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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

2015 年 5 月

FDD770N15A

N-Channel PowerTrench® MOSFET

150 V, 18 A, 77 mΩ

特性

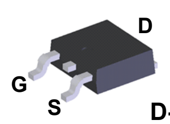
- $R_{DS(on)}$ = 61 mΩ （典型值） @ V_{GS} = 10 V， I_D = 12 A
- 快速开关速度
- 低栅极电荷
- 高性能沟道技术可实现极低的 $R_{DS(on)}$
- 高功率和高电流处理能力
- 符合 RoHS 标准

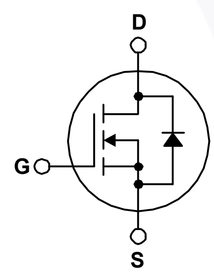
说明

此 N 沟道 MOSFET 采用飞兆半导体先进的 PowerTrench® 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

- DC-DC 转换器
- 用于服务器 / 电信 PSU 的同步整流
- 电池充电器
- AC 电机驱动和不间断电源
- 离线 UPS





绝对最大额定值 T_C = 25°C 除非另有说明。

符号	参数		FDD770N15A	单位
V_{DSS}	漏极－源极电压		150	V
V_{GSS}	栅极－源极电压	- DC	±20	V
		- AC (f > 1 Hz)	±30	
I_D	漏极电流	- 连续 （T_C = 25°C，硅限制）	18	A
		- 连续 （T_C = 100°C，硅限制）	11.4	
I_{DM}	漏极电流	- 脉冲 （说明 1）	36	A
E_{AS}	单脉冲雪崩能量 （说明 2）		31.7	mJ
dv/dt	二极管恢复 dv/dt 峰值 （说明 3）		6.0	V/ns
P_D	功耗	(T_C = 25°C)	56.8	W
		- 降低至 25°C 以上	0.46	W/°C
T_J， T_{STG}	工作和存储温度范围		-55 至 +150	°C
T_L	用于焊接的最大引线温度，距离外壳 1/8"，持续 5 秒		300	°C

热性能

符号	参数	FDD770N15A	单位
$R_{\theta JC}$	结至外壳热阻最大值	2.2	°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
FDD770N15A	FDD770N15A	DPAK	卷带	330 mm	16 mm	2500 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—源极击穿电压	I_D = 250 μA, V_{GS} = 0 V	150	-	-	V
ΔBV_{DSS} / ΔT_J	击穿电压温度系数	I_D = 250 μA，推荐选用 25°C	-	0.0824	-	V/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 120 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 120 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	-	-	±100	nA
导通特性						
$V_{GS(th)}$	栅极阈值电压	V_{GS} = V_{DS}, I_D = 250 μA	2.0	-	4.0	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 12 A	-	61	77	mΩ
g_{FS}	正向跨导	V_{DS} = 10 V, I_D = 12 A	-	20	-	S
动态特性						
C_{iss}	输入电容	V_{DS} = 75 V, V_{GS} = 0 V, f = 1 MHz	-	575	765	pF
C_{oss}	输出电容		-	64	85	pF
C_{rss}	反向传输电容		-	3.9	6	pF
$C_{oss(er)}$	能量相关输出电容	V_{DS} = 75 V, V_{GS} = 0 V	-	113	-	pF
$Q_{g(tot)}$	10 V 的栅极电荷总量	V_{DS} = 75 V, I_D = 12 A, V_{GS} = 10 V （说明 4）	-	8.4	11	nC
Q_{gs}	栅极 - 源极栅极电荷		-	2.7	-	nC
Q_{gd}	栅极 - 漏极 " 米勒 " 电荷		-	1.8	-	nC
$V_{plateau}$	栅极平台电压		-	5.7	-	V
Q_{sync}	总栅极电荷同步	V_{DS} = 0 V, I_D = 6 A	-	6.9	-	nC
Q_{oss}	输出电荷	V_{DS} = 37.5 V, V_{GS} = 0 V	-	14	-	nC
ESR	等效串联电阻 (G-S)	f = 1 MHz	-	0.5	-	Ω
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 75 V, I_D = 12 A, V_{GS} = 10 V, R_G = 4.7 Ω （说明 4）	-	10.3	30.6	ns
t_r	开通上升时间		-	3.1	16.2	ns
$t_{d(off)}$	关断延迟时间		-	15.8	41.6	ns
t_f	关断下降时间		-	2.8	15.6	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		-	-	18	A
I_{SM}	漏极 - 源极二极管最大正向脉冲电流		-	-	36	A
V_{SD}	漏极 - 源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 12 A	-	-	1.25	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, V_{DD} = 75 V, I_{SD} = 12 A, dI_F/dt = 100 A/μs	-	56.4	-	ns
Q_{rr}	反向恢复电荷		-	109	-	nC

注意：

1. 重复额定值：脉冲宽度受限于最大结温。
2. L = 3 mH， I_{AS} = 4.6 A，开始 T_J = 25°C。
3. I_{SD} ≤ 12 A， di/dt ≤ 200 A/μs， V_{DD} ≤ BV_{DSS}，开始 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

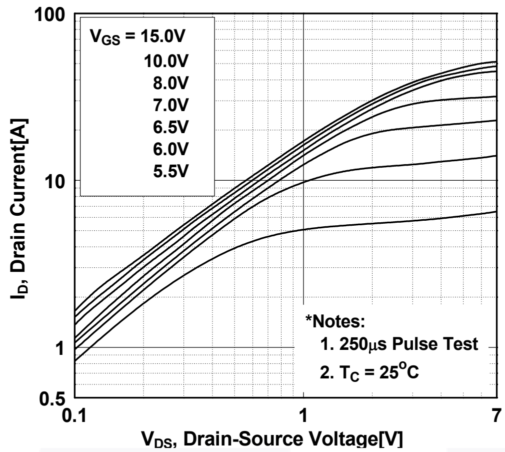


图 **2.** 传输特性

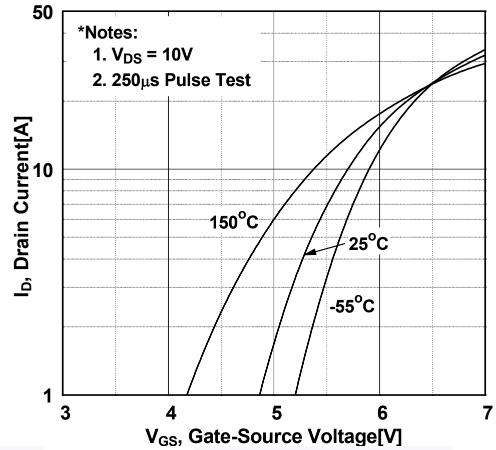


图 **3.** 导通电阻变化与漏极电流和栅极电压

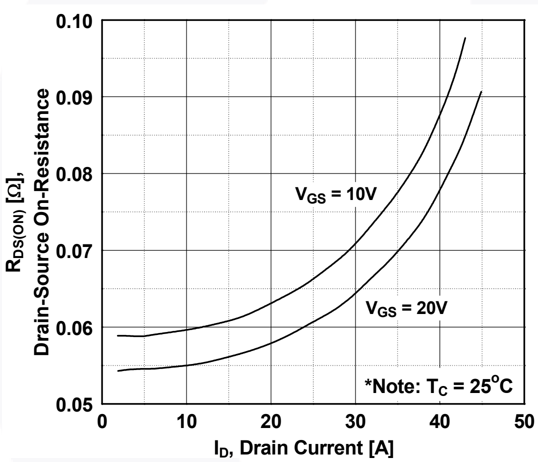


图 **4.** 体二极管正向电压变化与源极电流和温度

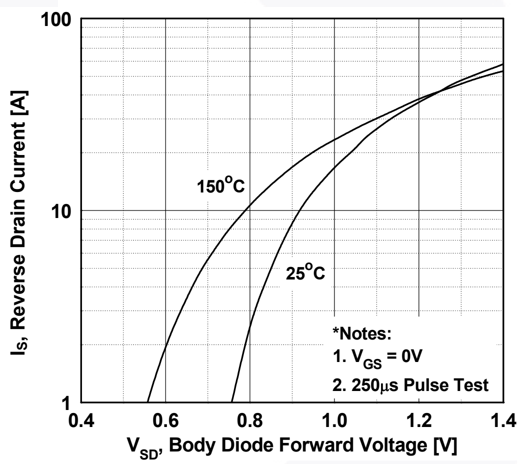


图 **5.** 电容特性

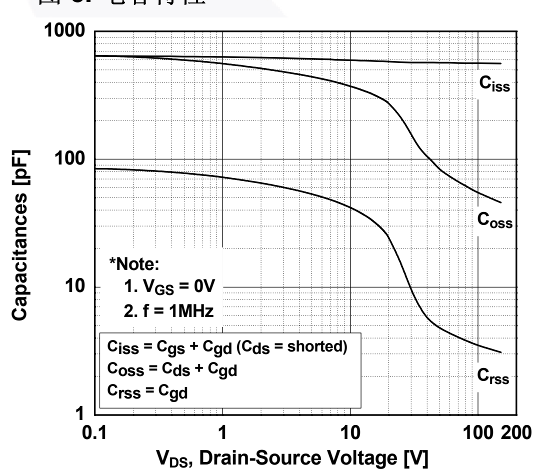
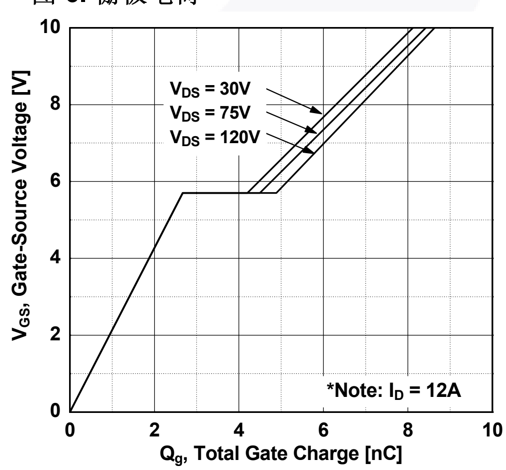


图 **6.** 栅极电荷



典型性能特征（接上页）

图 **7.** 击穿电压变化与温度

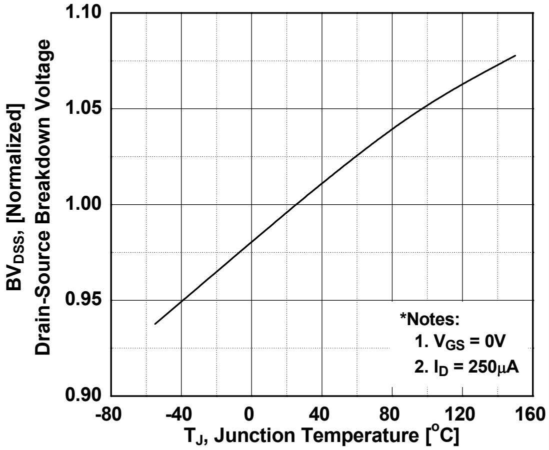


图 **8.** 导通电阻变化与温度

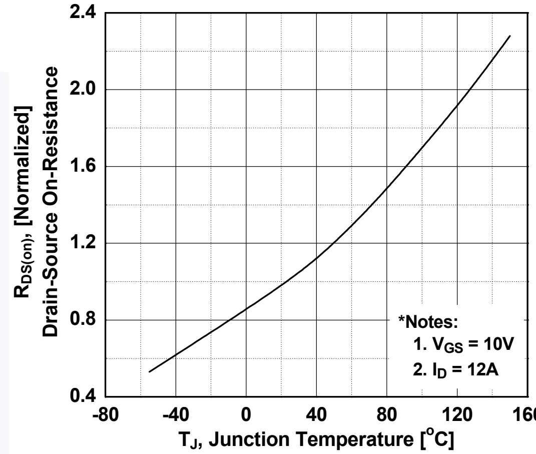


图 **9.** 最大安全工作区

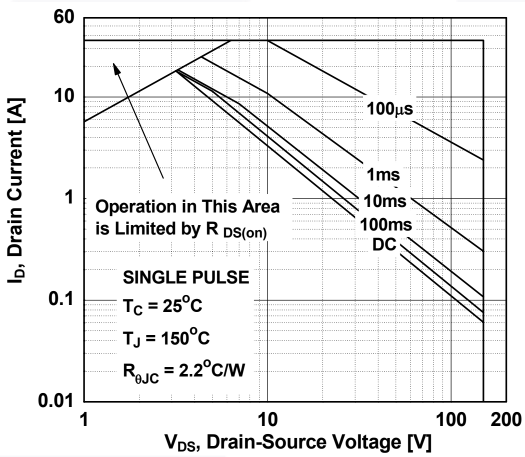


图 **10.** 最大漏极电流与外壳温度

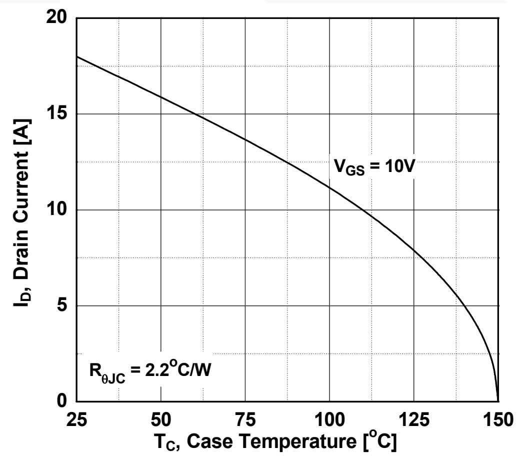


图 **11.** 输出电容 **(Eoss)** 与漏极 **-** 源极电压

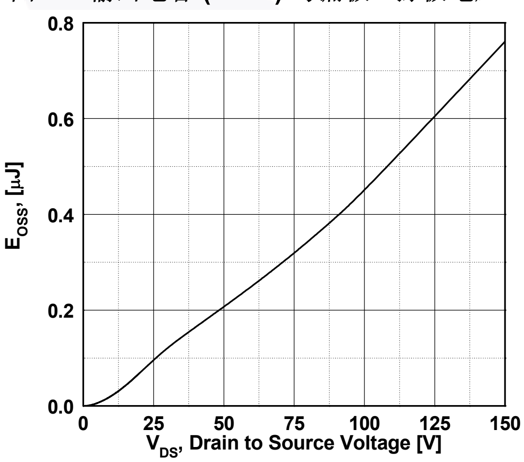
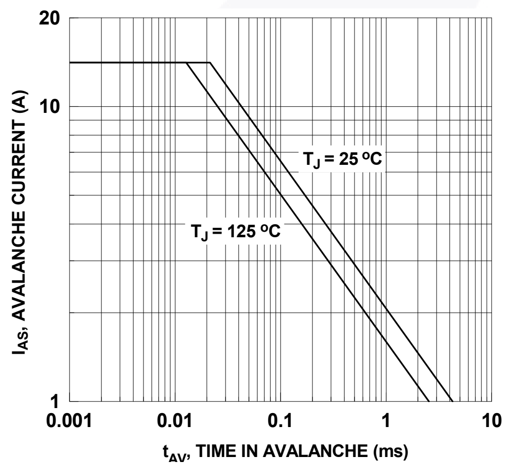
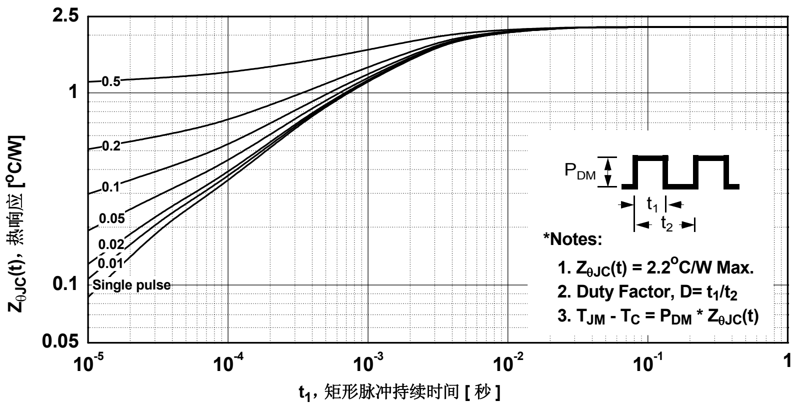


图 **12.** 非箝位电感开关能力



典型性能特征（接上页）

图 **13.** 瞬态热响应曲线



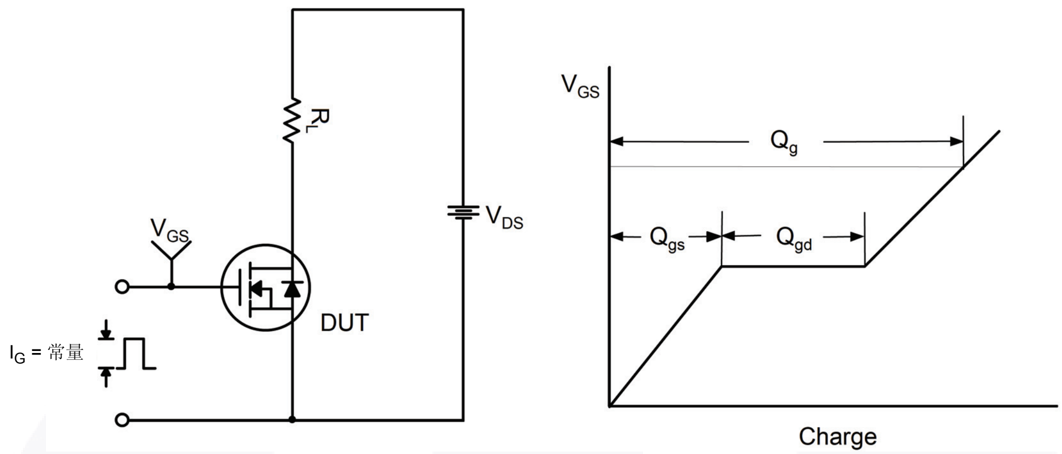


图 **14.** 栅极电荷测试电路与波形

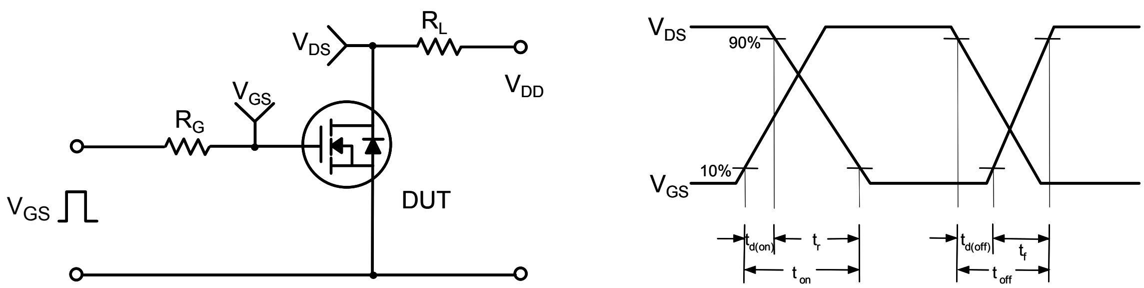


图 **15.** 阻性开关测试电路与波形

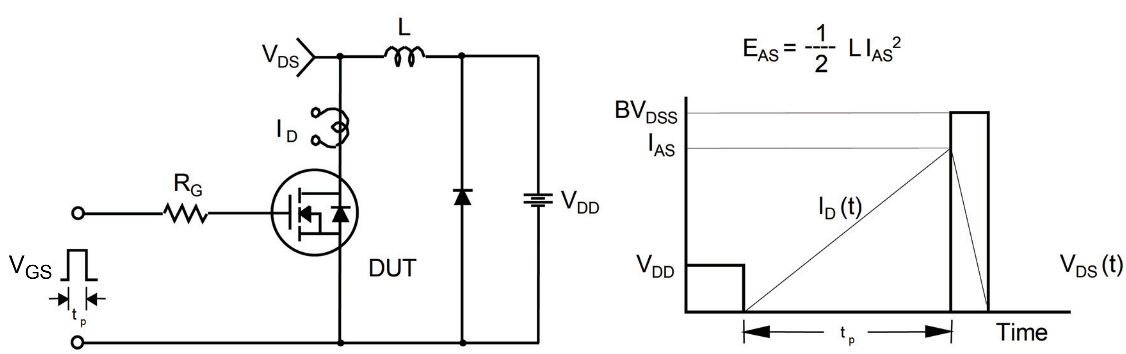


图 **16.** 非箝位电感开关测试电路与波形

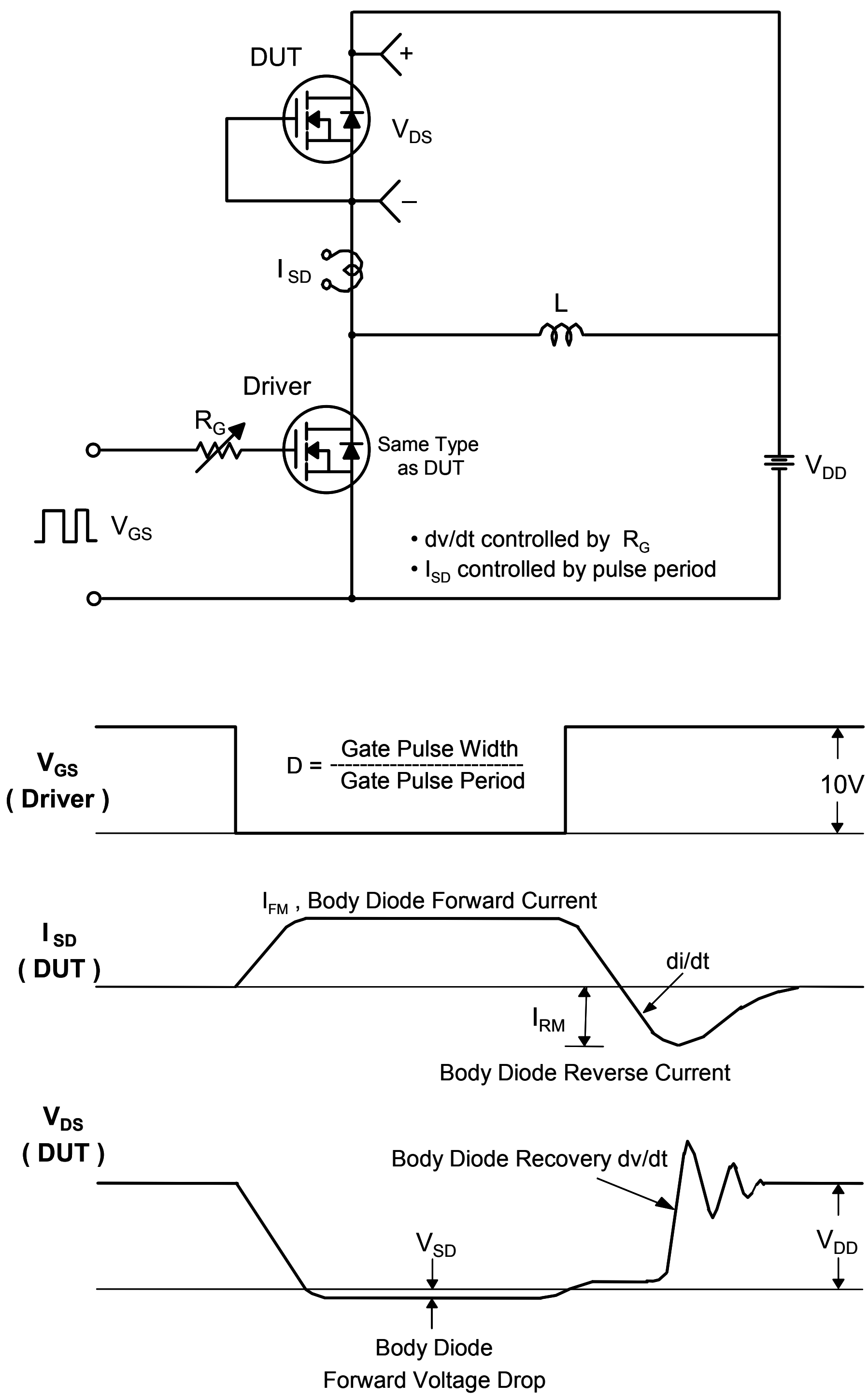
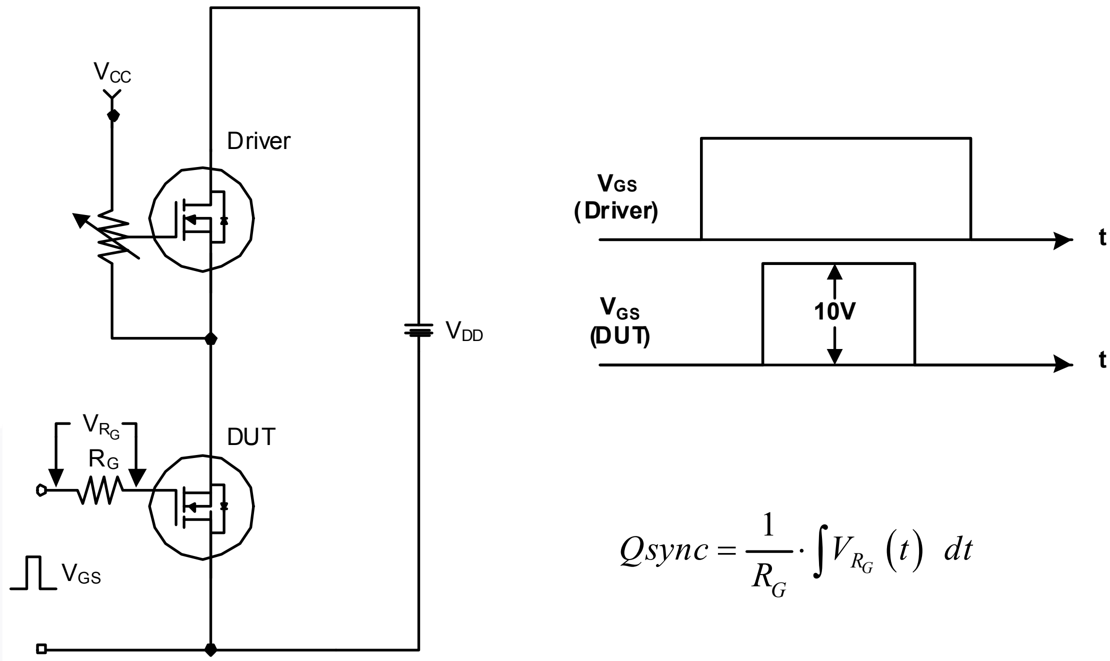


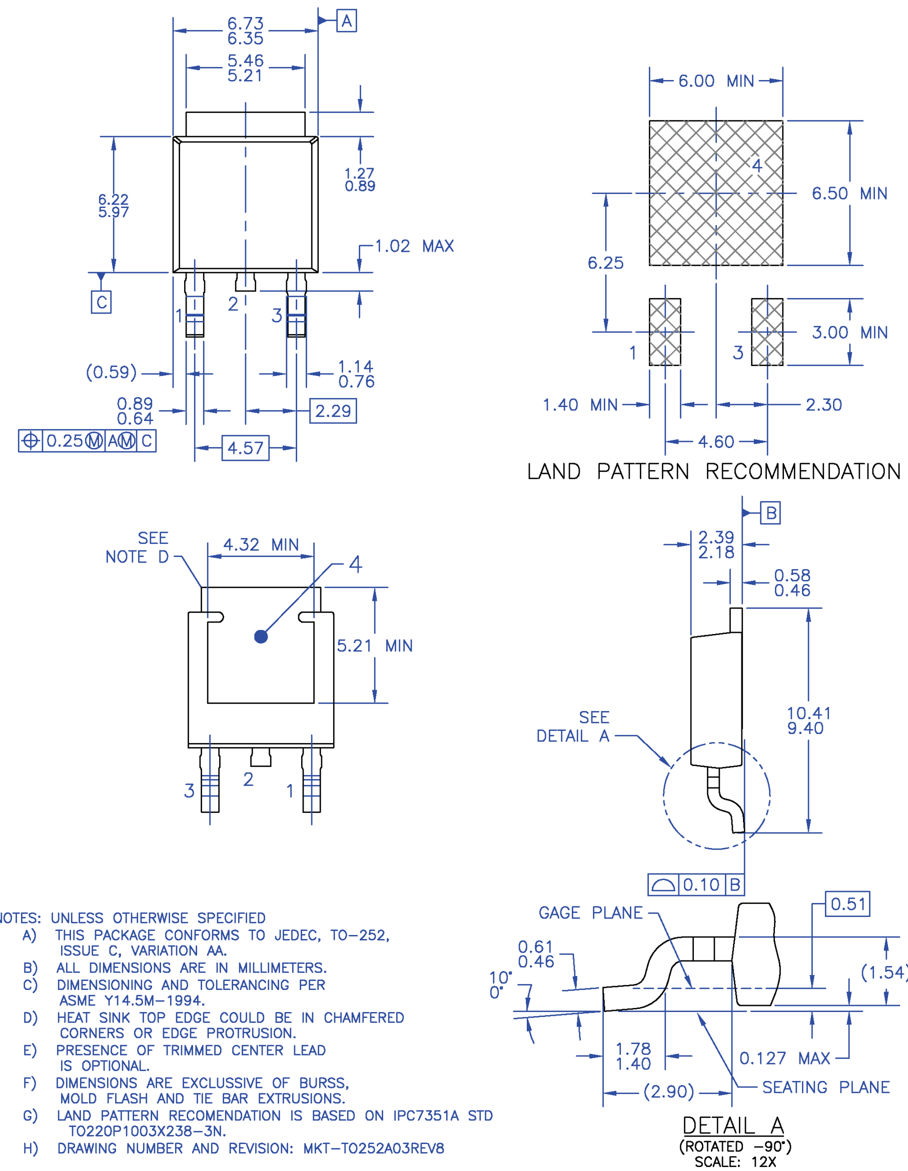
图 **17.** 二极管恢复 **dv/dt** 峰值测试电路与波形



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

图 **18.** 总栅极电荷 **Qsync** 测试电路与波形

机械尺寸



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B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
D) HEAT SINK TOP EDGE COULD BE IN CHAMFERED CORNERS OR EDGE PROTRUSION.
E) PRESENCE OF TRIMMED CENTER LEAD IS OPTIONAL.
F) DIMENSIONS ARE EXCLUSSIVE OF BURSS, MOLD FLASH AND TIE BAR EXTRUSIONS.
G) LAND PATTERN RECOMENDATION IS BASED ON IPC7351A STD TO220P1003X238-3N.
H) DRAWING NUMBER AND REVISION: MKT-TO252A03REV8

图 19. TO252 (D-PAK) 模塑 3 引线选项 AA&AB

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PRODUCT STATUS DEFINITIONS

Definition of Terms

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. I74

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