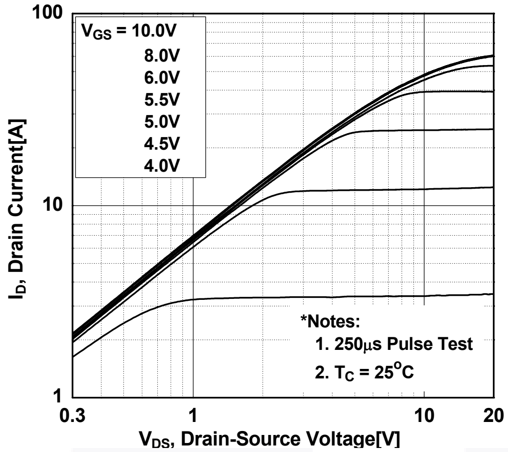


图 2. 传输特性

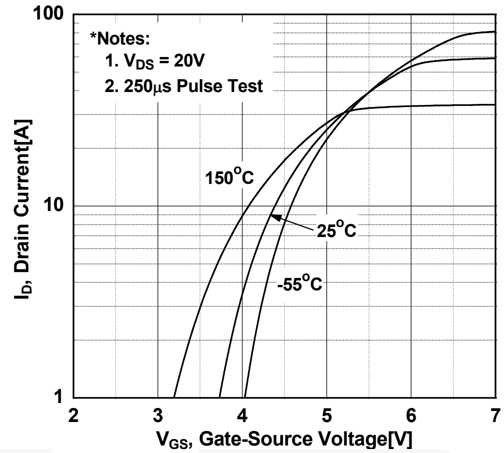


图 3. 导通电阻变化与漏极电流和栅极电压的关系

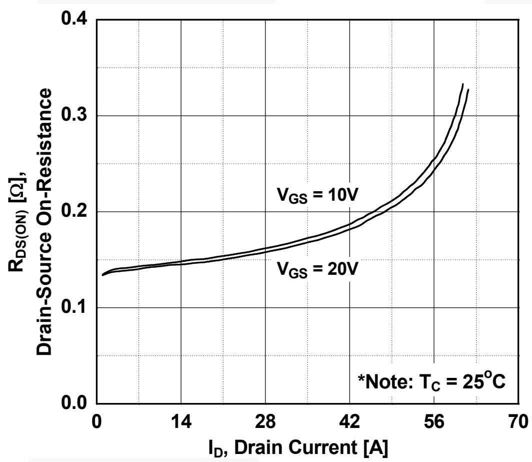


图 4. 体二极管正向电压变化与源极电流和温度的关系

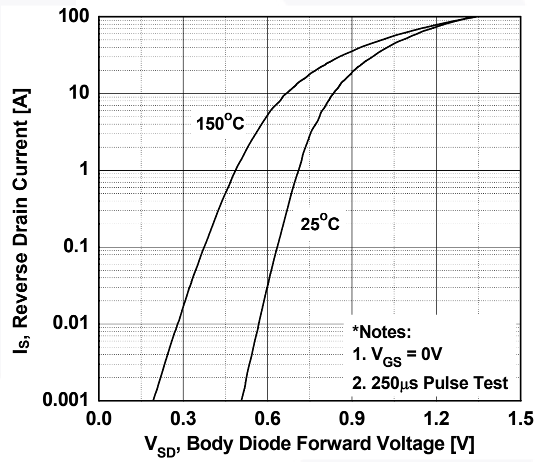


图 5. 电容特性

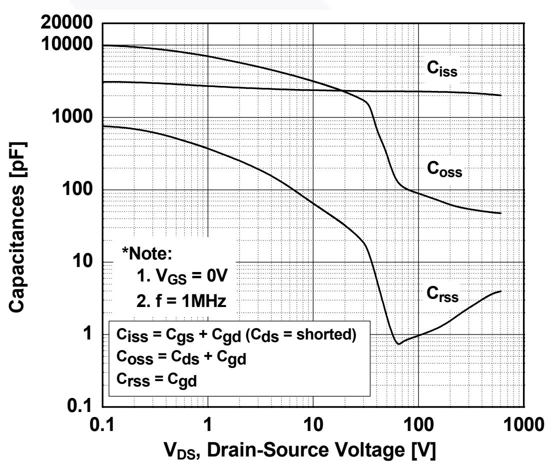
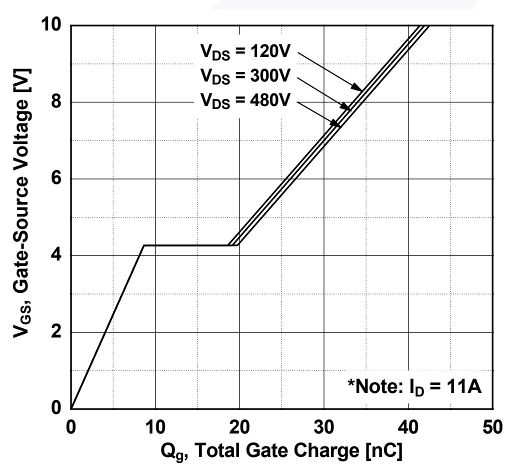


图 6. 栅极电荷特性



典型性能特性 （接上页）

图 7. 击穿电压变化与温度的关系

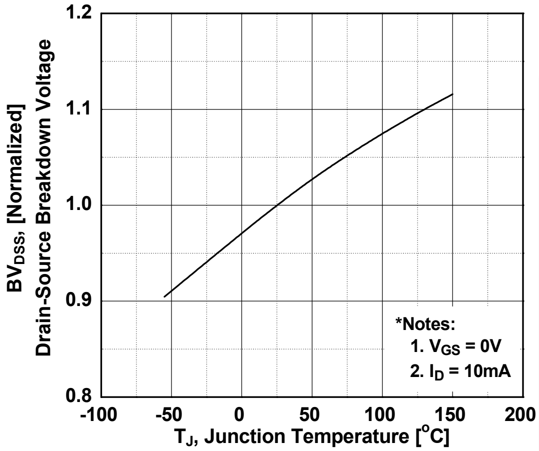


图 8. 导通电阻变化与温度的关系

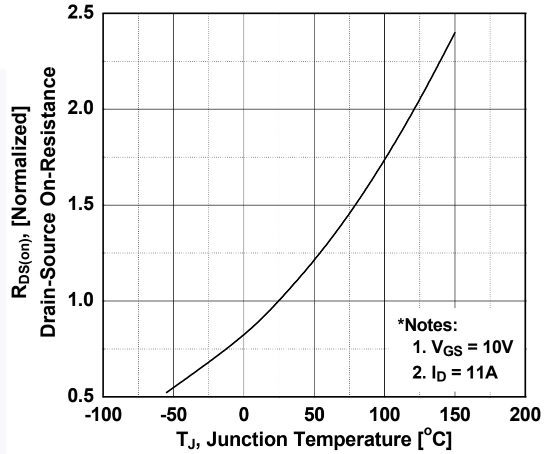


图 9. 最大安全工作区

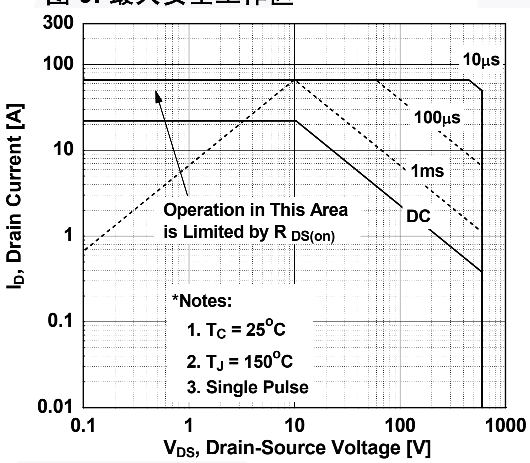


图 10. 最大漏极电流与壳温的关系

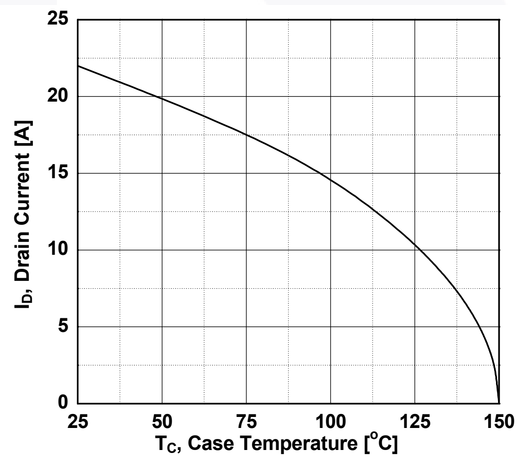
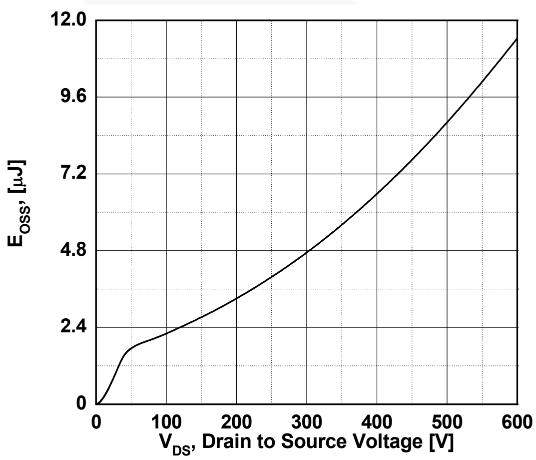
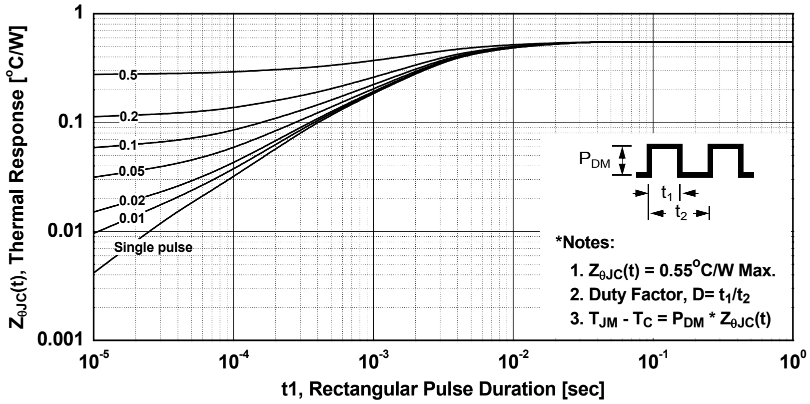


图 11. Eoss 与漏源极电压的关系



典型性能特性（接上页）

图 12. 瞬态热响应曲线



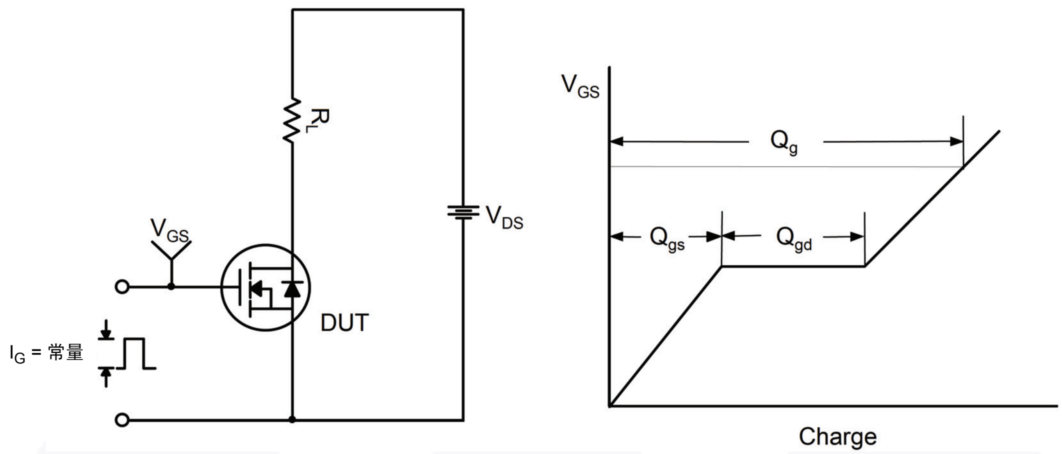


图 13. 栅极电荷测试电路与波形

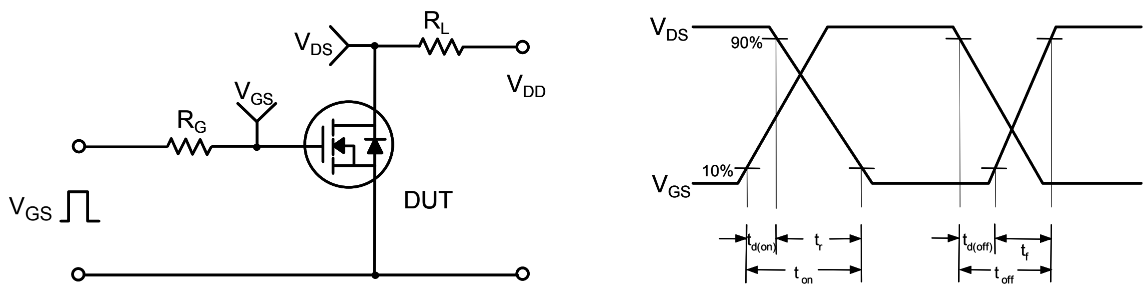


图 14. 阻性开关测试电路与波形

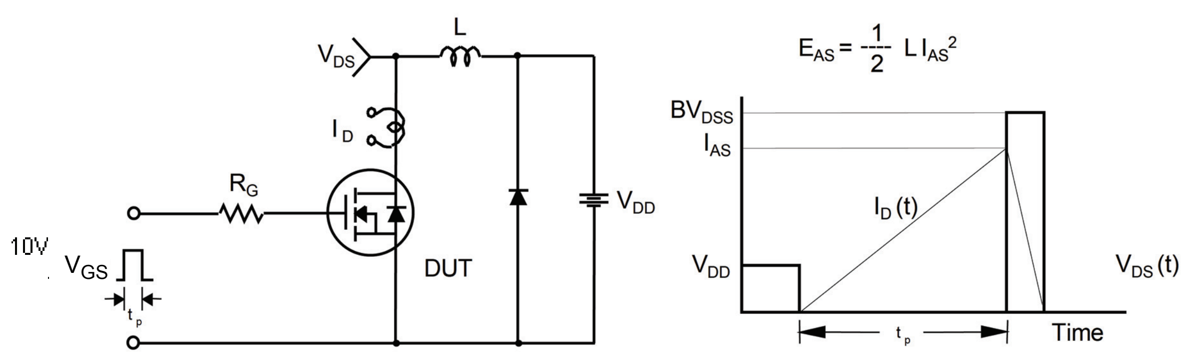


图 15. 非箝位电感开关测试电路与波形

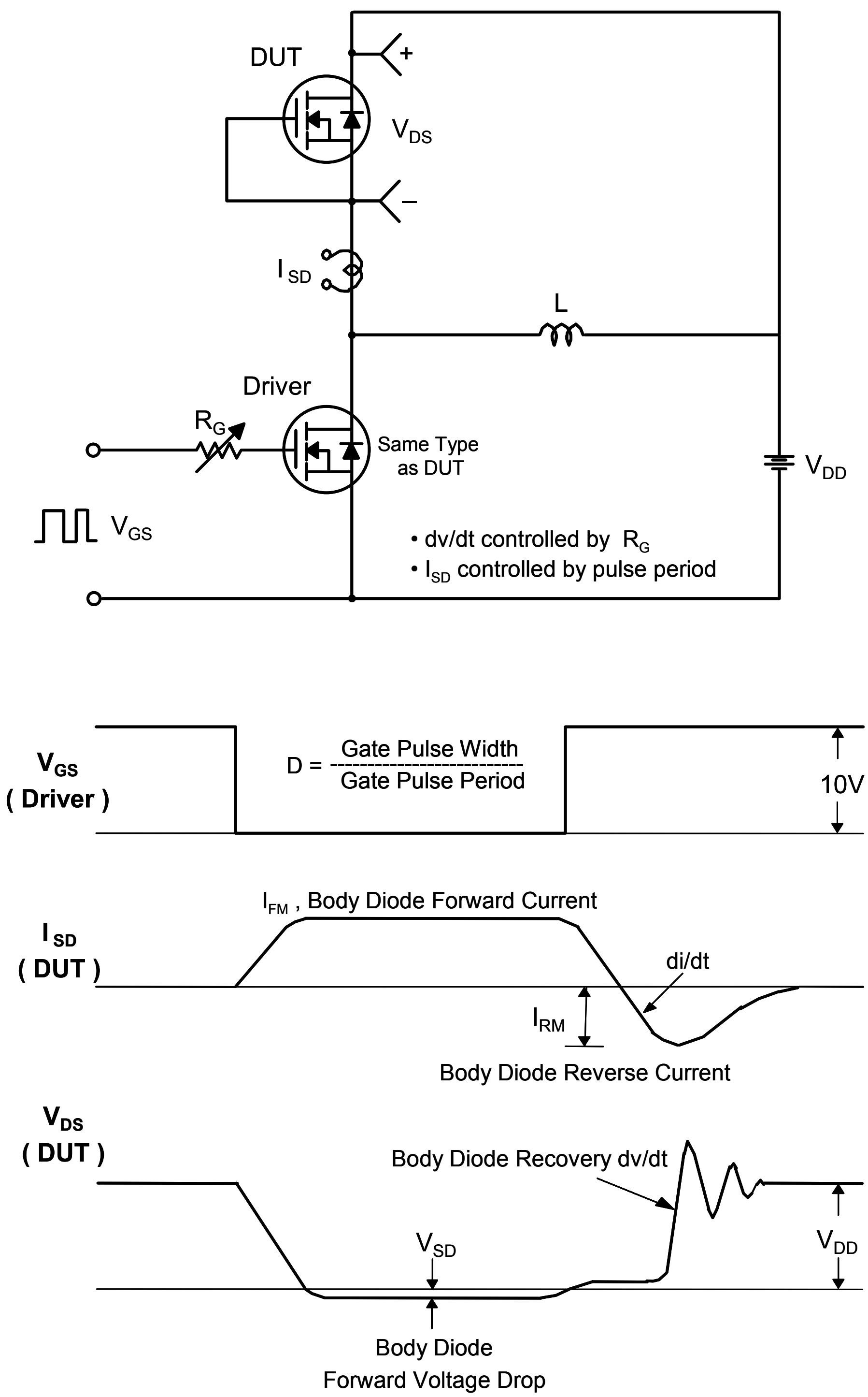


图 16. 二极管恢复 dv/dt 峰值测试电路与波形

机械尺寸

TO-247 3L

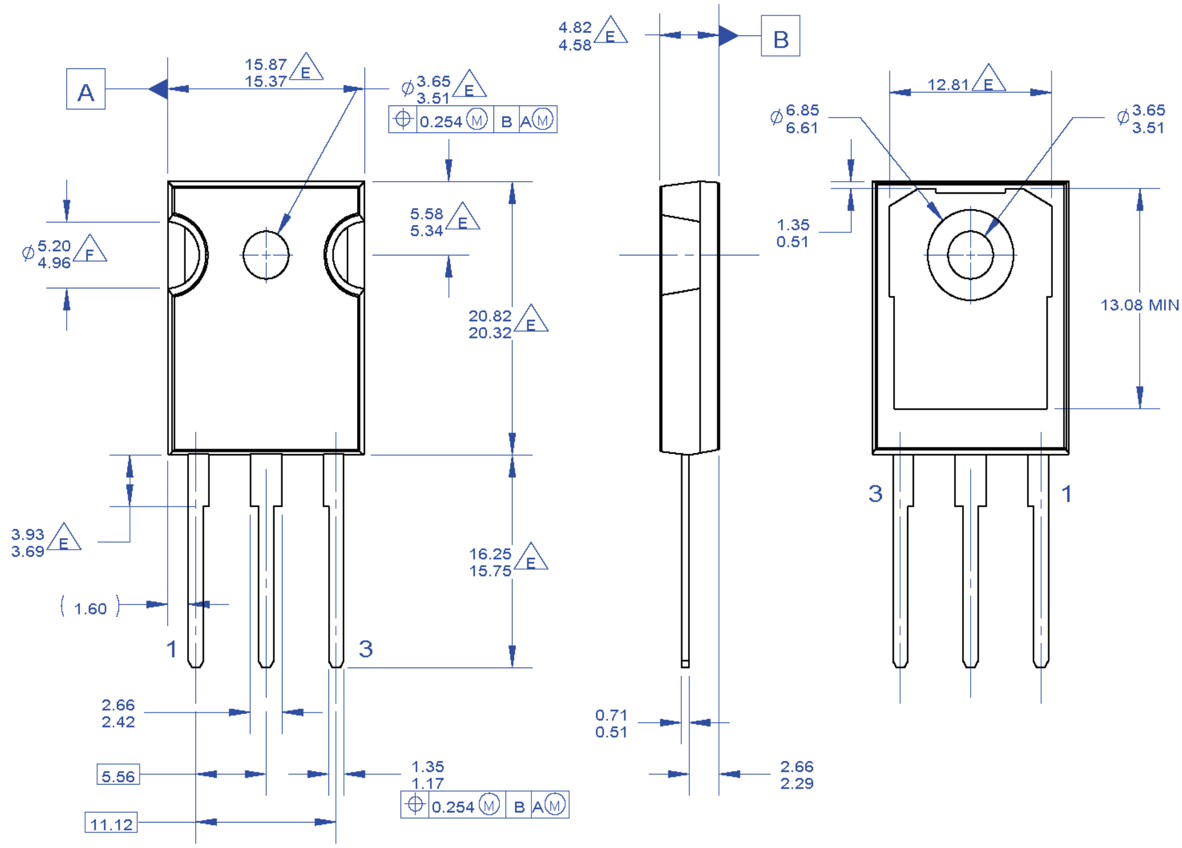


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图 17. TO-247，模塑， 3 引脚， Jedec 变体 AB

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Datasheet Identification	Product Status	Definition
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Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
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