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FCPF7N60NT

N 沟道 MOSFET
600 V, 6.8 A, 0.52 Ω

特性

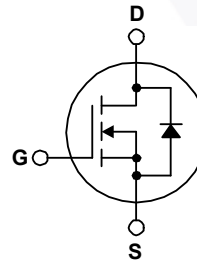
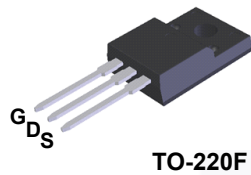
- Typ $R_{DS(on)} = 460 \text{ m}\Omega$
- 超低栅极电荷 (典型值 $Q_g = 17.8 \text{ nC}$)
- 低有效输出电容 (典型值 $C_{oss(eff.)} = 91 \text{ pF}$)
- 100% 经过雪崩测试
- 符合 RoHS 标准

应用

- 太阳能逆变器
- AC-DC 电源

描述

SupreMOS® MOSFET 是飞兆半导体的下一代高压超级结(SJ)技术, 该技术采用区别于传统 SJ MOSFET 产品的深沟槽填充工艺。这项先进技术和精密的工艺控制提供了最低的导通电阻, 卓越的开关性能和耐用性。SupreMOS MOSFET 产品适用于高频开关电源转换器应用, 如功率因数校正 (PFC)、服务器 / 电信电源、平板电视电源、ATX 电源及工业电源应用等。



MOSFET 最大额定值 $T_C = 25^\circ\text{C}$ 除非另有说明。

符号	参数	FCPF7N60NT	单位
V_{DSS}	漏极-源极电压	600	V
V_{GSS}	栅极-源极电压	± 30	V
I_D	漏极电流	- 连续 ($T_C = 25^\circ\text{C}$)	6.8*
		- 连续 ($T_C = 100^\circ\text{C}$)	4.3*
I_{DM}	漏极电流	(注 1)	20.4
E_{AS}	单脉冲雪崩能量	(注 2)	79.4
I_{AR}	雪崩电流		6.8
E_{AR}	重复雪崩能量		0.6
dv/dt	MOSFET dv/dt 强度		100
	二极管恢复 dv/dt 峰值	(注 3)	4.9
P_D	功耗	($T_C = 25^\circ\text{C}$)	30.5
		- 高于 25°C 的功耗系数	0.24
T_J, T_{STG}	工作和存储温度范围	-55 to +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	$^\circ\text{C}$

* 漏极电流受限于最大结温。

热性能

符号	参数	FCPF7N60NT	单位
$R_{\theta JC}$	结至外壳热阻最大值	4.1	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻最大值	62.5	

封装标识与订购信息

器件标识	器件	封装	卷尺寸	带宽	数量
FCPF7N60NT	FCPF7N60NT	TO-220F	-	-	50

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	$I_D = 1\text{ mA}, V_{GS} = 0\text{ V}, T_C = 25^\circ\text{C}$	600	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	$I_D = 1\text{ mA}$, 参考 25°C 数值	-	0.6	-	$V/^\circ\text{C}$
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 480\text{ V}, V_{GS} = 0\text{ V}$	-	-	10	μA
		$V_{DS} = 480\text{ V}, V_{GS} = 0\text{ V}, T_C = 125^\circ\text{C}$	-	-	100	
I_{GSS}	栅极-体漏电流	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA

导通特性

$V_{GS(th)}$	栅极阈值电压	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	2.0	-	4.0	V
$R_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\text{ V}, I_D = 3.4\text{ A}$	-	0.46	0.52	Ω
g_{FS}	正向跨导	$V_{DS} = 20\text{ V}, I_D = 3.4\text{ A}$	-	8.5	-	S

动态特性

C_{iss}	输入电容	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	-	719	960	pF
C_{oss}	输出电容		-	30	40	pF
C_{riss}	反向传输电容		-	2.1	3.2	pF
C_{oss}	输出电容	$V_{DS} = 380\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	-	17	-	pF
$C_{oss,eff}$	有效输出电容	$V_{DS} = 0\text{ V to } 380\text{ V}, V_{GS} = 0\text{ V}$	-	91	-	pF
$Q_g(tot)$	10 V 电压的栅极电荷总量	$V_{DS} = 380\text{ V}, I_D = 3.4\text{ A}$ $V_{GS} = 10\text{ V}$	-	17.8	35.6	nC
Q_{gs}	栅极-源极栅极电荷		-	3.2	6.3	nC
Q_{gd}	栅极-漏极“米勒”电荷		(注 4)	-	6.0	11.9
ESR	等效串联电阻 (G-S)	漏极开路, $f = 1\text{ MHz}$	-	2.5	-	Ω

开关特性

$t_{d(on)}$	导通延迟时间	$V_{DD} = 380\text{ V}, I_D = 3.4\text{ A}$ $R_G = 4.7\ \Omega$	-	12	24	ns
t_r	导通上升时间		-	6	22	ns
$t_{d(off)}$	关断延迟时间		-	35	80	ns
t_f	关断下降时间		(注 4)	-	12	24

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	-	-	20.4	A	
V_{SD}	漏极-源极二极管正向电压	$V_{GS} = 0\text{ V}, I_{SD} = 3.4\text{ A}$	-	-	1.2	V
t_{rr}	反向恢复时间	$V_{GS} = 0\text{ V}, I_{SD} = 3.4\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$	-	211	-	ns
Q_{rr}	反向恢复电荷		-	1.8	-	μC

注:

- 重复额定值: 脉冲宽度受限于最大结温。
- $I_{AS} = 12\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\ \Omega$, 开始于 $T_J = 25^\circ\text{C}$ 。
- $I_{SD} \leq 36\text{ A}, di/dt \leq 200\text{ A}/\mu\text{s}, V_{DD} = 380\text{ V}$ 开始于 $T_J = 25^\circ\text{C}$ 。
- 典型特性本质上独立于工作温度。

典型特性

图 1. 导通区域特性

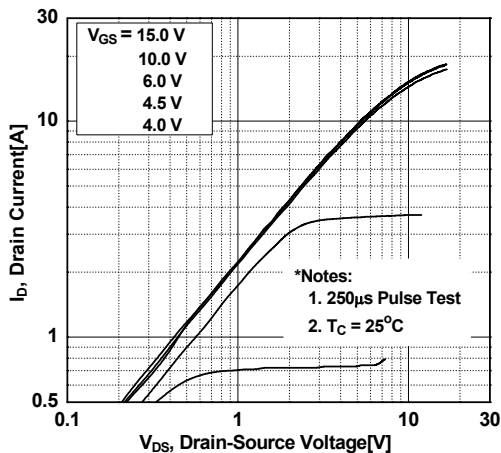


图 2. 传输特性

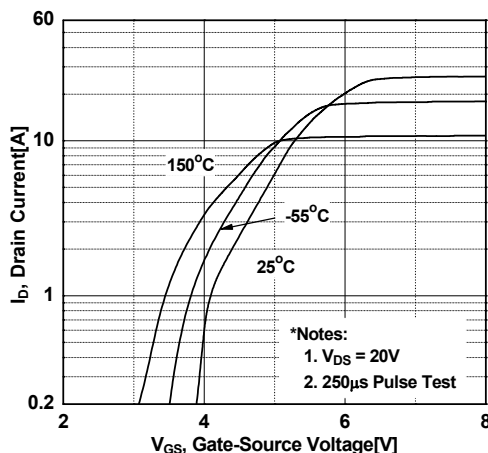


图 3. 导通电阻变化与漏极电流和栅极电压的关系

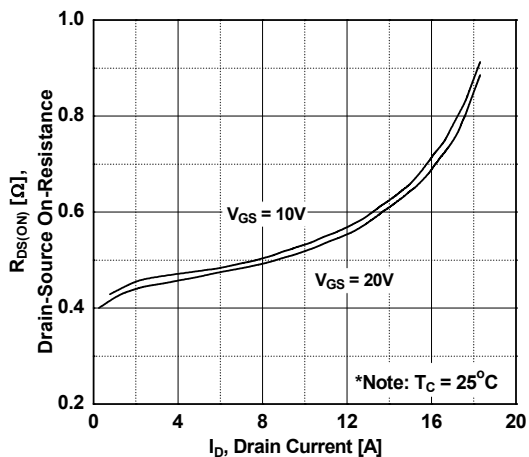


图 4. 体二极管正向电压变化与源极电流和温度的关系

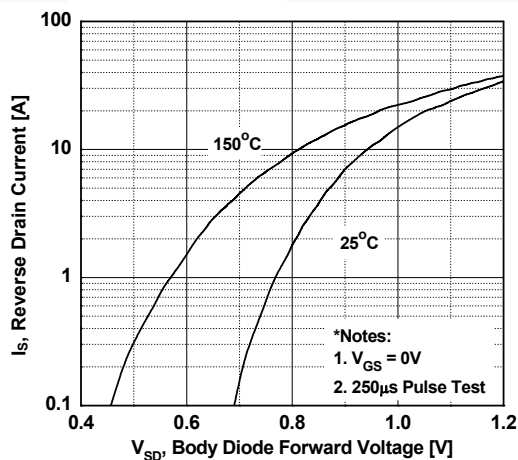


图 5. 电容特性

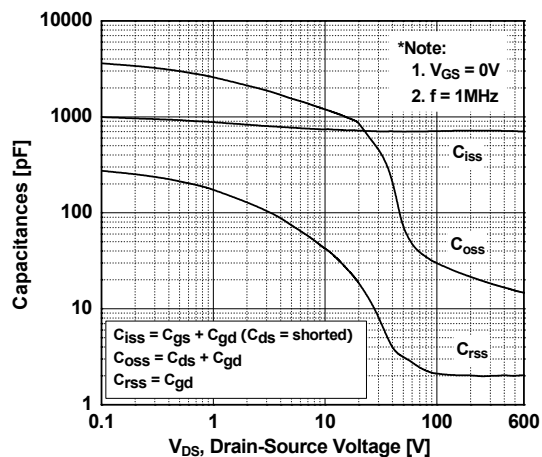
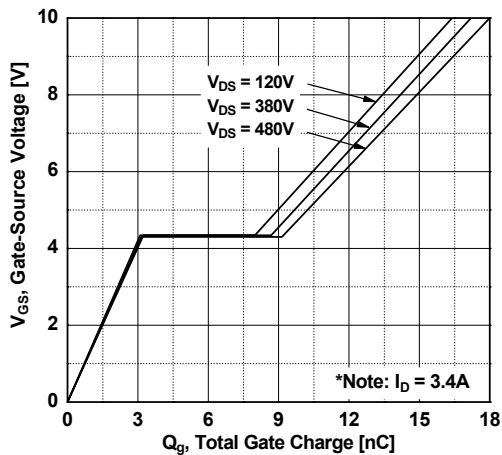


图 6. 栅极电荷特性



典型特性 (接上页)

图 7. 击穿电压变化与温度的关系

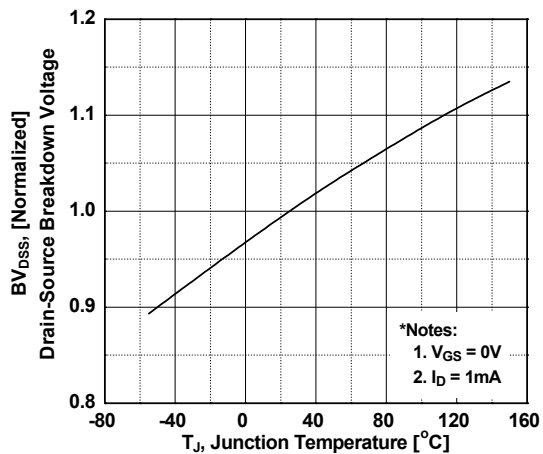


图 8. 导通电阻变化与温度的关系

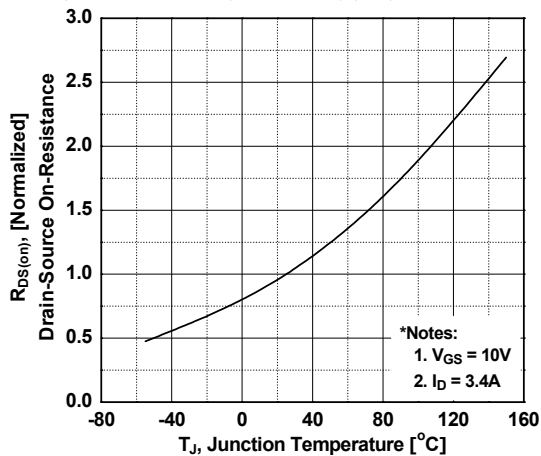


图 9. 最大安全工作区 _ FCPF7N60NT

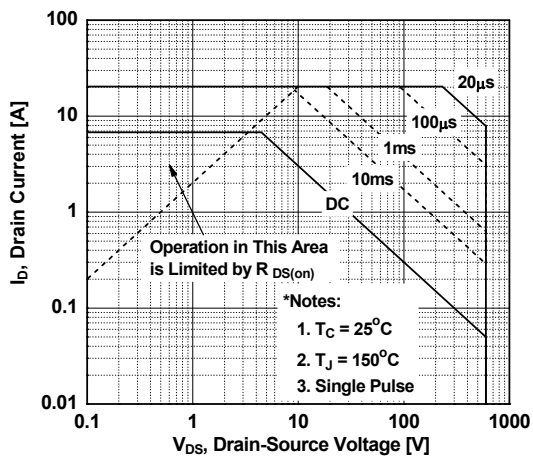
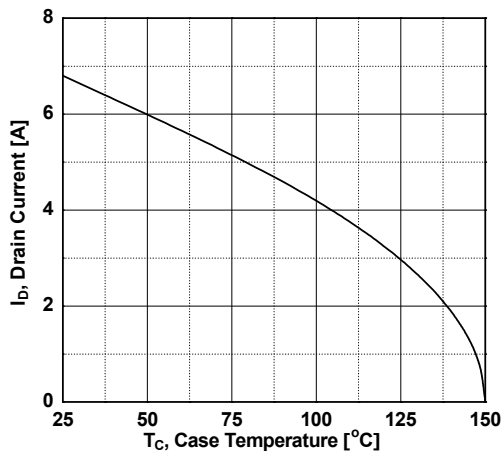


图 10. 最大漏极电流与壳温的关系



典型特性 (接上页)

图 11. 瞬态热响应曲线 _ FCPF7N60NT

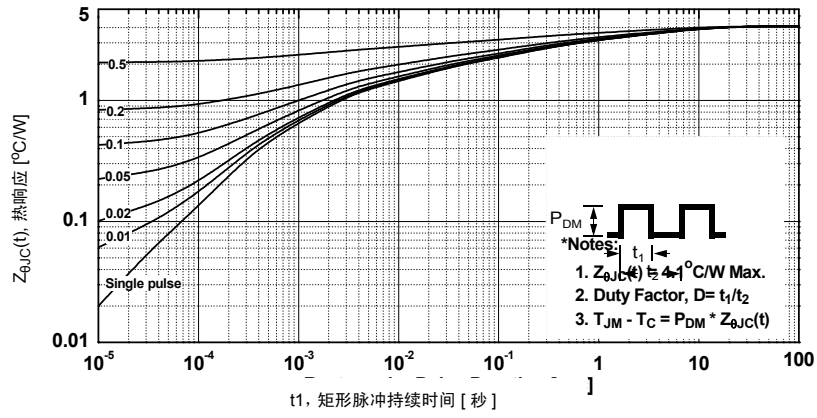


图 12. 栅极电荷测试电路与波形

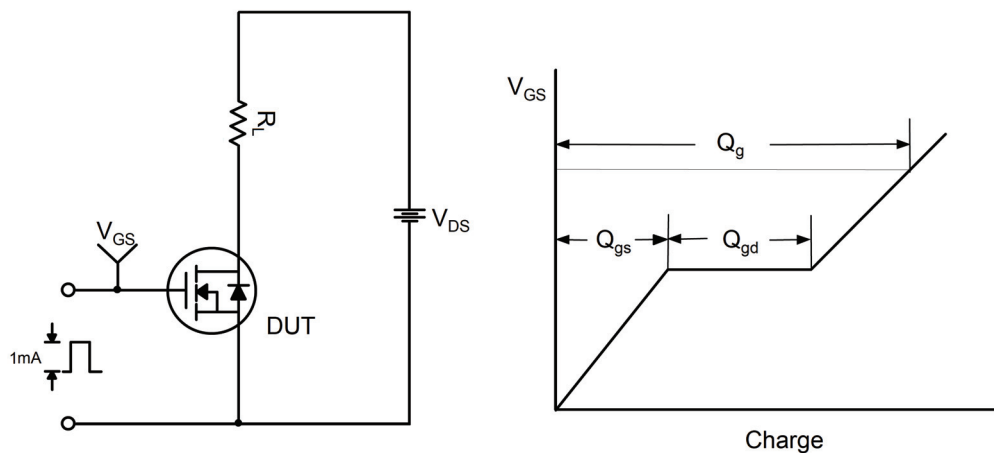


图 13. 阻性开关测试电路与波形

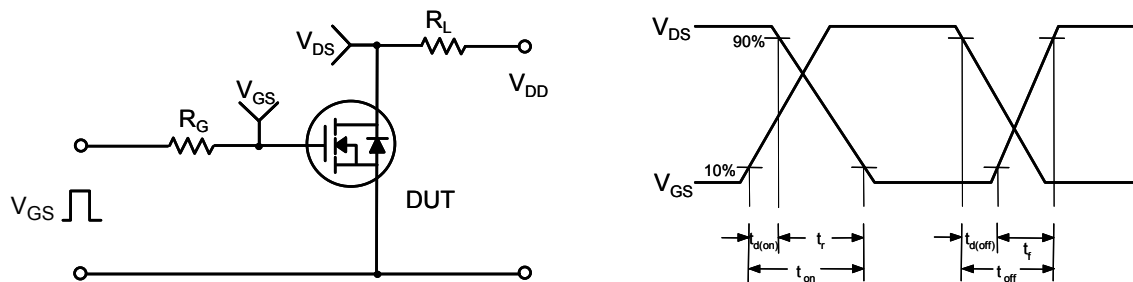


图 14. 非箝位感性开关测试电路与波形

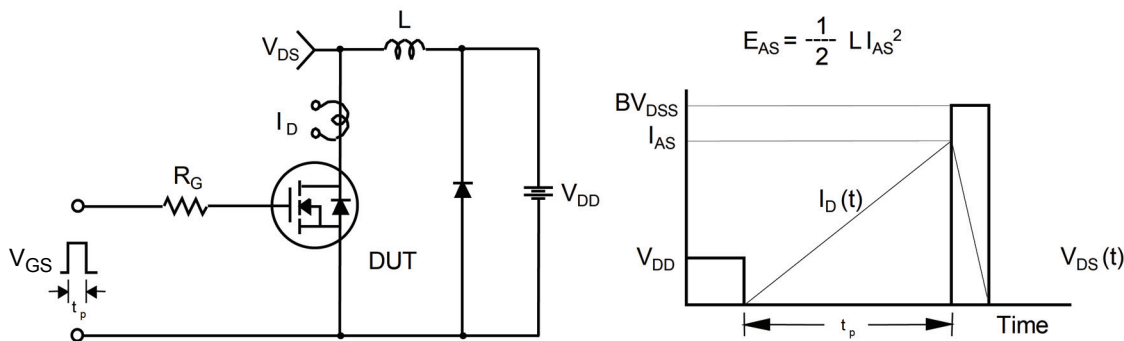
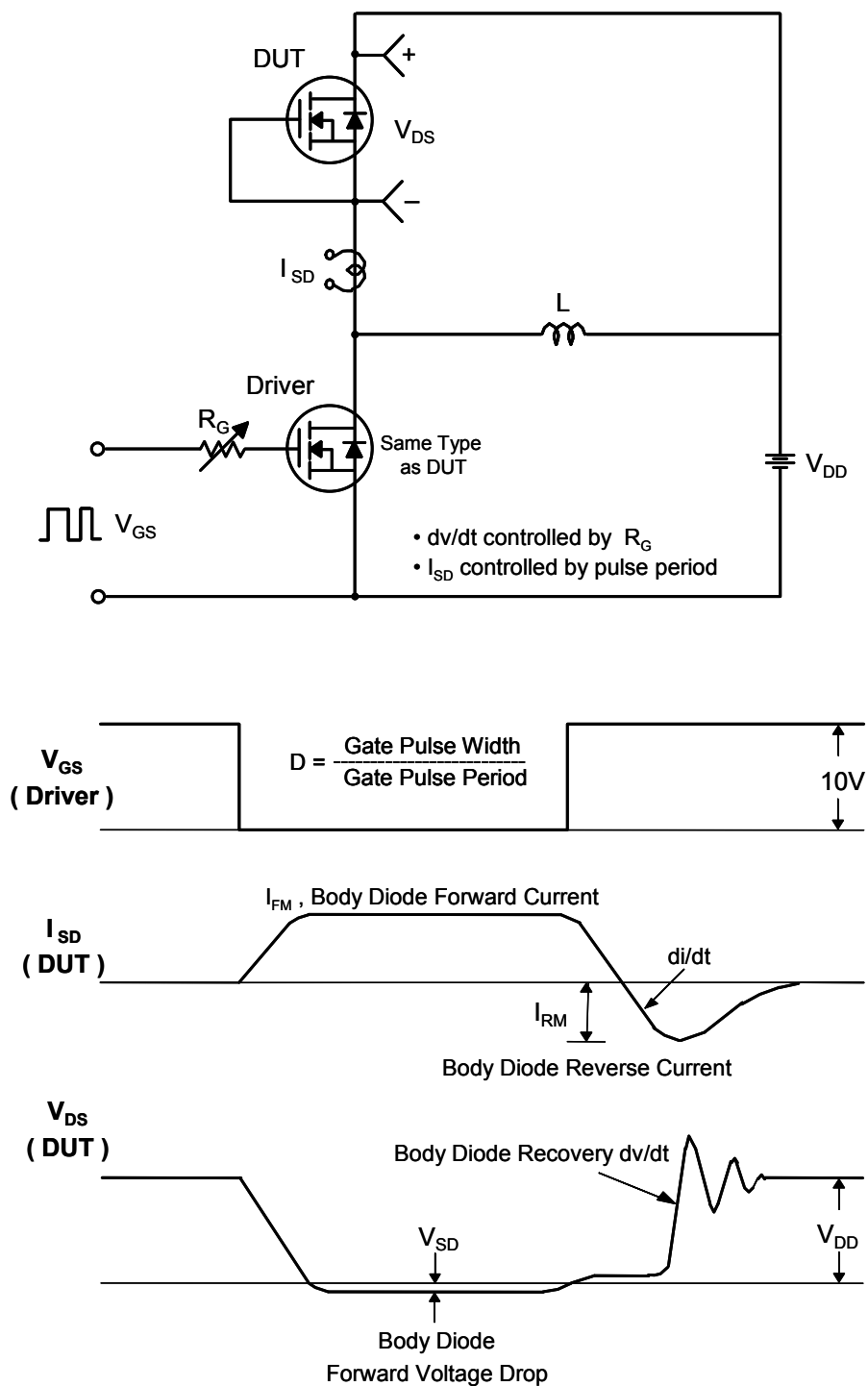
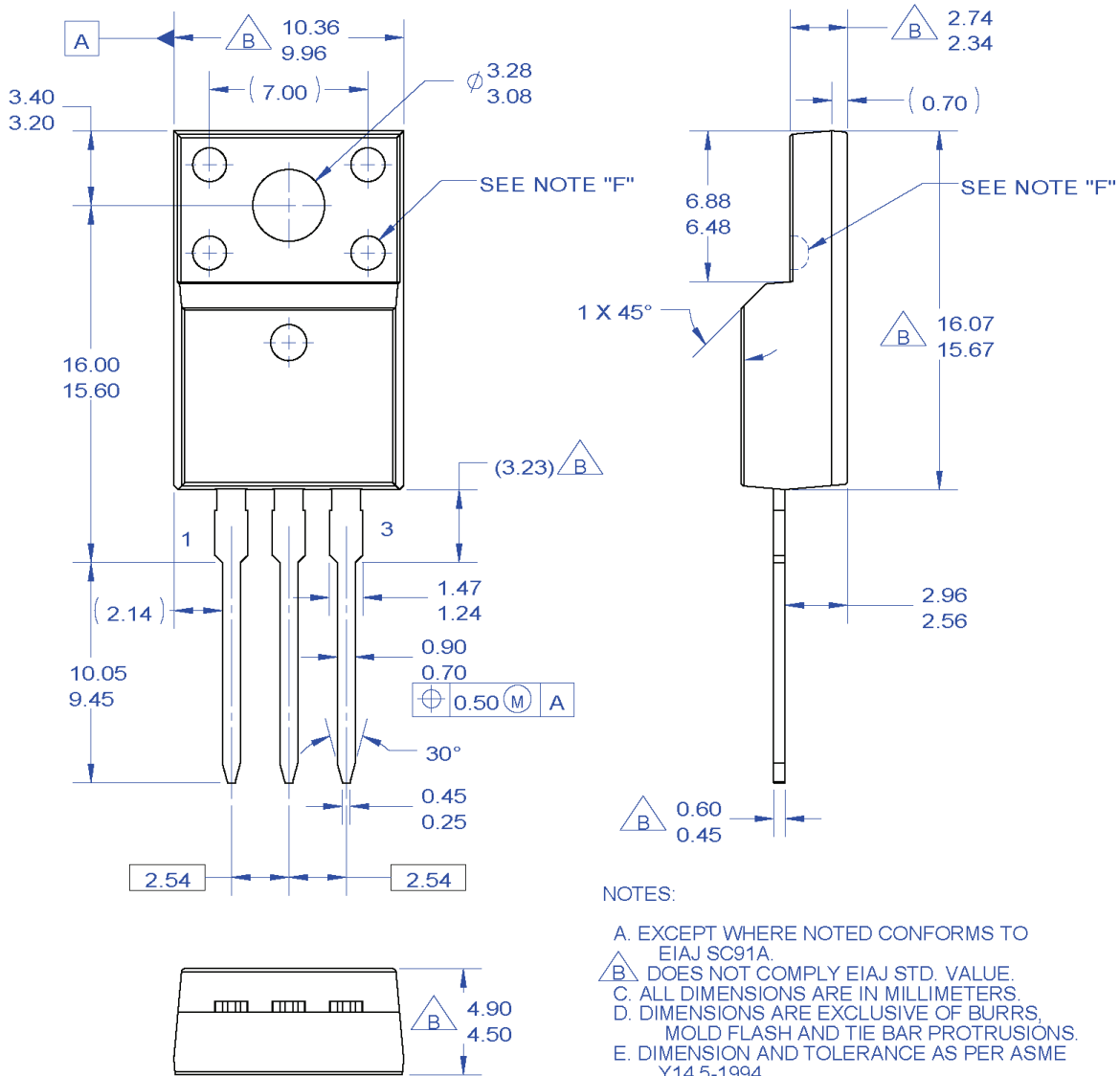


图 15. 峰值二极管恢复 dv/dt 测试电路与波形



机械尺寸

TO-220F 3L



NOTES:

- A. EXCEPT WHERE NOTED CONFORMS TO EIAJ SC91A.
- B. DOES NOT COMPLY EIAJ STD. VALUE.
- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- F. OPTION 1 - WITH SUPPORT PIN HOLE.
OPTION 2 - NO SUPPORT PIN HOLE.
- G. DRAWING FILE NAME: TO220M03REV3

图 16. TO220, 模塑, 3 引脚, 全封装, EIAJ SC91, 直引脚

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