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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.

FAIRCHILD SEMICONDUCTOR®

2014 年 1 月

FCP22N60N / FCPF22N60NT

N 沟道 SupreMOS® MOSFET

600 V, 22 A, 165 mΩ

特性

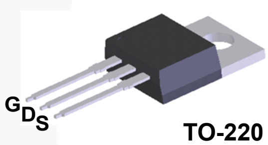
- BV_{DSS} > 650 V @ T_J = 150°C
- $R_{DS(on)}$ = 140 mΩ (Typ.) @V_{GS} = 10 V, I_D = 11 A
- 超低栅极电荷 （典型值 Q_g = 45 nC）
- 低有效输出电容 （典型值 $C_{oss(eff.)}$= 196.4 pF）
- 100% 经过雪崩测试
- 符合 RoHS 标准

应用

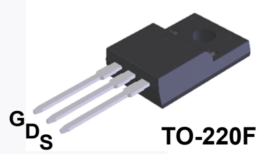
- LCD/LED/PDP 电视
- 照明
- 太阳能逆变器
- AC-DC 电源

说明

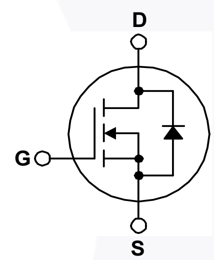
SupreMOS® MOSFET 是飞兆半导体的下一代高压超级结（SJ）技术，该技术采用区别于传统 SJ MOSFET 产品的深沟槽填充工艺。这项先进技术和精密的工艺控制提供了最低的 Rsp on-resistance （导通电阻规格），卓越的开关性能和耐用性。SupreMOS MOSFET 产品非常适合高频开关电源转换器应用，如功率因数校正 (PFC)、服务器 / 电信电源、平板电视电源、ATX 电源及工业电源应用。



TO-220



TO-220F



绝对最大额定值 T_C = 25°C 除非另有说明。

符号	参数		FCP22N60N	FCPF22N60NT	单位
V_{DSS}	漏极－源极电压		600		V
V_{GSS}	栅极－源极电压		±45		V
I_D	漏极电流	- 连续 (T_C = 25°C)	22	22*	A
		- 连续 (T_C = 100°C)	13.8	13.8*	
I_{DM}	漏极电流	- 脉冲 （注 1）	66	66*	A
E_{AS}	单脉冲雪崩能量	（注 2）	672		mJ
I_{AR}	雪崩电流	（注 1）	7.3		A
E_{AR}	重复雪崩能量	（注 1）	2.75		mJ
dv/dt	MOSFET dv/dt		100		V/ns
	二极管恢复 dv/dt 峰值	（注 3）	20		
P_D	功耗	(T_C = 25°C)	205	39	W
		- 超过 25°C 时降额	1.64	0.31	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

* 漏极电流受限于最大结温

热性能

符号	参数	FCP22N60N	FCPF22N60NT	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.61	3.2	°C/W
$R_{\theta JA}$	结至环境热阻最大值	62.5	62.5	

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
FCP22N60N	FCP22N60N	TO-220	塑料管	不适用	不适用	50 单元
FCPF22N60NT	FCPF22N60NT	TO-220F	塑料管	不适用	不适用	50 单元

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 = 1 mA, V_{GS} = 0 V, T_J = 25°C	600	-	-	V
		I_D = 1 mA, V_{GS} = 0 V, T_J = 150°C	650	-	-	
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	I_D = 1 mA，参考 25°C	-	0.68	-	V/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 480 V, V_{GS} = 0 V	-	-	10	μA
		V_{DS} = 480 V, T_J = 125°C	-	-	100	
I_{GSS}	栅极 - 体漏电流	V_{GS} = ±45 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	3.0	4.0	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 11 A	-	0.140	0.165	Ω
g_{FS}	正向跨导	V_{DS} = 20 V, I_D = 11 A	-	22	-	S
动态特性						
C_{iss}	输入电容	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	-	1950	-	pF
C_{oss}	输出电容		-	75.9	-	pF
C_{rss}	反向传输电容		-	3	-	pF
C_{oss}	输出电容	V_{DS} = 380 V, V_{GS} = 0 V, f = 1 MHz	-	43.2	-	pF
$C_{oss(eff.)}$	有效输出电容	V_{DS} = 0 V 至 480 V， V_{GS} = 0 V	-	196.4	-	pF
$Q_{g(tot)}$	10V 的栅极电荷总量	V_{DS} = 380 V, I_D = 11 A, V_{GS} = 10 V （说明 4）	-	45	-	nC
Q_{gs}	栅极 - 源极栅极电荷		-	8.7	-	nC
Q_{gd}	栅极 - 漏极 " 密勒 " 电荷		-	14.5	-	nC
ESR	等效串联电阻 (G-S)	f = 1 MHz	-	1	-	Ω
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 380 V, I_D = 11 A, V_{GS} = 10 V, R_G = 4.7 Ω （说明 4）	-	16.9	-	ns
t_r	开通上升时间		-	16.7	-	ns
$t_{d(off)}$	关断延迟时间		-	49	-	ns
t_f	关断下降时间		-	4	-	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		-	-	22	A
I_{SM}	漏极 - 源极二极管最大正向脉冲电流		-	-	66	A
V_{SD}	漏极 - 源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 11 A	-	-	1.2	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, I_{SD} = 11 A, dI_F/dt = 100 A/μs	-	350	-	ns
Q_{rr}	反向恢复电荷		-	6	-	μC

注意：

1. 重复额定值：脉冲宽度受限于最大结温。
2. I_{AS} = 7.3 A， R_G = 25 Ω，启动 T_J = 25°C。
3. I_{SD} ≤ 22 A， di/dt ≤ 200 A/μs， V_{DD} ≤ 380 V，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

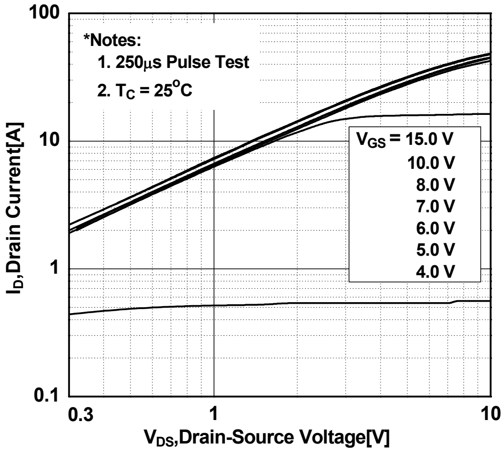


图 2. 传输特性

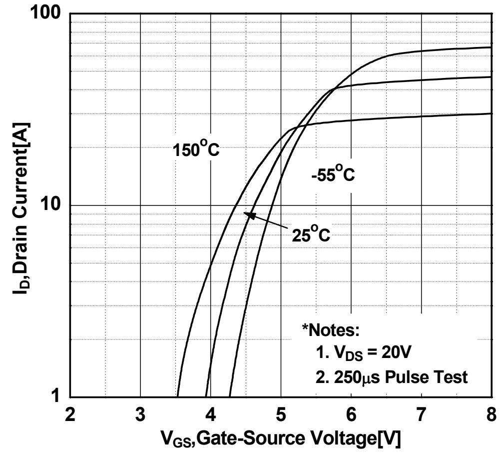


图 3. 导通电阻变化与漏极电流和栅极电压

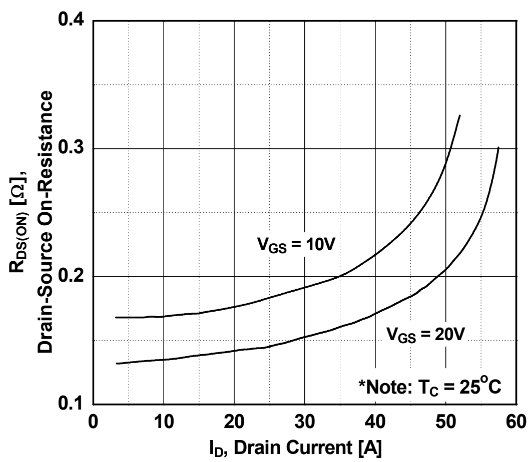


图 4. 体二极管正向电压变化与源极电流和温度

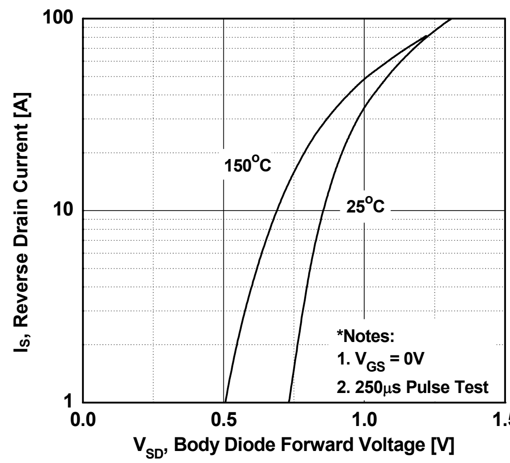


图 5. 电容特性

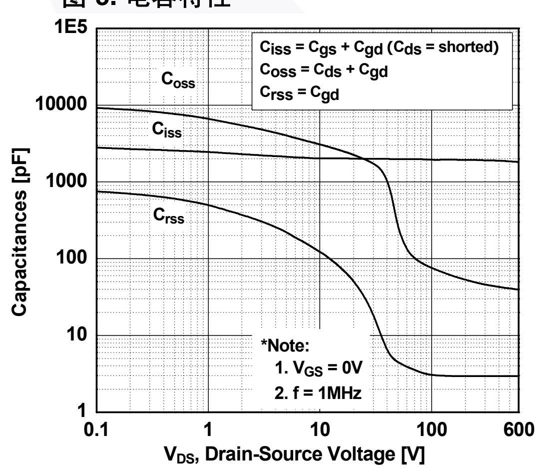
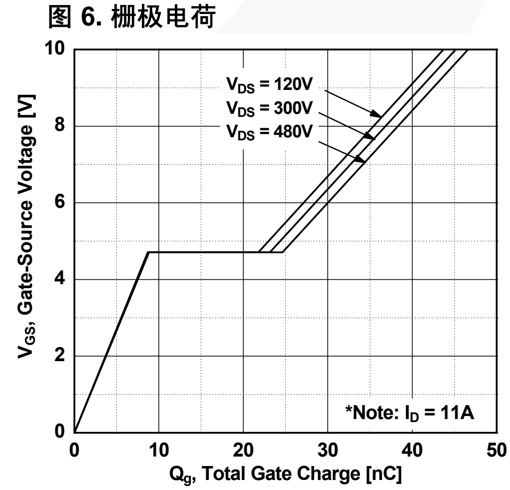


图 6. 栅极电荷



典型性能特征（接上页）

图 7. 击穿电压变化与温度

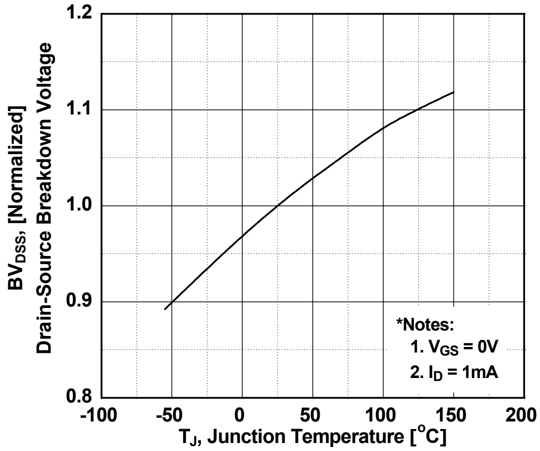


图 8. 导通电阻变化与温度

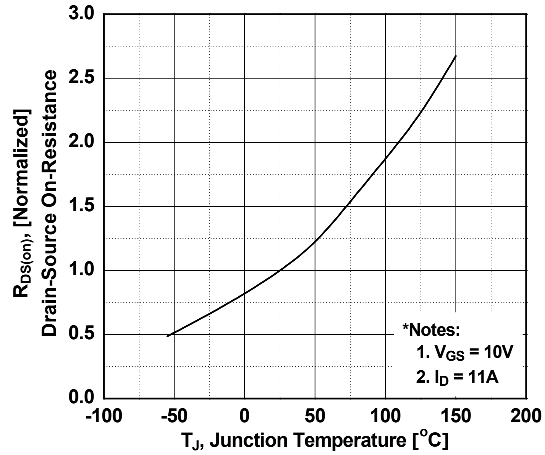


图 9. 用于 FCP22N60N 最大安全工作区

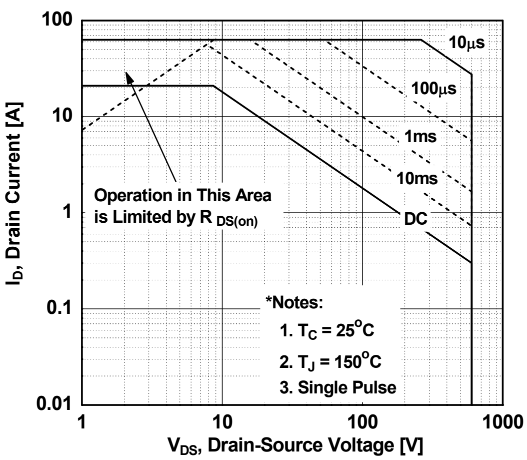


图 10. 用于 FCPF22N60N 最大安全操作区 T

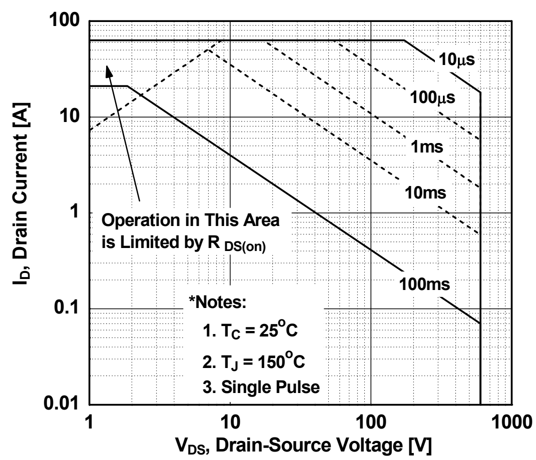
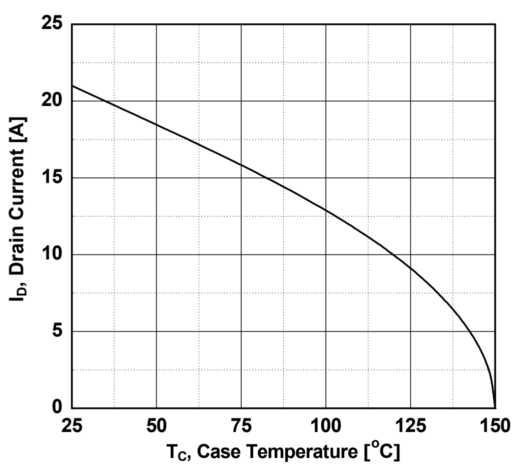


图 11. 最大漏极电流与壳温的关系



典型性能特征（接上页）

图 12. FCP22N60N 的瞬态热响应曲线

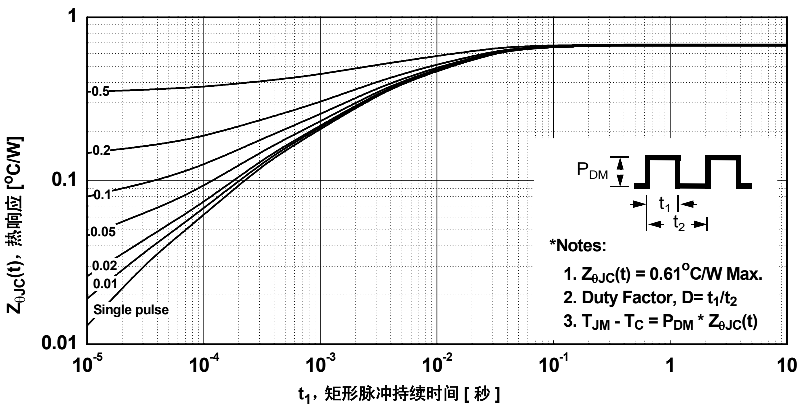
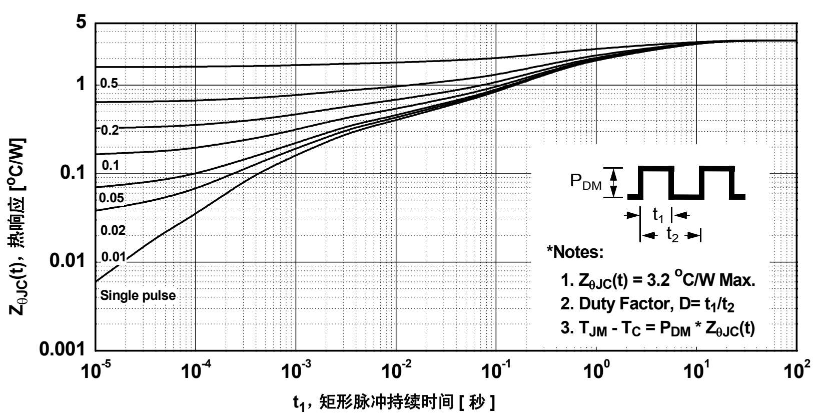


图 13.FCPF22N60NT 的瞬态热响应曲线



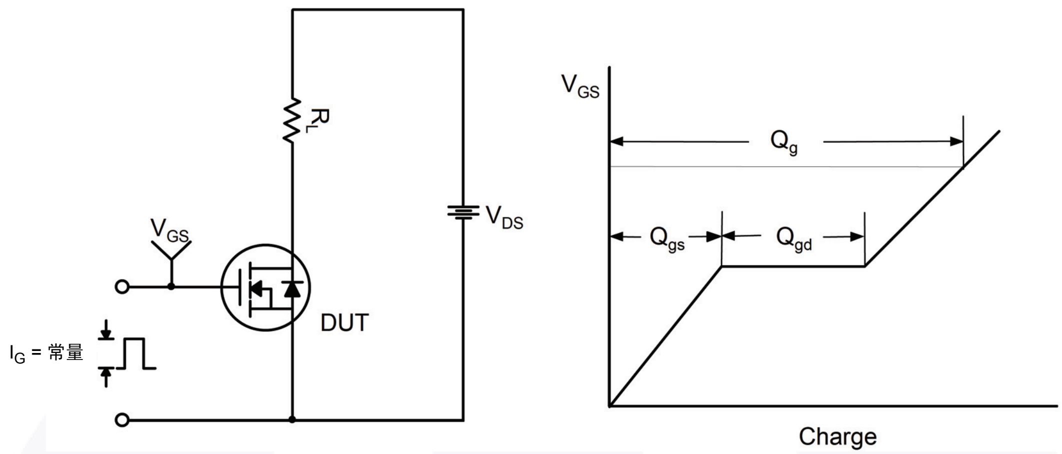


图 14. 栅极电荷测试电路与波形

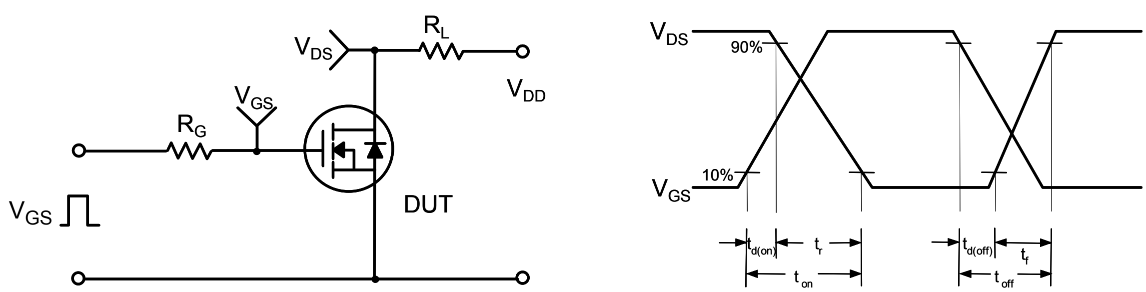


图 15. 阻性开关测试电路与波形

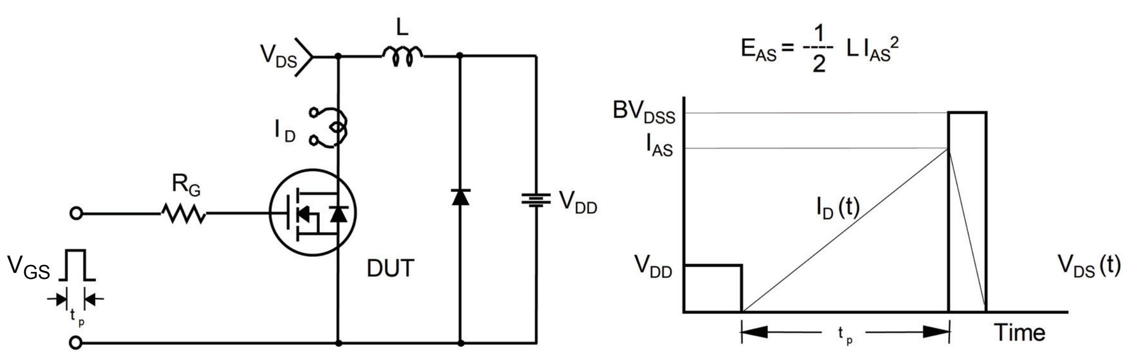


图 16. 非箝位感性开关测试电路与波形

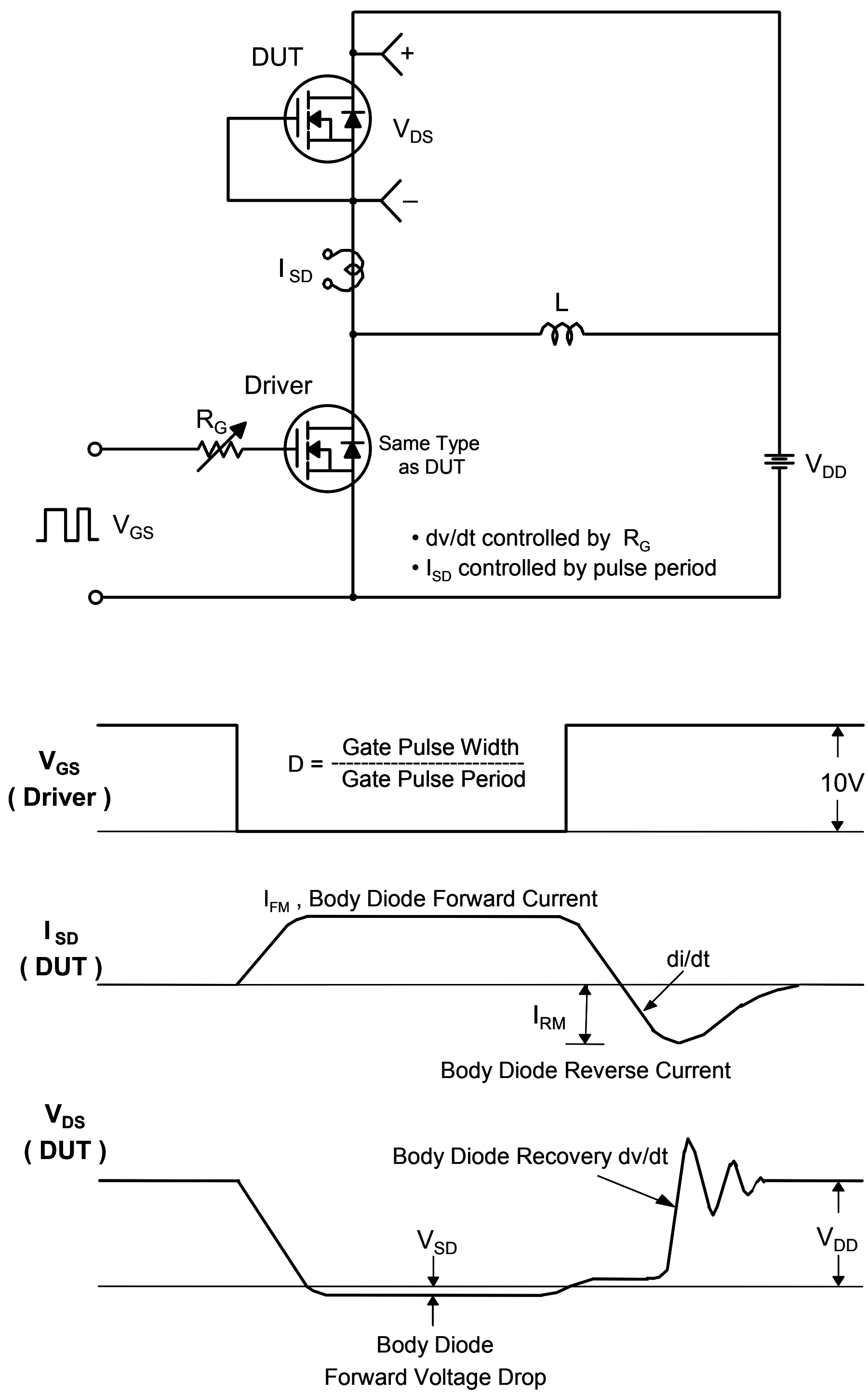


图 17. 二极管恢复 dv/dt 峰值测试电路与波形

机械尺寸

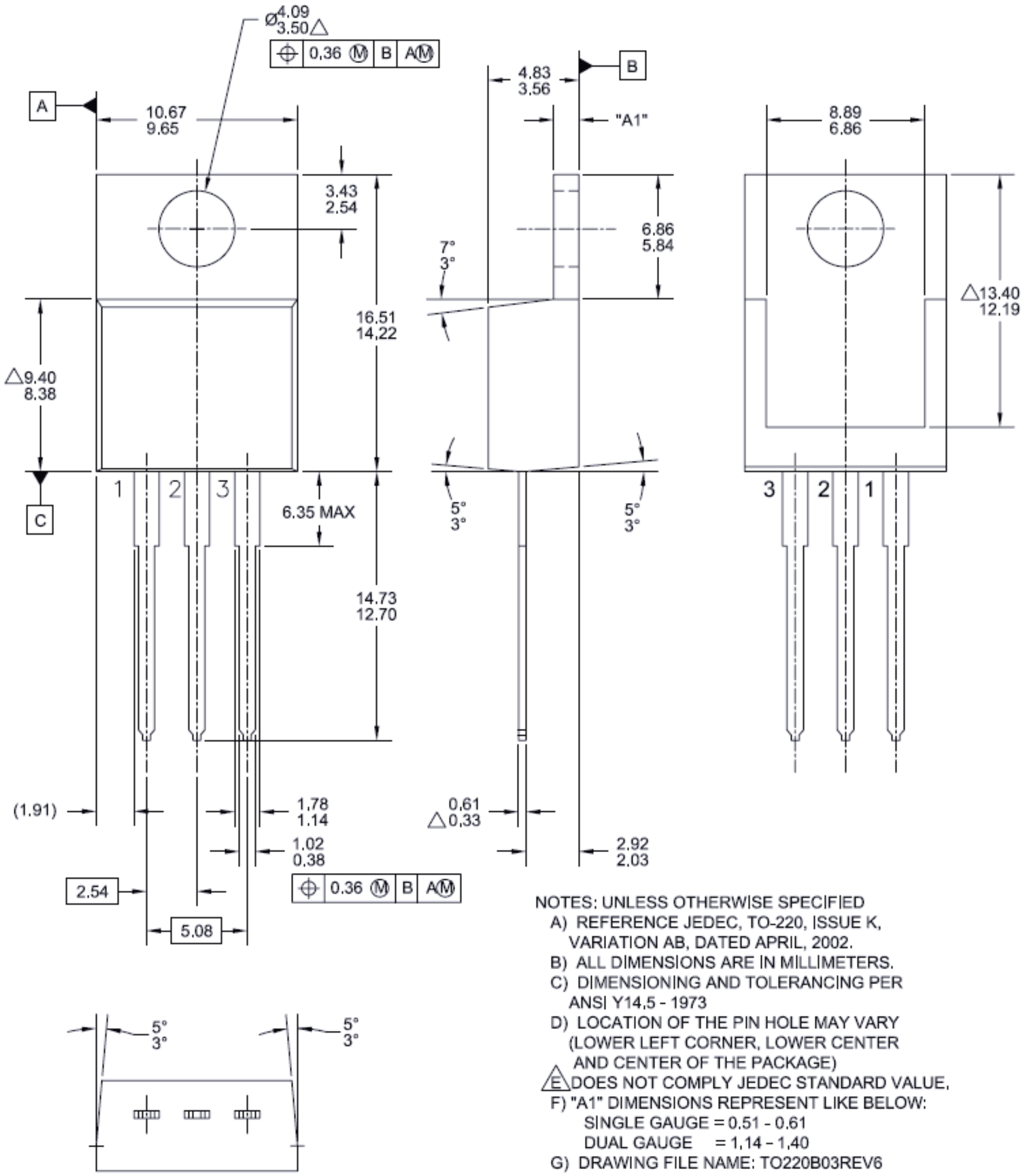


图 18. TO-220，模塑， 3 引脚， Jedec 变体 AB

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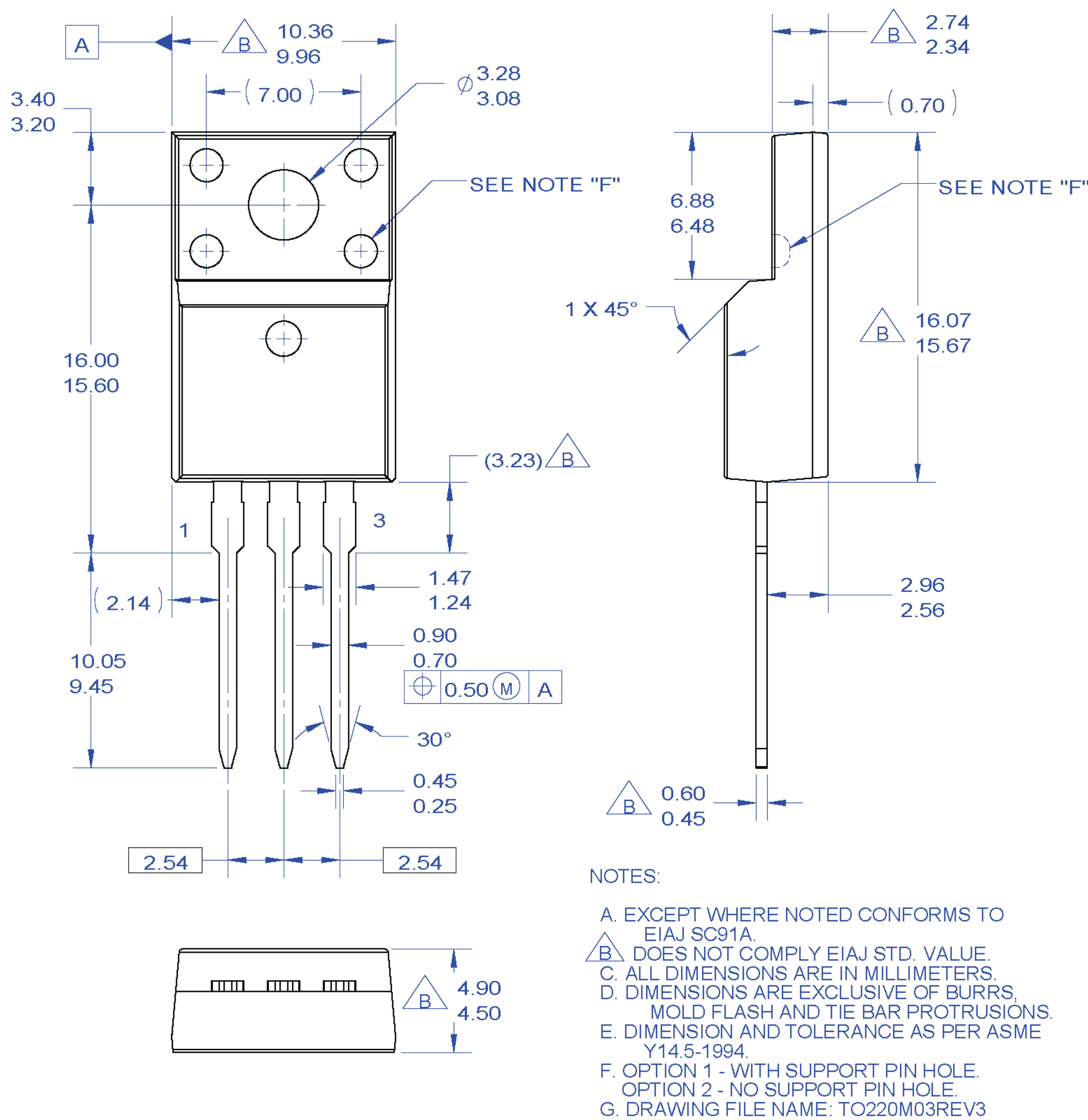

图 19. TO220， 模塑， 3 引脚，全封装， EIAJ SC91，直引脚

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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. I66

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