

FDD1600N10ALZ

N 沟道 PowerTrench® MOSFET

100 V, 6.8 A, 160 mΩ

特性

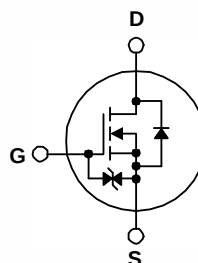
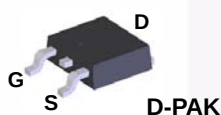
- $R_{DS(on)} = 124 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 10 \text{ V}$, $I_D = 3.4 \text{ A}$
- $R_{DS(on)} = 175 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 5 \text{ V}$, $I_D = 2.1 \text{ A}$
- 低栅极电荷 (典型值 2.78 nC)
- 低 C_{RSS} (典型值 2.04 pF)
- 快速开关
- 100% 经过雪崩测试
- 改善的 dv/dt 处理能力
- 符合 RoHS 标准

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 $T_C = 25^\circ\text{C}$ 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 ($T_C = 25^\circ\text{C}$)	A
		—连续 ($T_C = 100^\circ\text{C}$)	
I_{DM}	漏极电流 (脉冲)	13.6	A
E_{AS}	单脉冲雪崩能量 (注 1)	5.08	mJ
dv/dt	二极管恢复 dv/dt 峰值 (注 2)	6.0	V/ns
P_D	功耗 ($T_C = 25^\circ\text{C}$)	14.9	W
		—超过 25°C 时降额	0.12
T_J, T_{STG}	工作和存储温度范围	-55 至 +150	$^\circ\text{C}$
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	FDD1600N10ALZ	单位
$R_{\theta JC}$	结至外壳热阻最大值	8.4	$^\circ\text{C/W}$
$R_{\theta JA}$	结至环境热阻最大值	87	

封装标识与订购信息

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 $T_C = 25^\circ\text{C}$ 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
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关断特性

BV_{DSS}	漏极-源极击穿电压	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0\ \text{V}$	100	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	$I_D = 250\ \mu\text{A}$, 参考 25°C	-	0.1	-	$\text{V}/^\circ\text{C}$
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 80\ \text{V}$, $V_{GS} = 0\ \text{V}$	-	-	1	μA
		$V_{DS} = 80\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_C = 125^\circ\text{C}$	-	-	500	
I_{GSS}	栅极-源极漏电流	$V_{GS} = \pm 20\ \text{V}$, $V_{DS} = 0\ \text{V}$	-	-	± 10	μA

导通特性

$V_{GS(th)}$	栅极阈值电压	$V_{GS} = V_{DS}$, $I_D = 250\ \mu\text{A}$	1.4	-	2.8	V
$R_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\ \text{V}$, $I_D = 3.4\ \text{A}$	-	124	160	$\text{m}\Omega$
		$V_{GS} = 5\ \text{V}$, $I_D = 2.1\ \text{A}$	-	175	375	
g_{FS}	正向跨导	$V_{DS} = 10\ \text{V}$, $I_D = 6.8\ \text{A}$	-	19.6	-	S

动态特性

C_{iss}	输入电容	$V_{DS} = 50\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	-	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	$V_{DS} = 50\ \text{V}$, $V_{GS} = 0\ \text{V}$	-	85	-	pF
$Q_{g(tot)}$	10V 的栅极电荷总量	$V_{GS} = 10\ \text{V}$	-	2.78	3.61	nC
$Q_{g(tot)}$	5V 的栅极电荷总量	$V_{GS} = 5\ \text{V}$	-	1.5	1.95	nC
Q_{gs}	栅极-源极栅极电荷	$V_{DD} = 50\ \text{V}$, $I_D = 6.8\ \text{A}$ (说明 4)	-	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		-	2.5	-	nC
Q_{oss}	输出电荷	$V_{DS} = 50\ \text{V}$, $V_{GS} = 0\ \text{V}$	-	5.2	-	nC
ESR	等效串联电阻 (G-S)	$f = 1\ \text{MHz}$	-	2.1	-	Ω

开关特性

$t_{d(on)}$	导通延迟时间	$V_{DD} = 50\ \text{V}$, $I_D = 6.8\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_G = 4.7\ \Omega$ (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. $L = 1\ \text{mH}$, $I_{AS} = 3.18\ \text{A}$, $R_G = 25\ \Omega$, 启动 $T_J = 25^\circ\text{C}$ 。
3. $I_{SD} \leq 6.8\ \text{A}$, $di_F/dt \leq 200\ \text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, 启动 $T_J = 25^\circ\text{C}$ 。
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

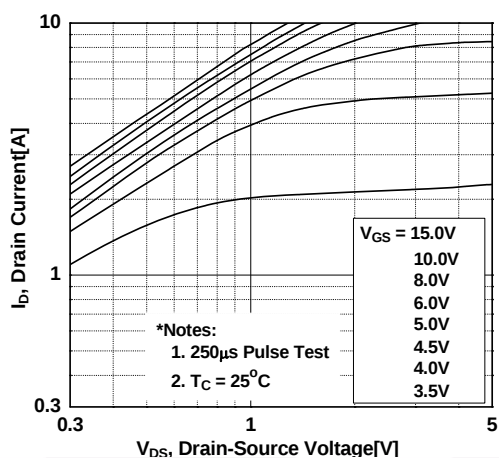


图 2. 传输特性

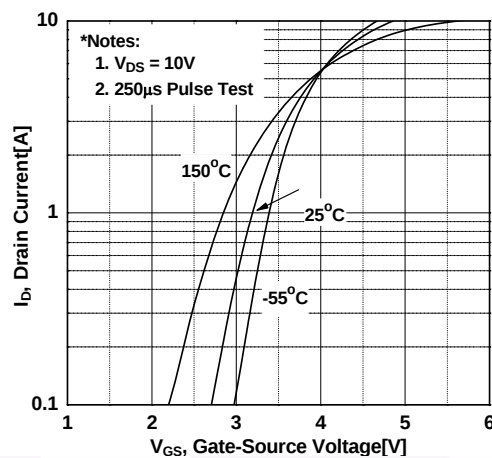


图 3. 导通电阻变化与漏极电流和栅极电压

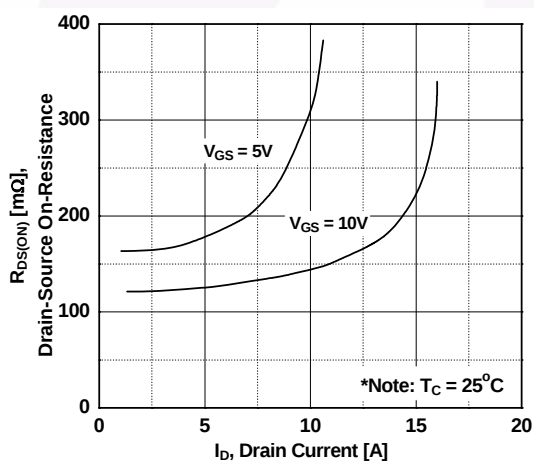


图 4. 体二极管正向电压变化与源电流和温度

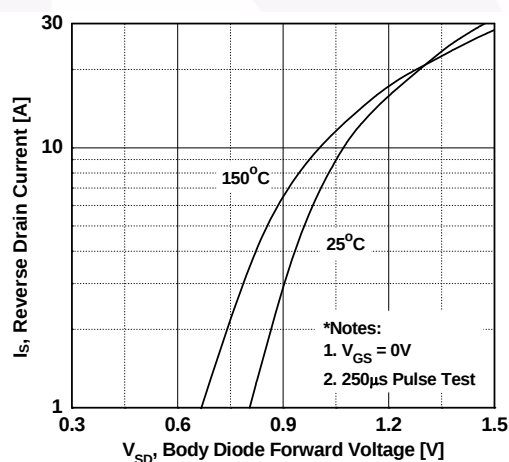


图 5. 电容特性

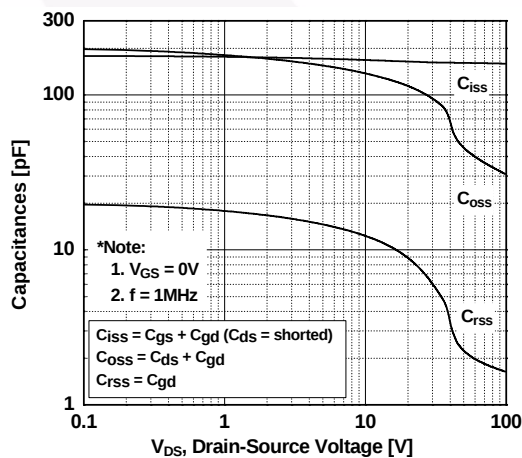
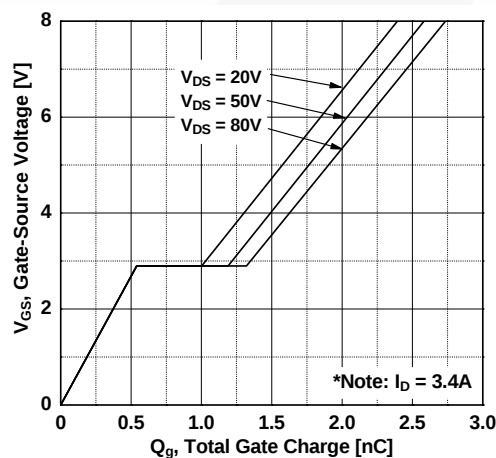


图 6. 栅极电荷



典型性能特征 (接上页)

图 7. 击穿电压变化与温度

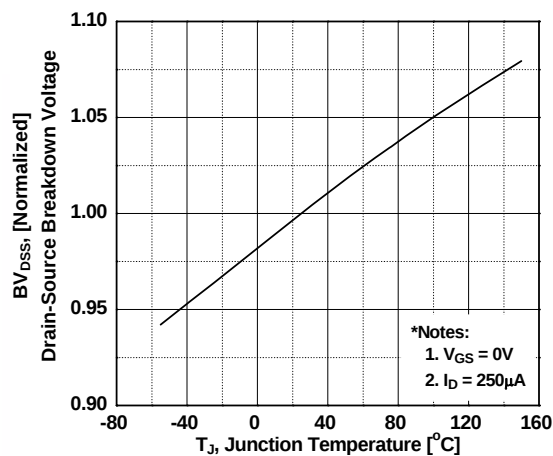


图 8. 导通电阻变化与温度

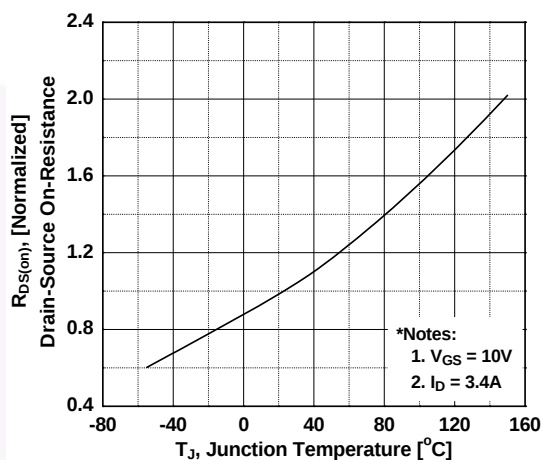


图 9. 最大安全工作区

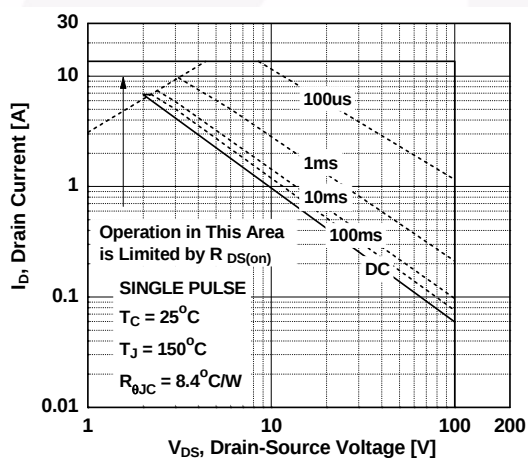


图 10. 最大漏极电流与壳体温度

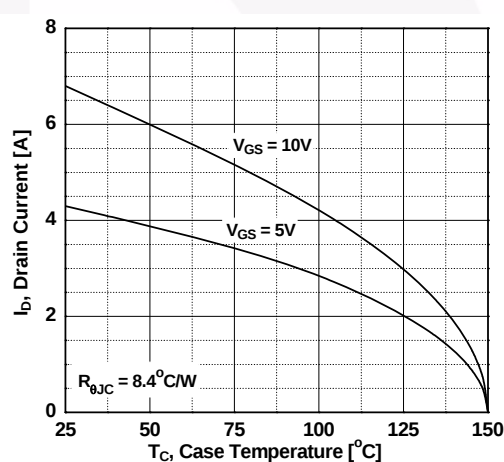


图 11. E_oss 与漏极至源极电压

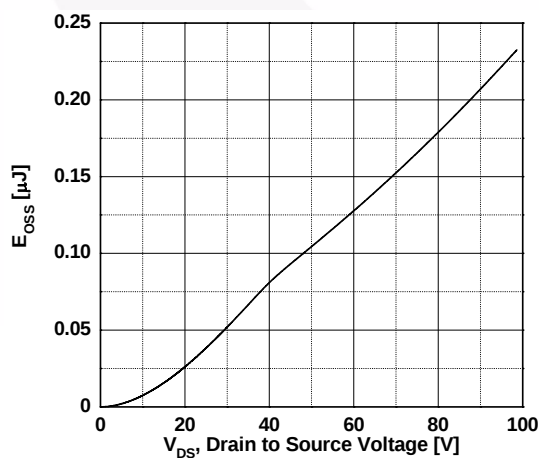
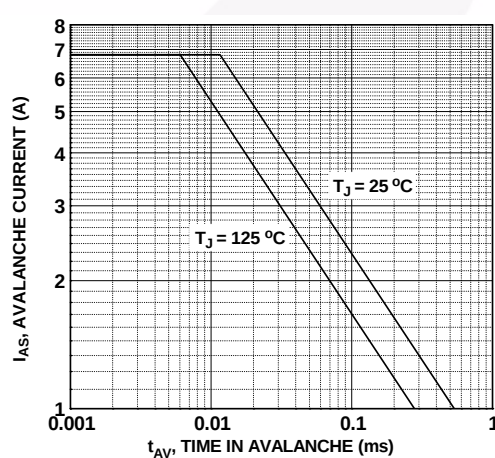
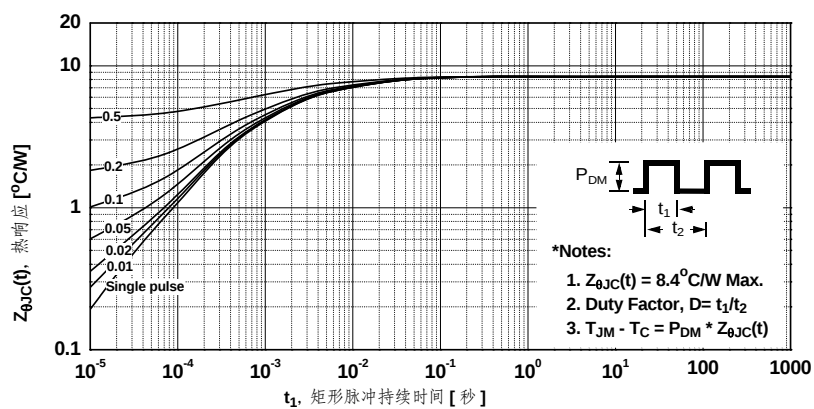


图 12. 非箝位感性开关能力



典型性能特征 (接上页)

图 13. 瞬态热响应曲线



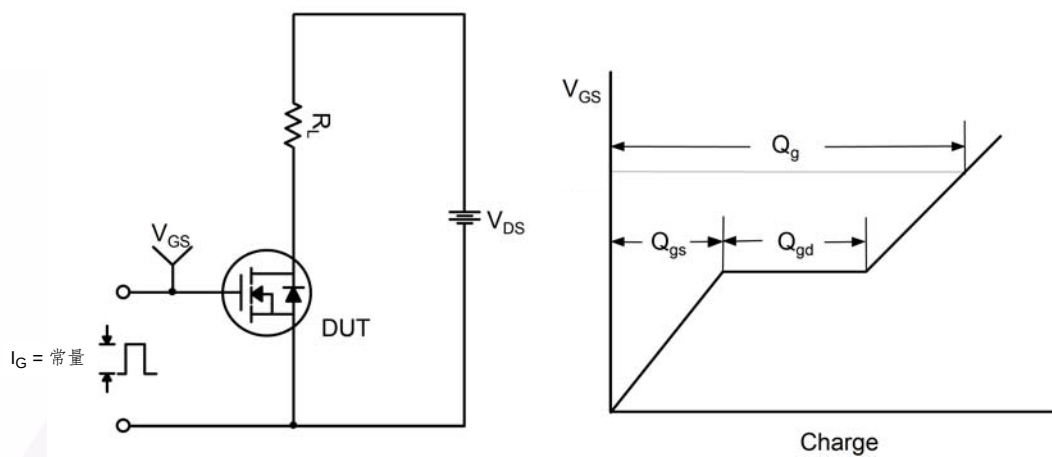


图 14. 栅极电荷测试电路与波形

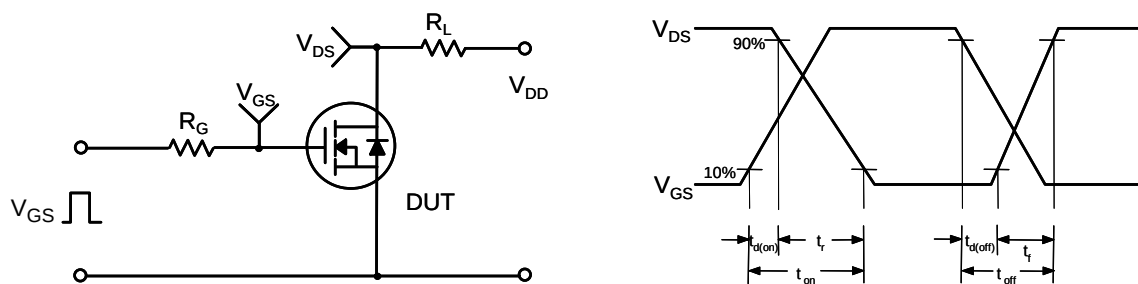


图 15. 阻性开关测试电路与波形

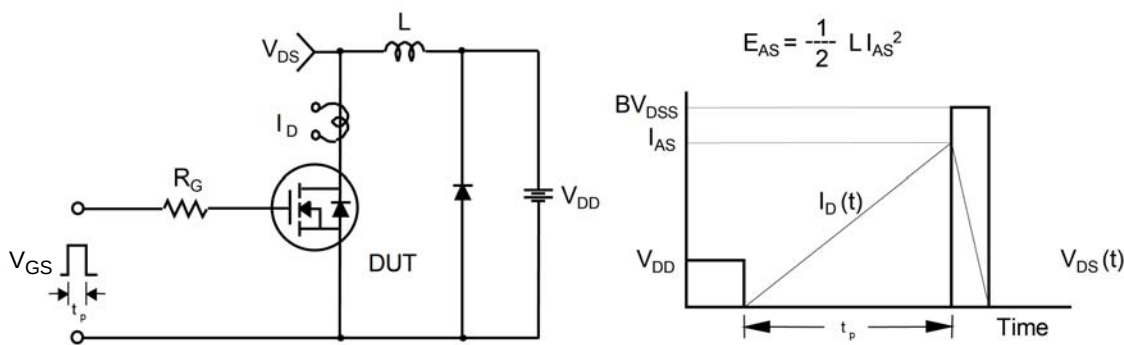


图 16. 非箝位感性开关测试电路与波形

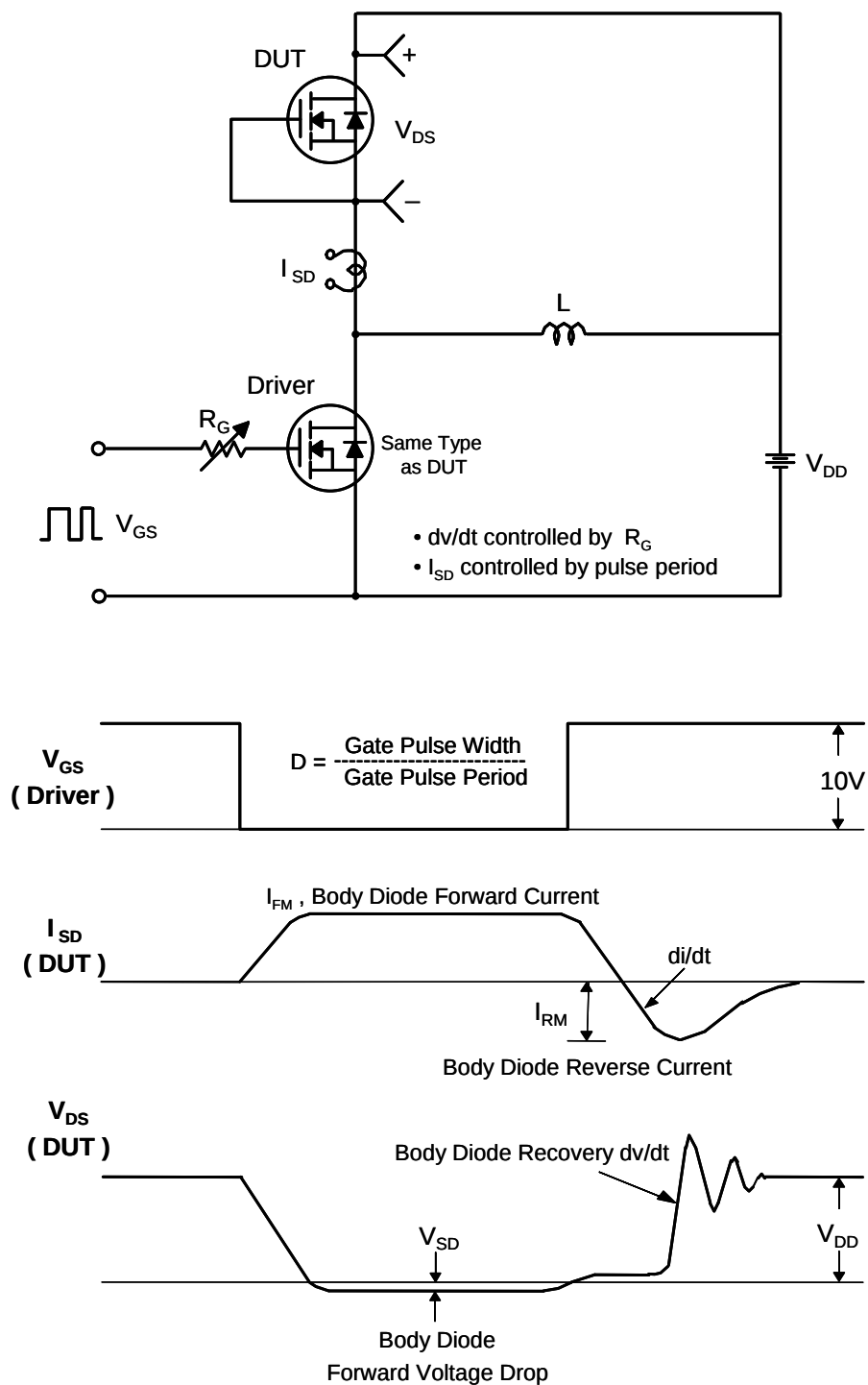


图 17. 二极管恢复 dv/dt 峰值测试电路与波形

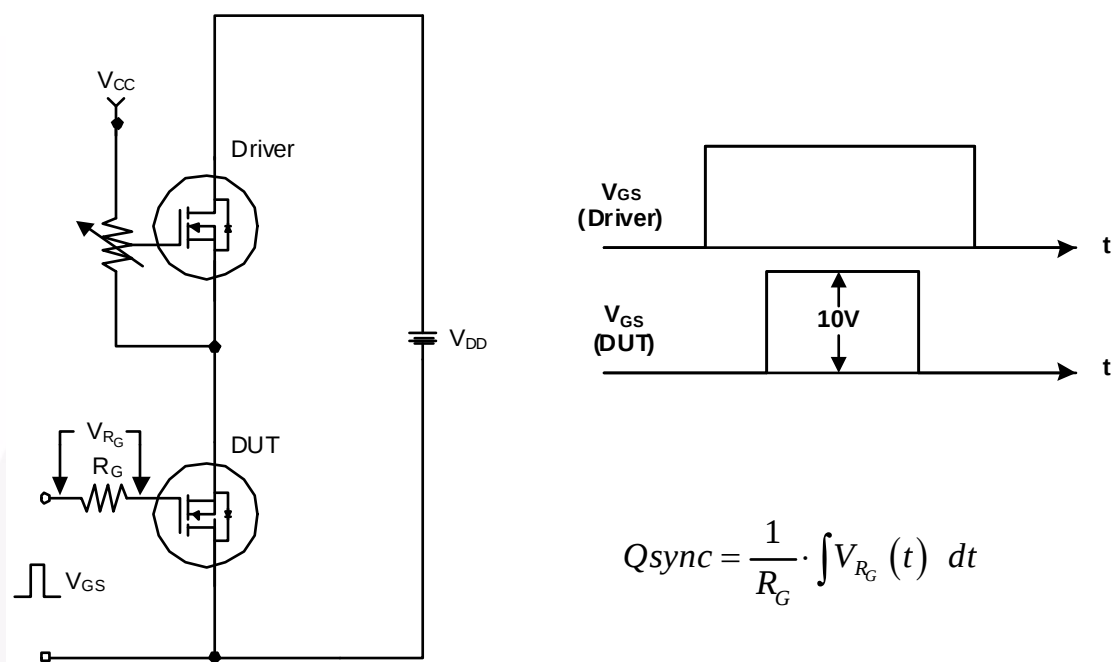


图 18. 总栅极电荷 Q_{sync} . 测试电路和波形

机械尺寸

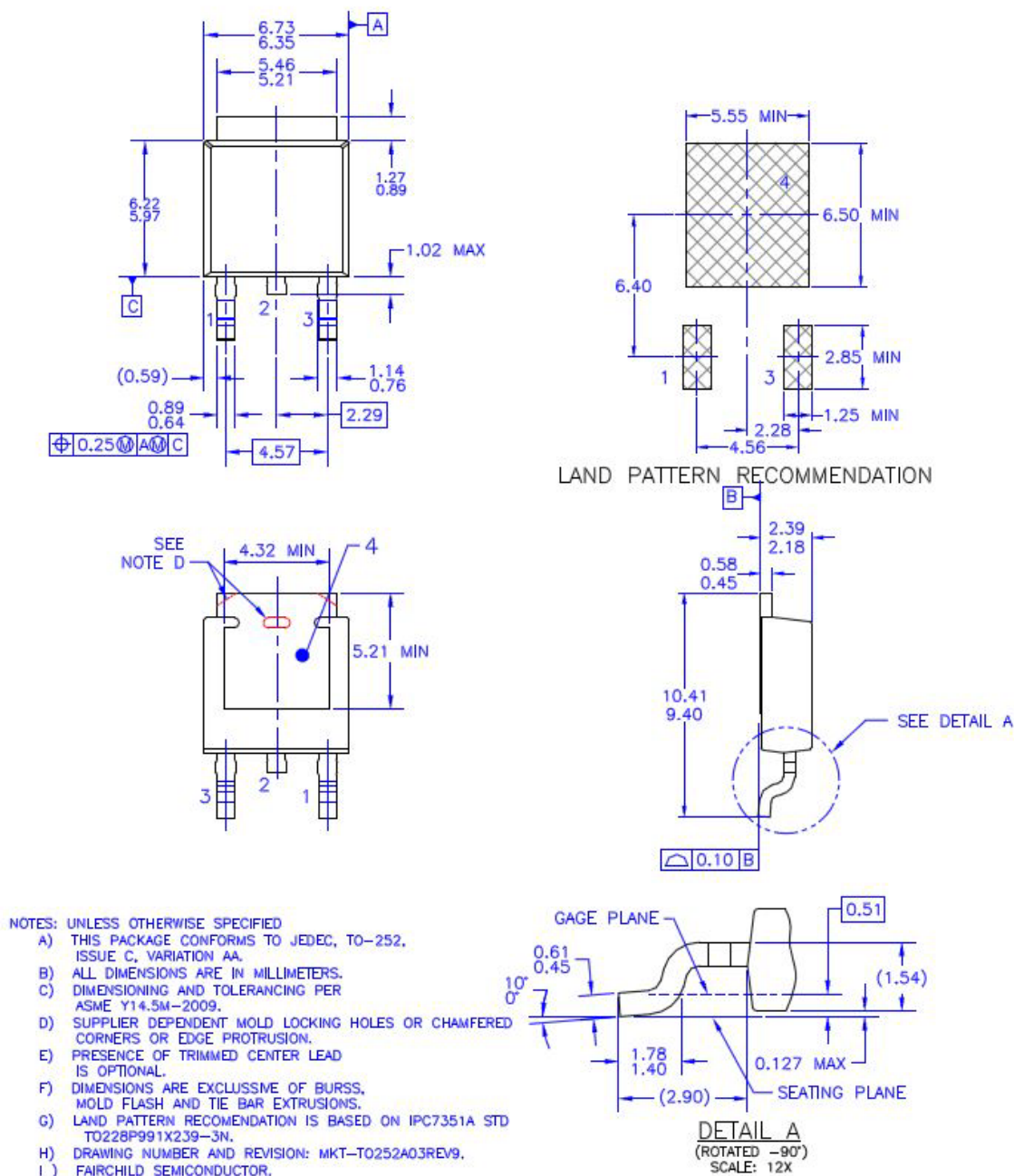


图 19. TO252 (D-PAK), 模塑, 3 引脚, 选项 AA&AB

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