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FAIRCHILD SEMICONDUCTOR®

2013 年 12 月

FDD1600N10ALZ

N 沟道 PowerTrench® MOSFET

100 V， 6.8 A， 160 mΩ

特性

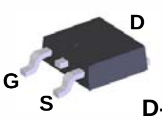
- $R_{DS(on)}$ = 124 mΩ (Typ.)@V_{GS} = 10 V, I_D = 3.4 A
- $R_{DS(on)}$ = 175 mΩ (Typ.)@V_{GS} = 5 V, I_D = 2.1 A
- 低栅极电荷 （典型值 2.78 nC）
- 低 C_{rss} （典型值 2.04 pF）
- 快速开关
- 100% 经过雪崩测试
- 改善的 dv/dt 处理能力
- 符合 RoHS 标准

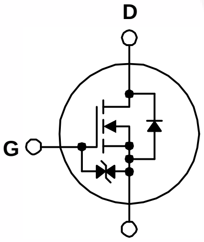
说明

该 N 沟道 MOSFET 采用飞兆半导体的先进 Power Trench® 工艺生产，这一先进工艺专用于最小化通态电阻，同时保持卓越的开关性能。

应用

- 消费电子设备
- LED 电视和显示器
- 同步整流
- 不间断电源
- 微型太阳能逆变器





MOSFET 最大额定值 T_C = 25°C 除非另有说明。

符号	参数		FDD1600N10ALZ	单位
V_{DSS}	漏极—源极电压		100	V
V_{GSS}	栅极—源极电压		±20	V
I_D	漏极电流	—连续 (T_C = 25°C)	6.8	A
		—连续 (T_C = 100°C)	4.3	
I_{DM}	漏极电流	—脉冲 （注 1）	13.6	A
E_{AS}	单脉冲雪崩能量 （注 2）		5.08	mJ
dv/dt	二极管恢复 dv/dt 峰值 （注 3）		6.0	V/ns
P_D	功耗	(T_C = 25°C)	14.9	W
		—超过 25°C 时降额	0.12	W/°C
T_J, T_{STG}	工作和存储温度范围		-55 至 +150	°C
T_L	用于焊接的最大引脚温度，距离外壳 1/8"，持续 5 秒		300	°C

热性能

符号	参数	FDD1600N10ALZ	单位
$R_{\theta JC}$	结至外壳热阻最大值	8.4	°C/W
$R_{\theta JA}$	结至环境热阻最大值	87	

封装标识与定购信息

器件编号	顶标	封装	包装方法	卷尺寸	带宽	数量
FDD1600N10ALZ	1600N10ALZ	DPAK	卷带	330 mm	16 mm	2500 单元

电气特性 $T_C = 25^oC$ 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_{DSS}	漏极—源极击穿电压	I_D = 250 μA, V_{GS} = 0 V	100	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	I_D = 250 μA，参考 25°C	-	0.1	-	V/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 80 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 80 V, V_{GS} = 0 V, T_C = 125°C	-	-	500	
I_{GSS}	栅极—源极漏电流	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±10	μA
导通特性						
$V_{GS(th)}$	栅极阈值电压	$V_{GS} = V_{DS}$, I_D = 250 μA	1.4	-	2.8	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 3.4 A	-	124	160	mΩ
		V_{GS} = 5 V, I_D = 2.1 A	-	175	375	
g_{FS}	正向跨导	V_{DS} = 10 V, I_D = 6.8 A	-	19.6	-	S
动态特性						
C_{iss}	输入电容	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	-	169	225	pF
C_{oss}	输出电容		-	43	55	pF
C_{rss}	反向传输电容		-	2.04	-	pF
$C_{oss(er)}$	能源相关输出电容	V_{DS} = 50 V, V_{GS} = 0 V		85	-	pF
$Q_{g(tot)}$	10V 的栅极电荷总量	V_{GS} = 10 V; V_{DD} = 50 V, I_D = 6.8 A （说明 4）	-	2.78	3.61	nC
$Q_{g(tot)}$	5V 的栅极电荷总量	V_{GS} = 5 V		1.5	1.95	nC
Q_{gs}	栅极—源极栅极电荷		-	0.72	-	nC
Q_{gd}	栅极—漏极 " 密勒 " 电荷		-	0.56	-	nC
$V_{plateau}$	栅极电场电压		-	4.02	-	V
Q_{sync}	总栅极电荷同步	V_{DS} = 0 V, I_D = 3.4 A	-	2.5	-	nC
Q_{oss}	输出电荷	V_{DS} = 50 V, V_{GS} = 0 V	-	5.2	-	nC
ESR	等效串联电阻 (G-S)	f = 1 MHz	-	2.1	-	Ω
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 50 V, I_D = 6.8 A, V_{GS} = 10 V, R_G = 4.7 Ω （说明 4）	-	7	24	ns
t_r	开通上升时间		-	2	14	ns
$t_{d(off)}$	关断延迟时间		-	13	36	ns
t_f	关断下降时间		-	2	14	ns
漏极—源极二极管特性						
I_S	漏极—源极二极管最大正向连续电流		-	-	6.8	A
I_{SM}	漏极—源极二极管最大正向脉冲电流		-	-	13.6	A
V_{SD}	漏极—源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 6.8 A	-	-	1.3	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, I_{SD} = 6.8 A, V_{DS} = 50 V, dI_F/dt = 100 A/μs	-	37	-	ns
Q_{rr}	反向恢复电荷		-	42	-	nC

注意：

1. 重复额定值：脉冲宽度受限于最大结温。
2. L = 1 mH，I_{AS} =3.18 A，R_G = 25 Ω，启动 T_J = 25°C。
3. I_{SD} ≤ 6.8 A，di/dt ≤ 200 A/μs，$V_{DD} \le BV_{DSS}$，启动 T_J = 25°C。
4. 本质上独立于工作温度的典型特性。

典型性能特征

图 **1.** 导通区域特性

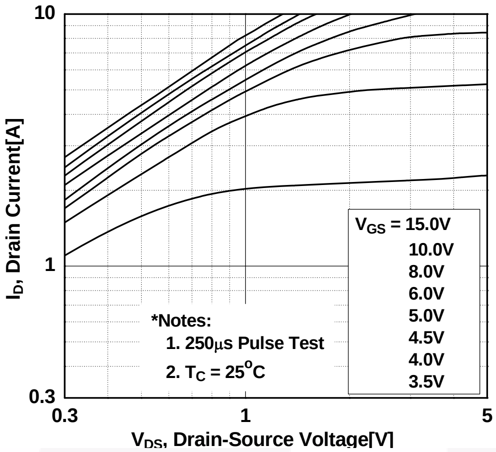


图 **2.** 传输特性

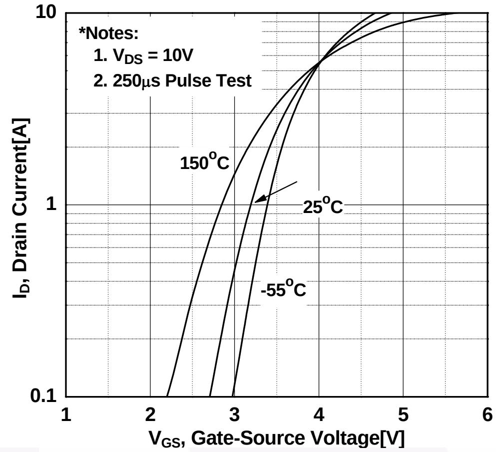


图 **3.** 导通电阻变化与漏极电流和栅极电压

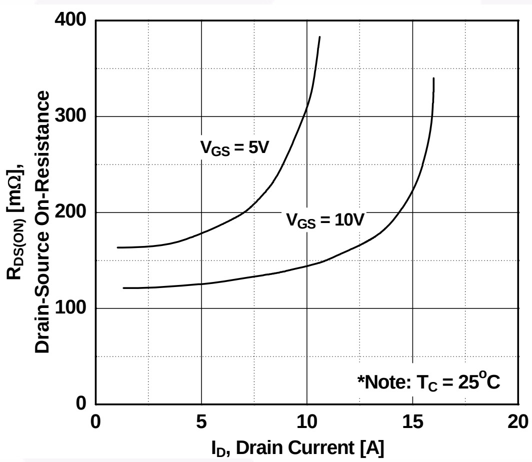


图 **4.** 体二极管正向电压变化与源电流和温度

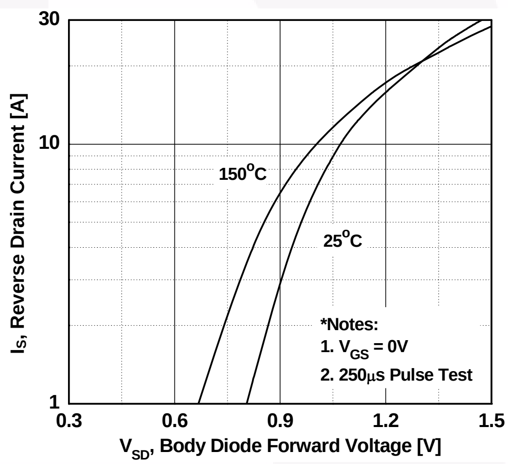


图 **5.** 电容特性

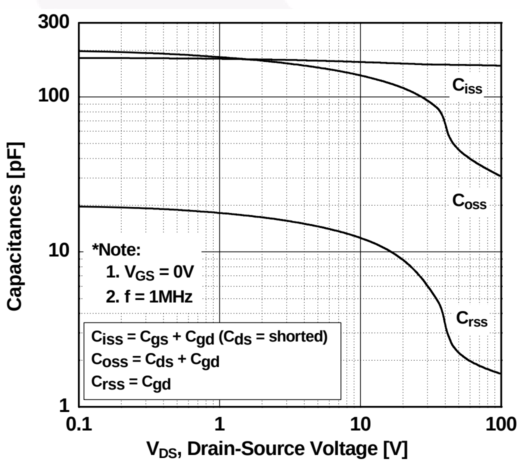
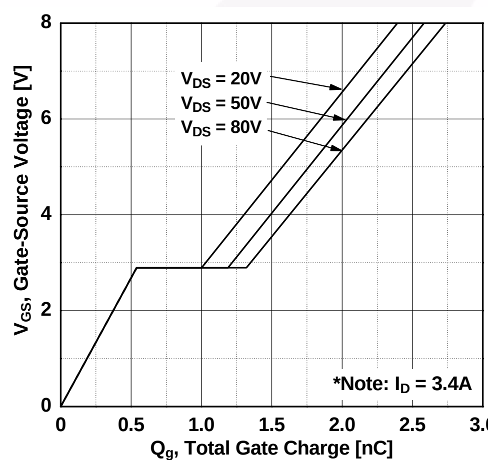


图 **6.** 栅极电荷



典型性能特征 (接上页)

图 **7.** 击穿电压变化与温度

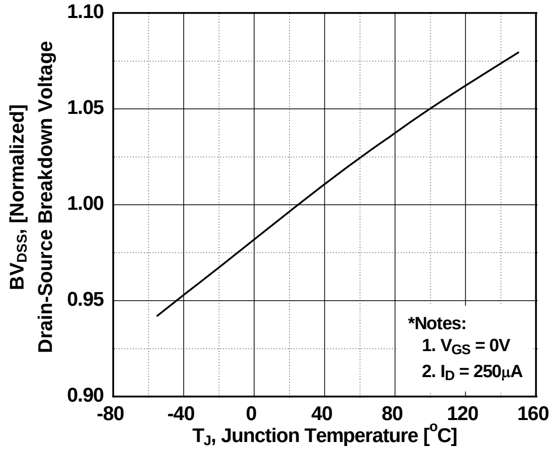


图 **8.** 导通电阻变化与温度

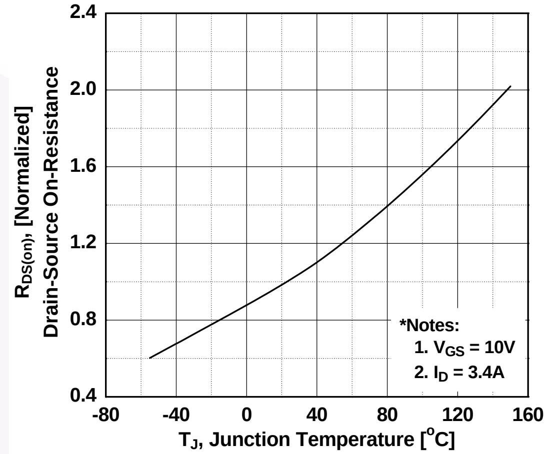


图 **9.** 最大安全工作区

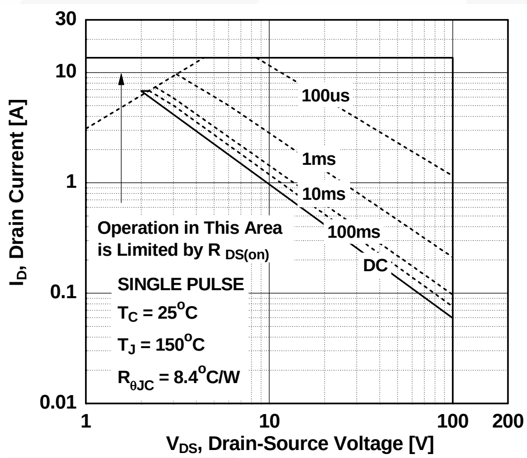


图 **10.** 最大漏极电流与壳体温度

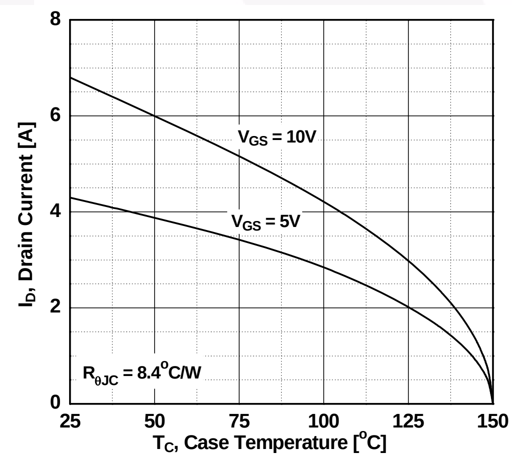


图 **11. Eoss** 与漏极至源极电压

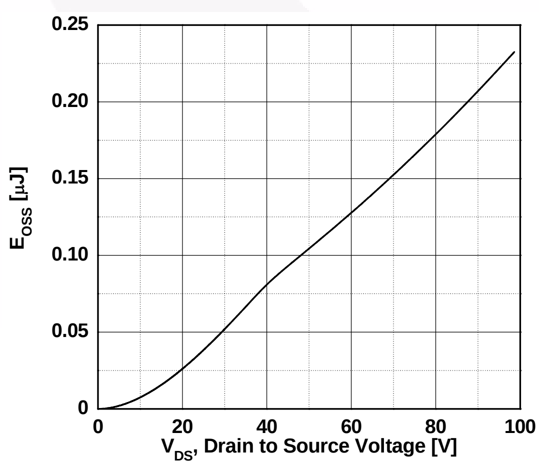
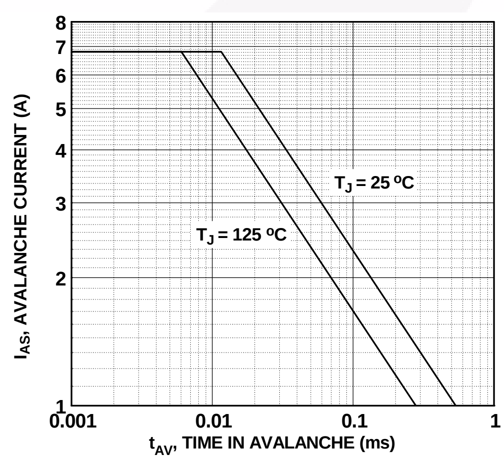
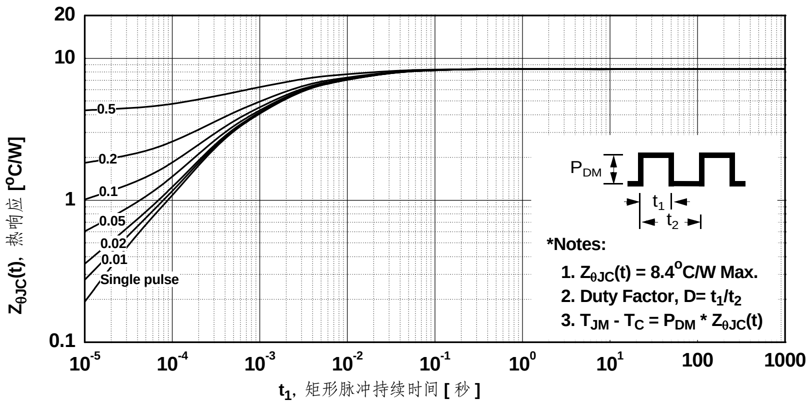


图 **12.** 非箝位感性开关能力



典型性能特征 (接上页)

图 **13.** 瞬态热响应曲线



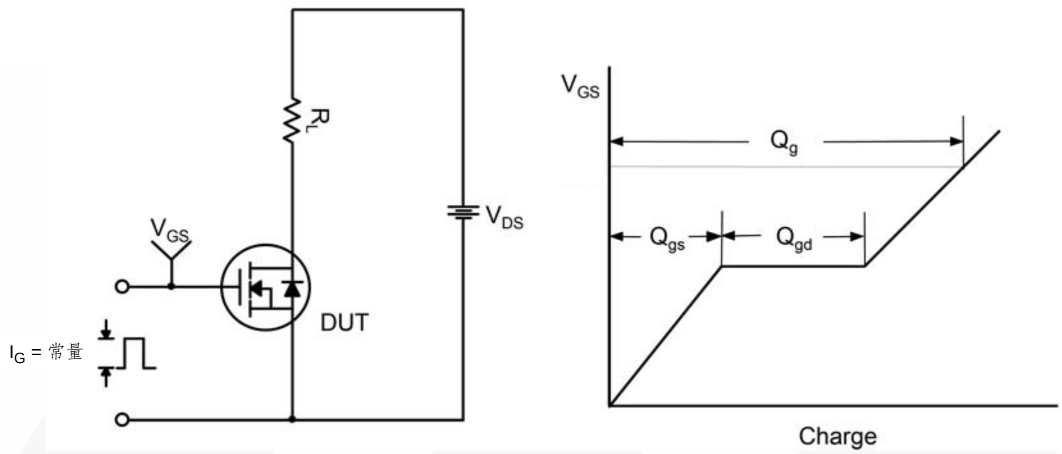


图 **14.** 栅极电荷测试电路与波形

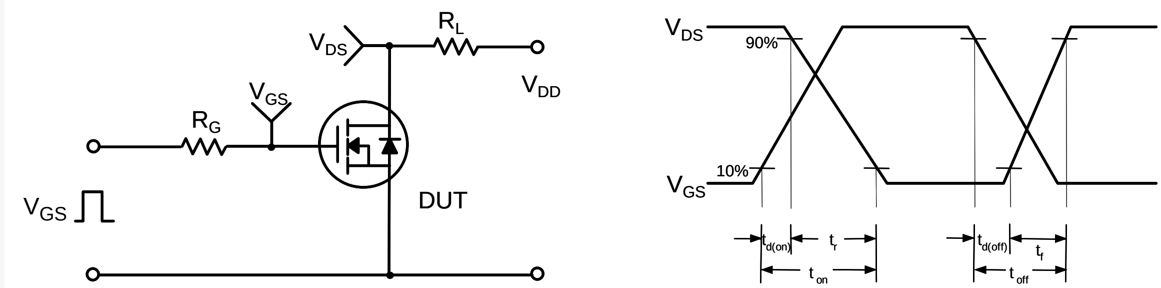


图 **15.** 阻性开关测试电路与波形

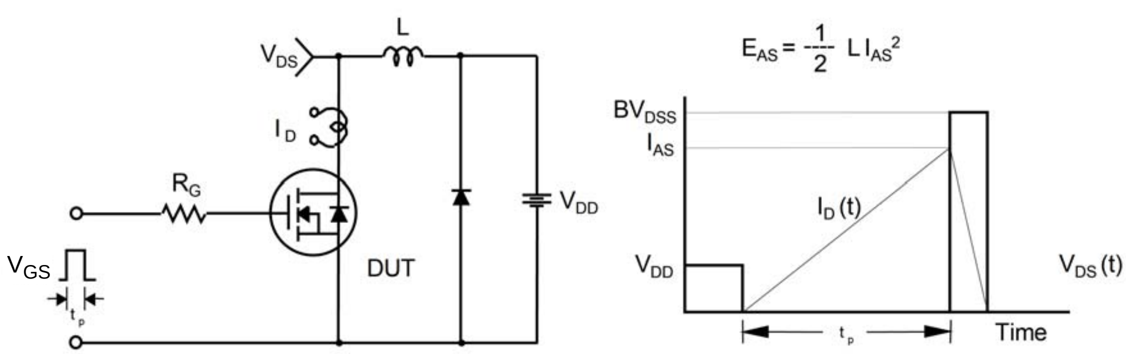


图 **16.** 非箝位感性开关测试电路与波形

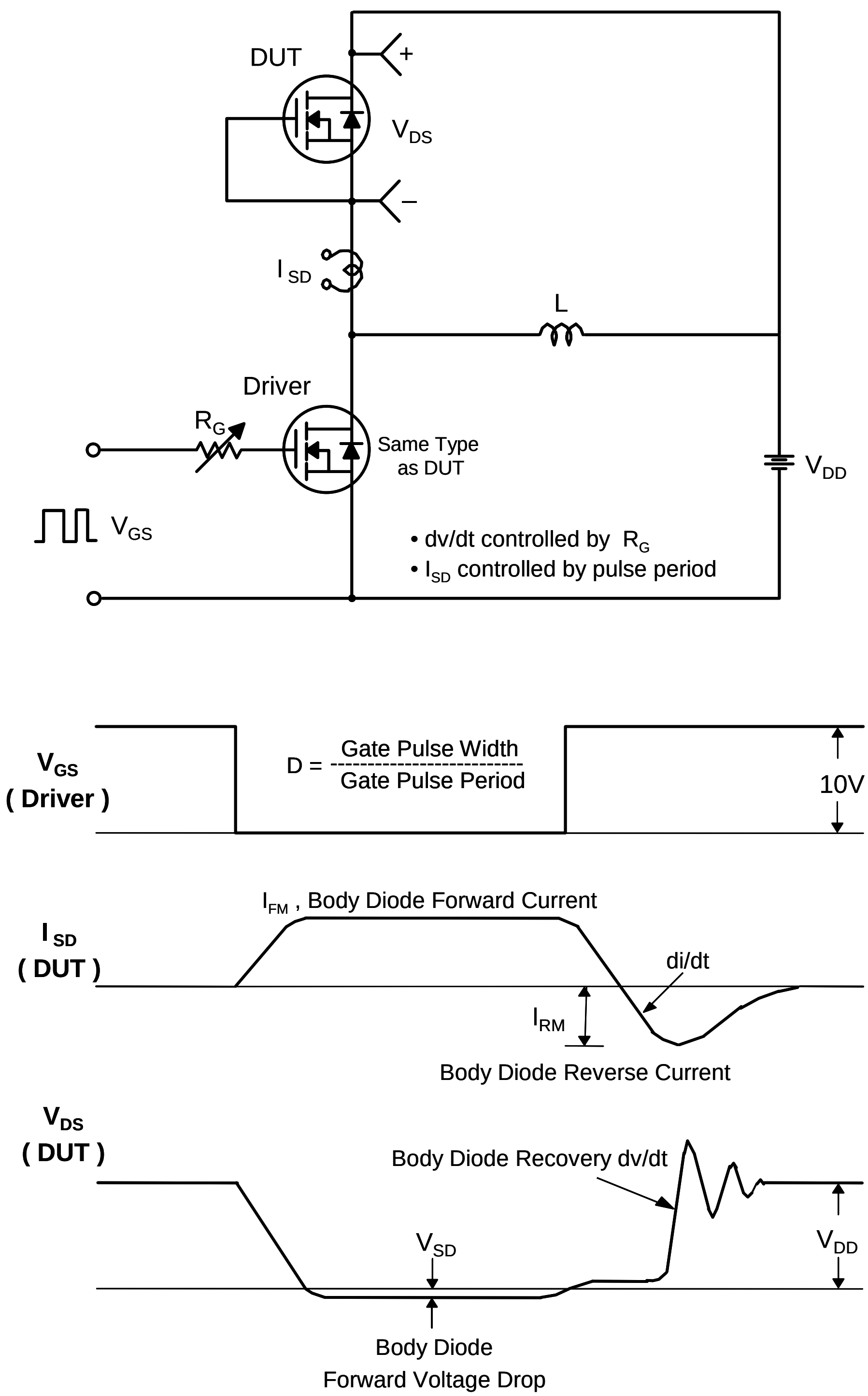
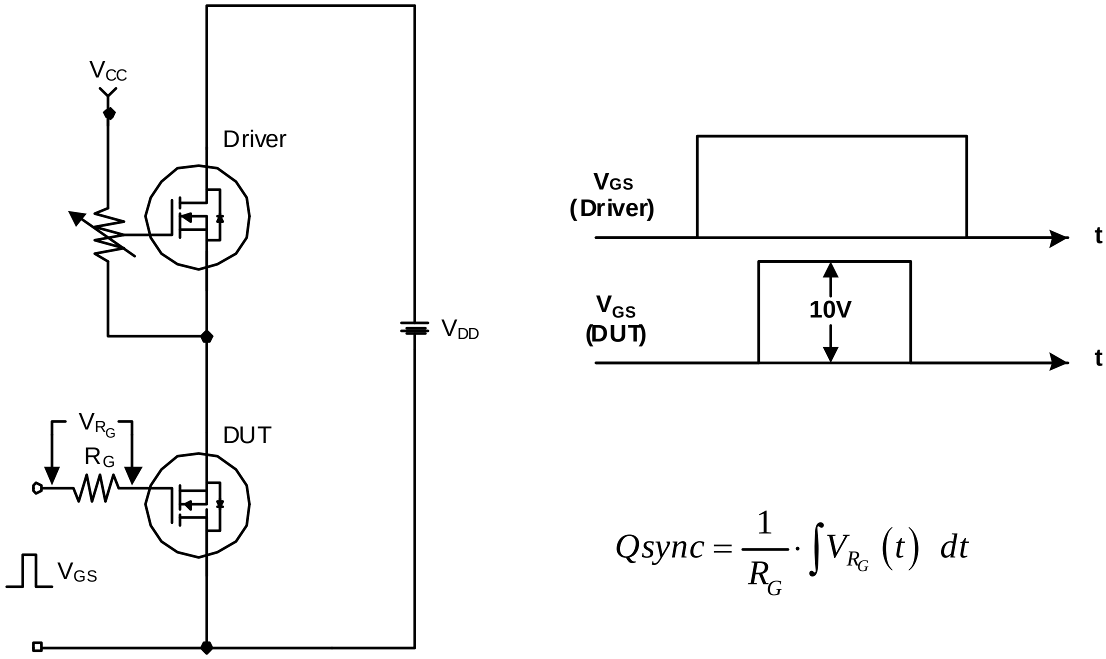


图 **17.** 二极管恢复 **dv/dt** 峰值测试电路与波形



$$Qsync = \frac{1}{R_G} \cdot \int V_{R_G}(t)\ dt$$

图 **18.** 总栅极电荷 **Qsync.** 测试电路和波形

机械尺寸

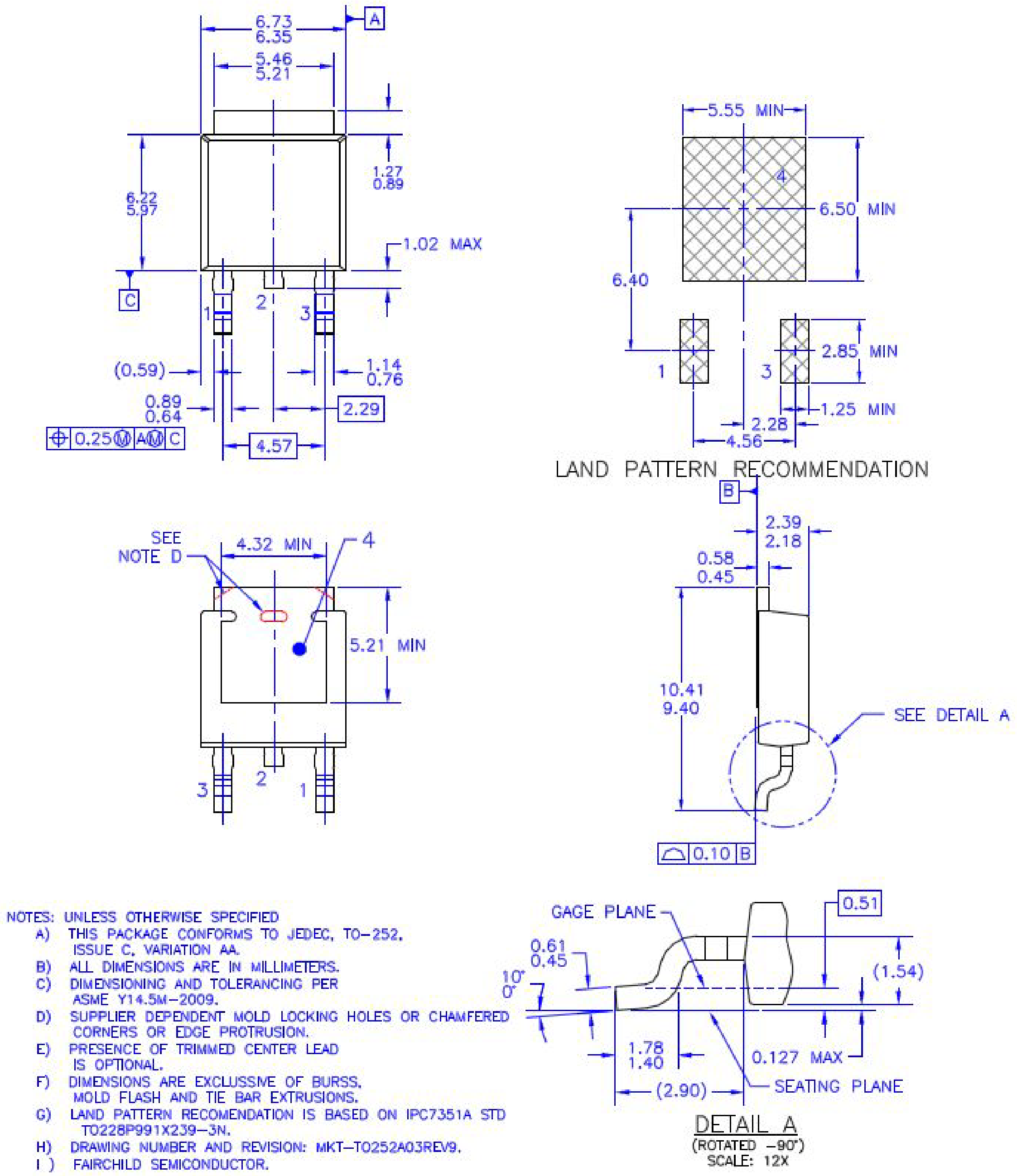


图 **19. TO252 (D-PAK)**，模塑， **3** 引脚，选项 **AA&AB**

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Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
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.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I66

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