FAIRCHILD SEMICONDUCTOR®

2025 年 4 月

FDMS015N04B

N 沟道 PowerTrench® MOSFET

40 V， 100 A， 1.5 mΩ

特性

- $R_{DS(on)}$ = 1.13 mΩ （典型值） @ V_{GS} = 10 V， I_D = 50 A
- 低 $R_{DS(on)}$ 和高效的先进硅封装组合
- 快速开关速度
- 100% 经过 UIL 测试
- 符合 RoHS 标准

说明

此 N 沟道 MOSFET 采用飞兆半导体先进的 Power Trench® 工艺生产，这一先进工艺是专为最大限度地降低导通电阻并保持卓越开关性能而定制的。

应用

- 用于 ATX/ 服务器的同步整流
- 电池保护电路
- 电机驱动和不间断电源

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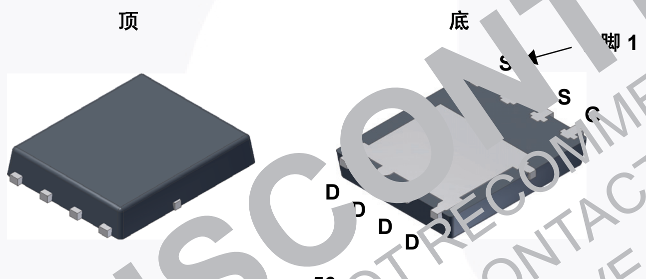
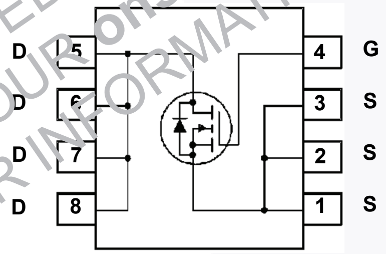


Power 56



MOSFET 最大额定值 T_C = 25°C 除非另有说明。

符号	参数		FDMS015N04B	单位
V_{DSS}	漏极—源极电压		40	V
V_{GSS}	栅极—源极电压		±20	V
I_D	漏极电流	- 连续 (T_C = 25°C)	100	A
		- 连续 (T_A = 25°C) （说明 1a）	31.3	
I_{DM}	漏极电流	- 脉冲 （说明 2）	400	A
E_{AS}	单脉冲雪崩能量 （说明 3）		526	mJ
P_D	功耗	(T_C = 25°C)	104	W
		(T_A = 25°C) （说明 1a）	2.5	W
T_J，T_{STG}	工作和存储温度范围		-55 至 +150	°C

热性能

符号	参数	FDMS015N04B	单位
$R_{\theta JC}$	结至外壳热阻最大值	1.2	°C/W
$R_{\theta JA}$	结至环境热阻最大值 （说明 1a）	50	

封装标识与定购信息

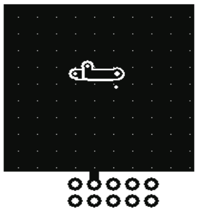
器件标识	器件	封装	卷尺寸	带宽	数量
FDMS015N04B	FDMS015N04B	Power 56	13 ”	12 mm	3000 个

电气特性 T_C = 25°C 除非另有说明。

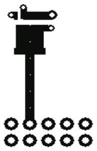
符号	参数	测试条件	最小值	典型值	最大值	单位
关断特性						
BV_{DSS}	漏极一源极击穿电压	I_D = 250 μA, V_{GS} = 0 V	40	-	-	V
ΔBV_{DSS} / ΔT_J	击穿电压温度系数	I_D = 250 μA，推荐选用 25°C	-	37	-	mV/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 32 V, V_{GS} = 0 V	-	-	1	μA
I_{GSS}	栅极 - 体漏电流	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±100	nA
导通特性						
$V_{GS(th)}$	栅极阈值电压	V_{GS} = V_{DS}, I_D = 250 μA	[illegible]	[illegible]	4.0	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 50 A	-	1.13	1.5	mΩ
g_{FS}	正向跨导	V_{DS} = 5 V, I_D = 50 A	-	171	-	S
动态特性						
C_{iss}	输入电容	V_{DS} = 20 V, V_{GS} = 0 V f = 1 MHz	-	6560	8725	pF
C_{oss}	输出电容		-	2795	3720	pF
C_{rss}	反向传输电容		-	162	-	pF
C_{oss}(er)	能量相关输出电容	V_{DS} = 20 V, V_{GS} = 0 V	-	3896	-	pF
$Q_{g(tot)}$	10 V 的栅极电荷总量	V_{DS} = 20 V, I_D = 50 A V_{GS} = 0 V to 10 V （说明 4）	-	91	118	nC
Q_{gs}	栅极 - 源极栅极电荷		-	26	-	nC
Q_{gs2}	栅极平台电荷阈值		-	9	-	nC
Q_{gd}	栅极 - 漏极 “ 米勒 ” 电荷		-	16	-	nC
ESR	等效串联电阻	f = 1 MHz	-	1.4	-	Ω
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 20 V, I_D = 50 A V_{GS} = 10 V, R_G = 4.7 Ω （说明 4）	-	34	78	ns
t_r	开通上升时间		-	24	58	ns
$t_{d(off)}$	关断延迟时间		-	71	152	ns
t_f	关断下降时间		-	26	62	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		-	-	100	A
I_{SM}	漏极 - 源极二极管最大正向脉冲电流		-	-	400	A
V_{SD}	漏极 - 源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 50 A	-	-	1.3	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, I_{SD} = 50 A dI_F/dt = 100 A/μs	-	78	-	ns
Q_{rr}	反向恢复电荷		-	90	-	nC

注意：

1.$R_{\theta JA}$ 取决于安装在 FR-4 材质 1.5 x 1.5 in. 电路板上 1 in^2 2 盎司焊盘上的器件。 $R_{\theta JC}$ 通过设计保证，而 $R_{\theta CA}$ 取决于用户的电路板设计。



a. 50 °C/W，安装于
1 in^2 2 盎司焊盘。



b. 125 °C/W，安装于
最小尺寸的 2 盎司焊盘。

2. 重复额定值：脉冲宽度受限于最大结温。
3. L = 3 mH， I_{AS} = 18.72 A，开始 T_J = 25°C。
4. 本质上独立于工作温度的典型特性。

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典型性能特征

图 1. 导通区域特性

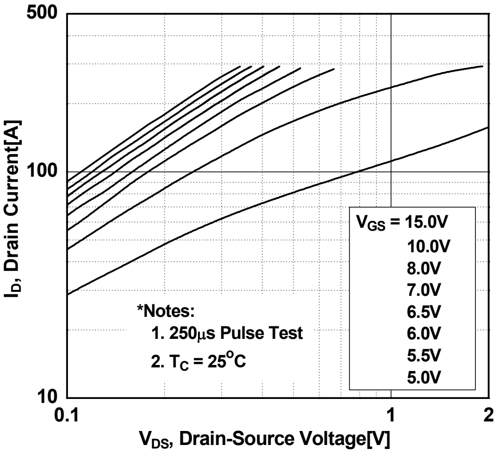


图 2. 传输特性

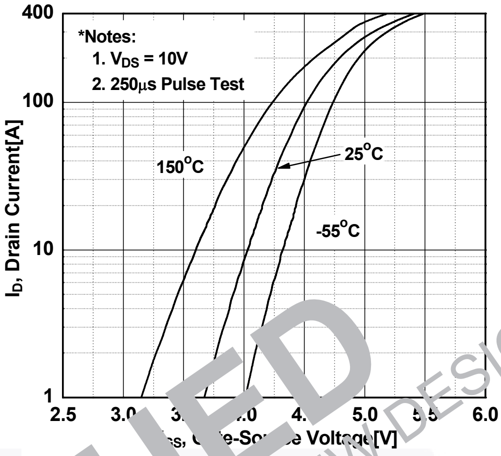


图 3. 导通电阻变化与漏极电流和栅极电压

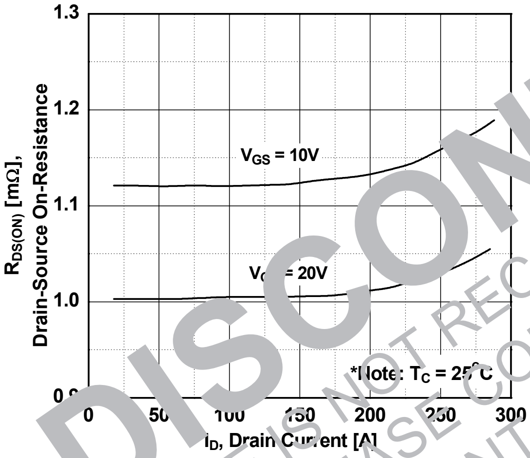


图 4. 体二极管正向电压变化与源极电流和温度

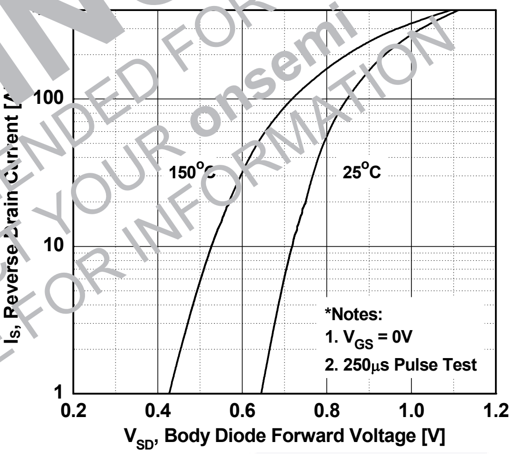


图 5. 电容特性

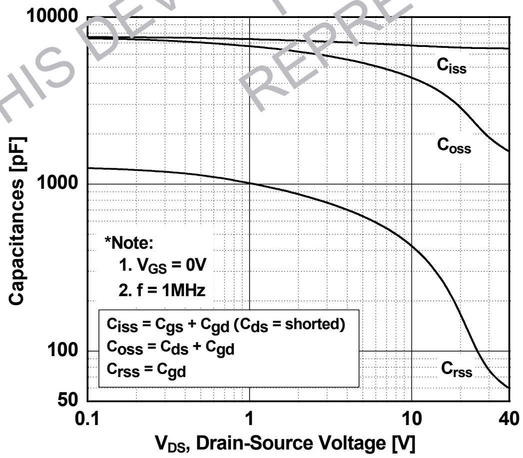
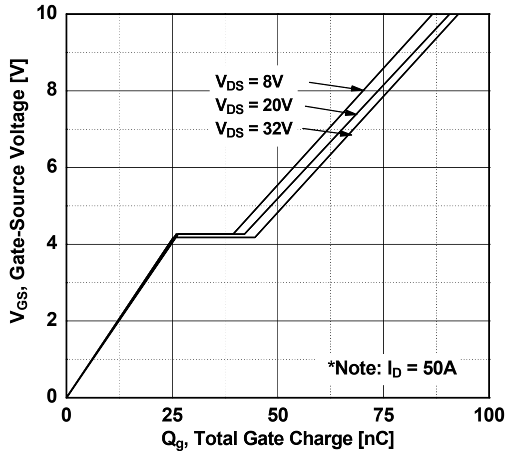


图 6. 栅极电荷



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典型性能特征（接上页）

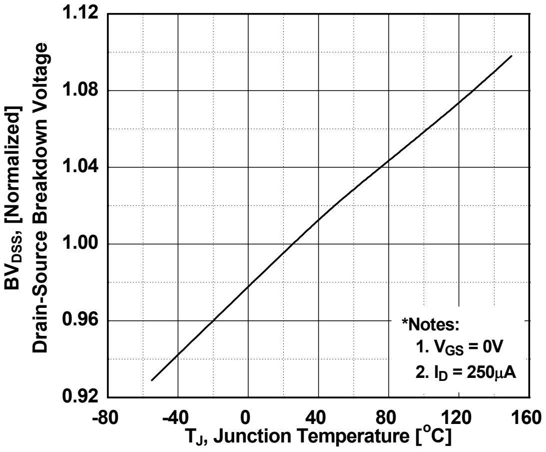

图 7. 击穿电压变化与温度

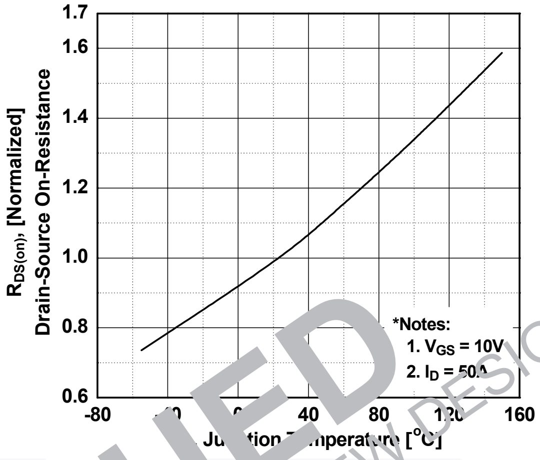

图 8. 导通电阻变化与温度

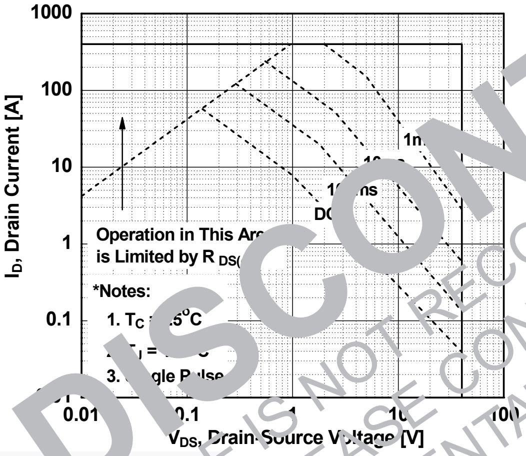

图 9. 最大安全工作区

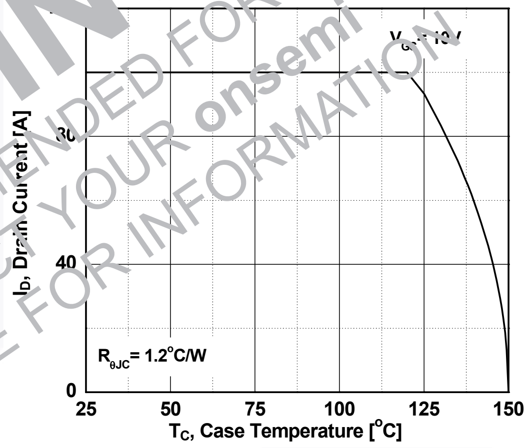

图 10. 最大漏极电流与外壳温度

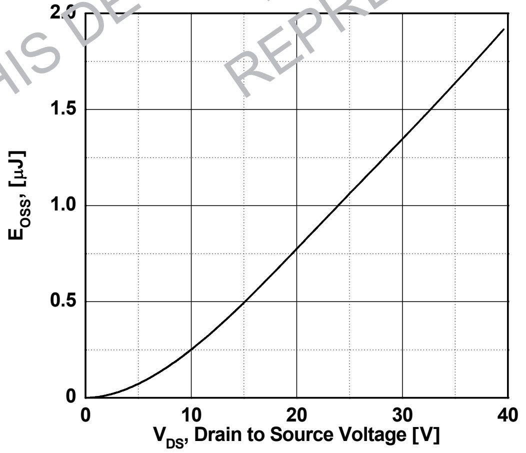

图 11. 输出电容 (Eoss) 与漏极 - 源极电压

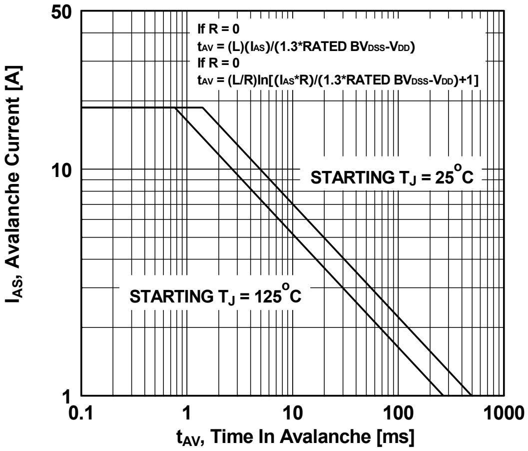

图 12. 非箝位电感开关能力

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典型性能特征（接上页）

图 13. 瞬态热响应曲线

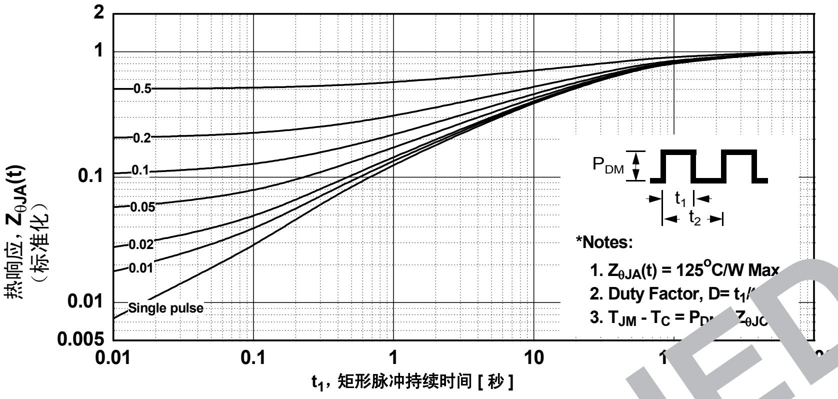

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图 14. 栅极电荷测试电路与波形

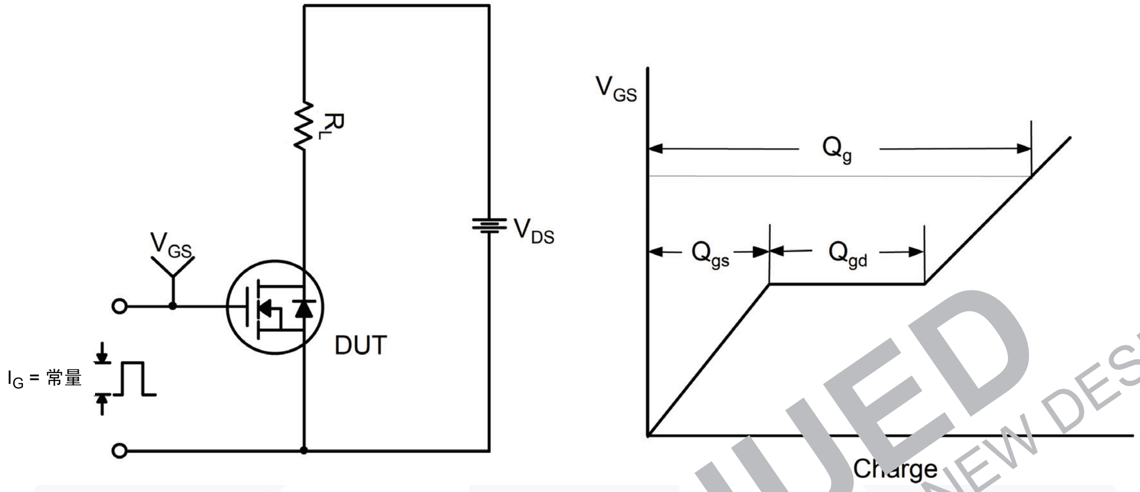

图 15. 阻性开关测试电路与波形

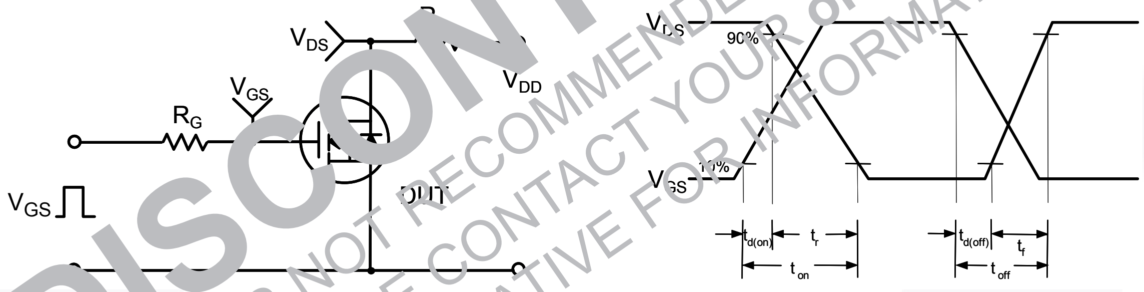

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图 16. 非箝位电感开关测试电路与波形

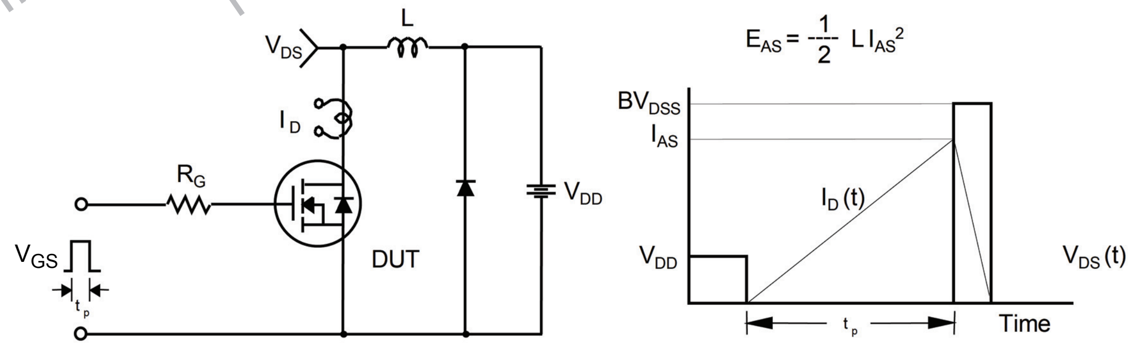
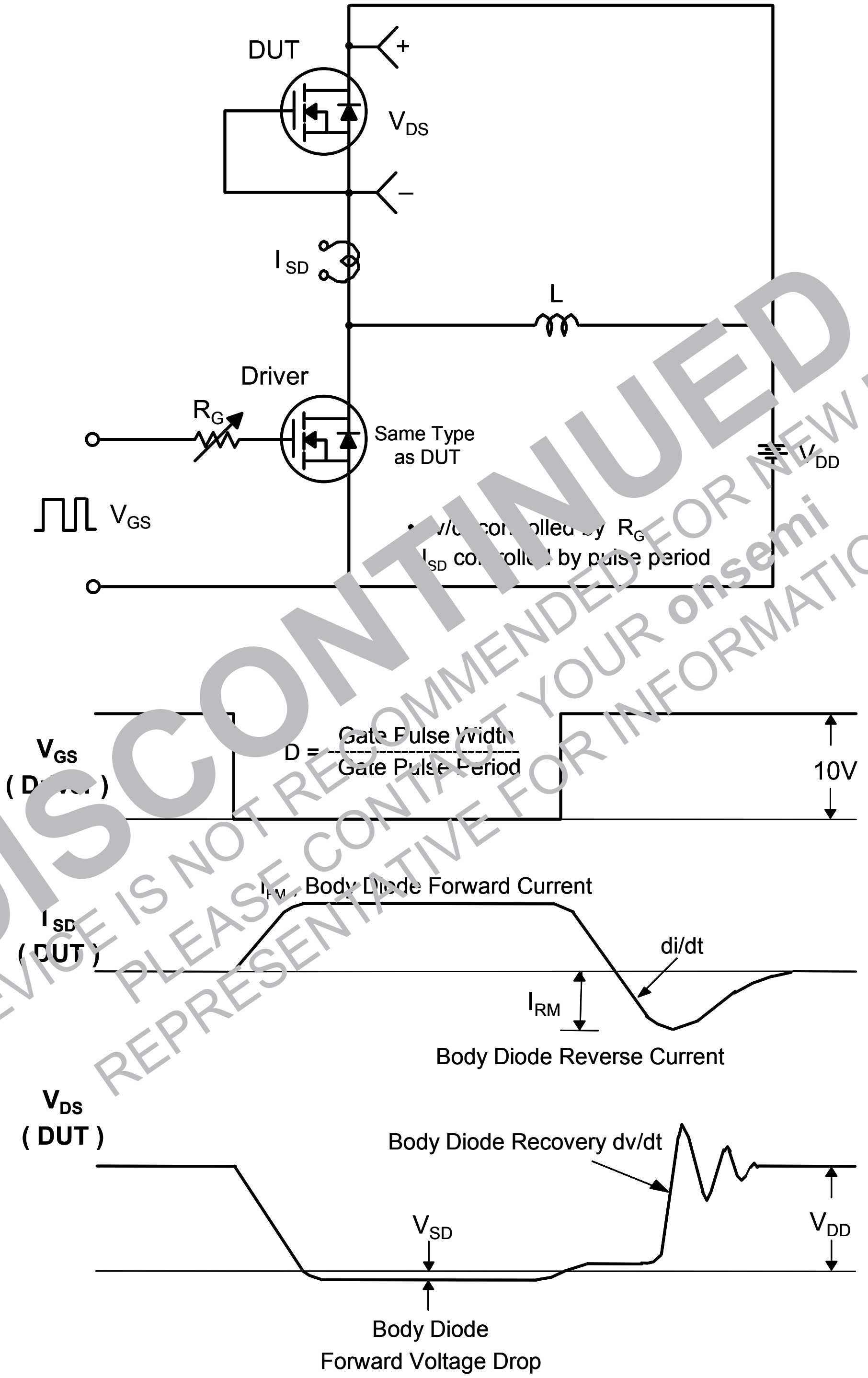


图 17. 二极管恢复 dv/dt 峰值测试电路与波形



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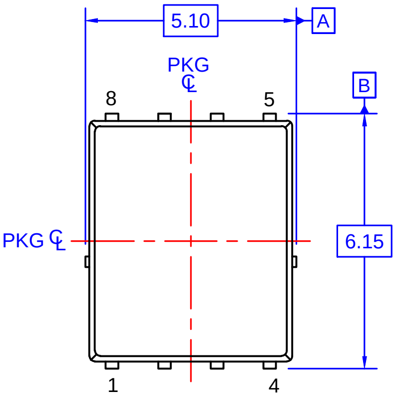
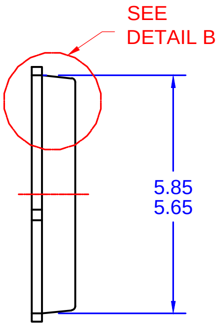
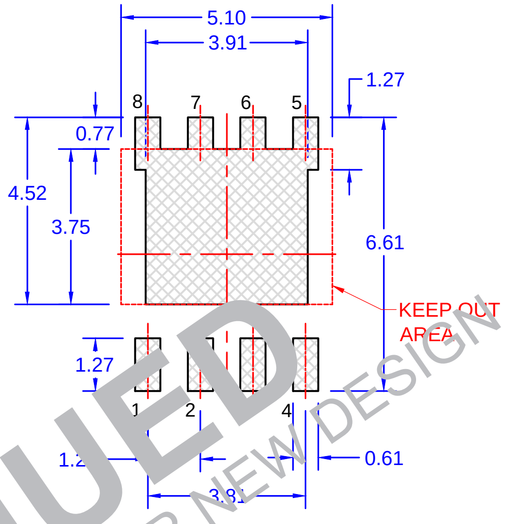
PQFN8 5X6, 1.27P
CASE 483AE
ISSUE A

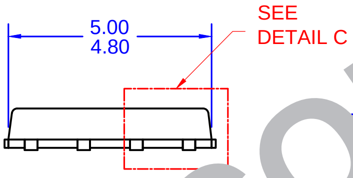


TOP VIEW

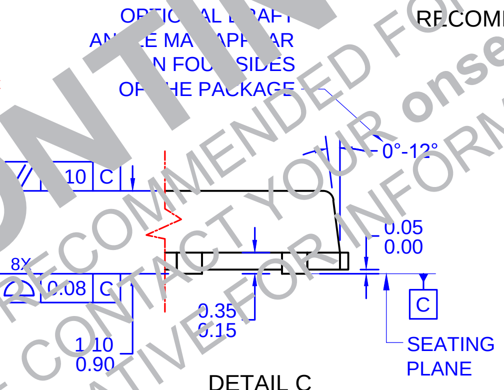




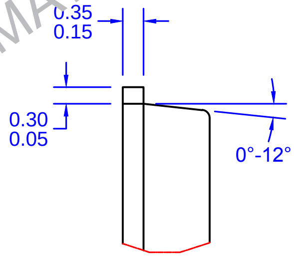
LAND PATTERN RECOMMENDATION



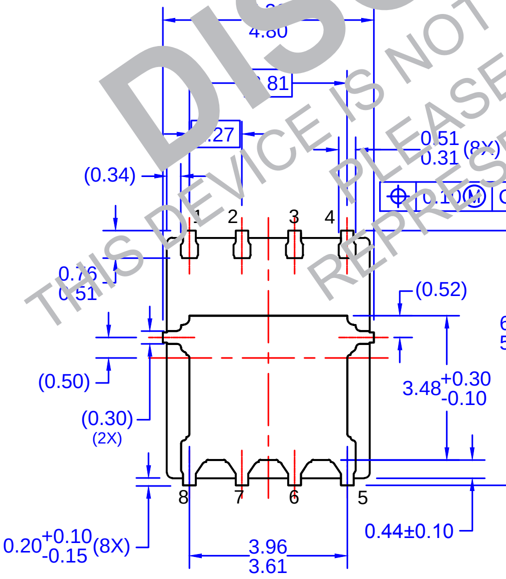
SIDE VIEW



DETAIL C
SCALE: 2:1



DETAIL B
SCALE: 2:1



BOTTOM VIEW

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A. PACKAGE STANDARD REFERENCE: JEDEC MO-240, ISSUE A, VAR. AA,.
B. DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
E. IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.

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