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FAIRCHILD SEMICONDUCTOR®

2014 年 1 月

FDB029N06

N 沟道 PowerTrench® MOSFET

60 V， 193 A， 3.1 mΩ

特性

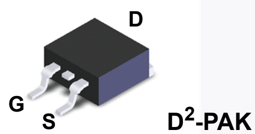
- $R_{DS(on)}$ = 2.4 mΩ (Typ.)@V_{GS} = 10 V, I_D = 75 A
- 快速开关速度
- 低栅极电荷
- 高性能沟道技术可实现极低的 $R_{DS(on)}$
- 高功率和高电流处理能力
- 符合 RoHS 标准

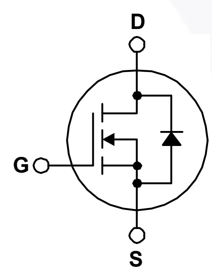
说明

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

- 用于 ATX/ 服务器 / 电信 PSU 的同步整流
- 电池保护电路
- 电机驱动和不间断电源
- 可再生系统





MOSFET 最大额定值 TC = 25°C 除非另有说明。

符号	参数		FDB029N06	单位
V_{DSS}	漏极－源极电压		60	V
V_{GSS}	栅极－源极电压		±20	V
I_D	漏极电流	- 连续 （T_C = 25°C，硅限制）	193	A
		- 连续 （T_C = 100°C，硅限制）	136	
		- 连续 （T_C = 25°C，封装限制）	120	
I_{DM}	漏极电流	- 脉冲 （注 1）	772	A
E_{AS}	单脉冲雪崩能量	（注 2）	1434	mJ
dv/dt	峰值二极管恢复 dv/dt	（注 3）	6	V/ns
P_D	功耗	(T_C = 25°C)	231	W
		- 降低至 25°C 以上	1.54	W/°C
T_J, T_{STG}	工作和存储温度范围		-55 至 +175	°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	FDB029N06	单位
$R_{θJC}$	结至外壳热阻最大值	0.65	°C/W
$R_{θJA}$	结至环境热阻 （最小尺寸的 2 盎司焊盘） 最大值。	62.5	
	结至环境热阻 （1 in^2 2 盎司焊盘） 最大值。	40	

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
FDB029N06	FDB029N06	D^2-PAK	卷带	330 mm	24 mm	800 个

电气特性 TC = 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

符号	参数	测试条件	最小值	典型值	最大值	单位
BV_{DSS}	漏极一源极击穿电压	I_D = 250 μA, V_{GS} = 0 V, T_C = 25°C	60	-	-	V
ΔBV_{DSS} / ΔT_J	击穿电压温度系数	I_D=1 mA，参考温度为 25°C	-	0.05	-	V/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 48 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 48 V, T_C = 150°C	-	-	500	
I_{GSS}	栅极 - 体漏电流	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±100	nA

导通特性

符号	参数	测试条件	最小值	典型值	最大值	单位
$V_{GS(th)}$	栅极阈值电压	V_{GS} = V_{DS}, I_D = 250 μA	2.5	3.5	4.5	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 75 A	-	2.4	3.1	mΩ
g_{FS}	正向跨导	V_{DS} = 10 V, I_D = 75 A	-	154	-	S

动态特性

符号	参数	测试条件	最小值	典型值	最大值	单位
C_{iss}	输入电容	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	-	7380	9815	pF
C_{oss}	输出电容		-	1095	1455	pF
C_{rss}	反向传输电容		-	415	625	pF
$Q_{g(tot)}$	10 V 的栅极电荷总量	V_{DS} = 48 V, I_D = 75 A, V_{GS} = 10 V （说明 4）	-	116	151	nC
Q_{gs}	栅极 - 源极栅极电荷		-	40	-	nC
Q_{gd}	栅极 - 漏极 " 米勒 " 电荷		-	35	-	nC

开关特性

符号	参数	测试条件	最小值	典型值	最大值	单位
$t_{d(on)}$	导通延迟时间	V_{DD} = 30 V, I_D = 75 A, V_{GS} = 10 V, R_G = 4.7 Ω （说明 4）	-	39	87	ns
t_r	开通上升时间		-	178	366	ns
$t_{d(off)}$	关断延迟时间		-	54	118	ns
t_f	关断下降时间		-	33	76	ns

漏极 - 源极二极管特性

符号	参数	测试条件	最小值	典型值	最大值	单位
I_S	漏极 - 源极二极管最大正向连续电流		-	-	193	A
I_{SM}	漏极 - 源极二极管最大正向脉冲电流		-	-	772	A
V_{SD}	漏极 - 源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 75 A	-	-	1.3	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, I_{SD} = 75 A, dI_F/dt = 100 A/μs	-	46	-	ns
Q_{rr}	反向恢复电荷		-	50	-	nC

注意:

1. 重复额定值：脉冲宽度受限于最大结温。
2. L=0.51 mH， I_{AS}=75 A， V_{DD}=50 V， R_G=25 Ω，开始 T_J=25°C。
3. $I_{SD} \le$ 75 A， di/dt ≤ 450 A/μs， $V_{DD} \le BV_{DSS}$，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

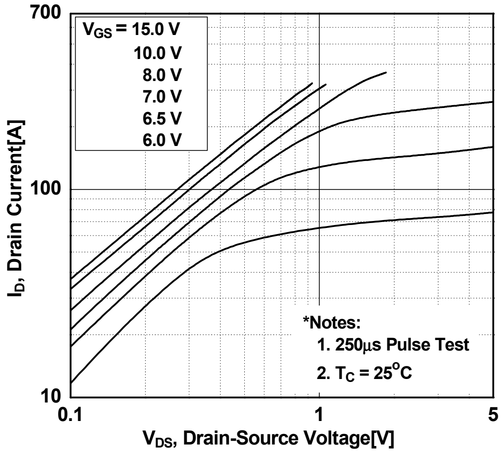


图 2. 传输特性

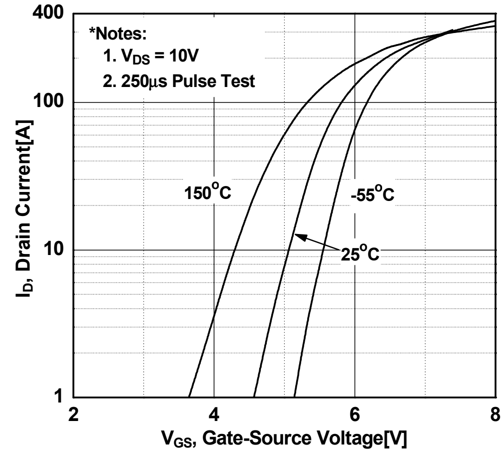


图 3. 导通电阻变化 vs. 漏极电流和栅极电压

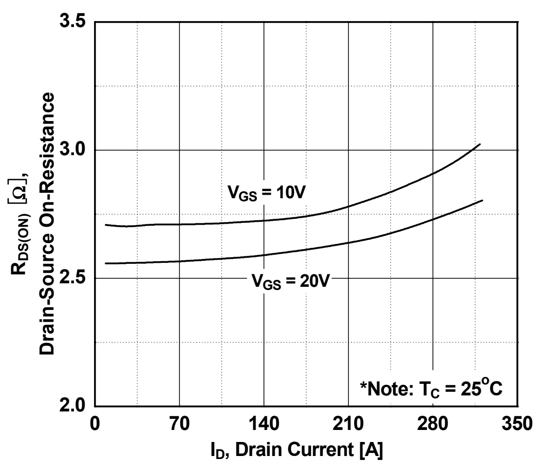


图 4. 体二极管正向电压变化 vs. 源极电流和温度

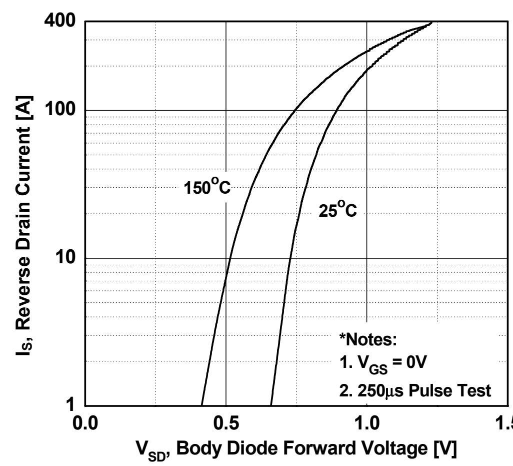


图 5. 电容特性

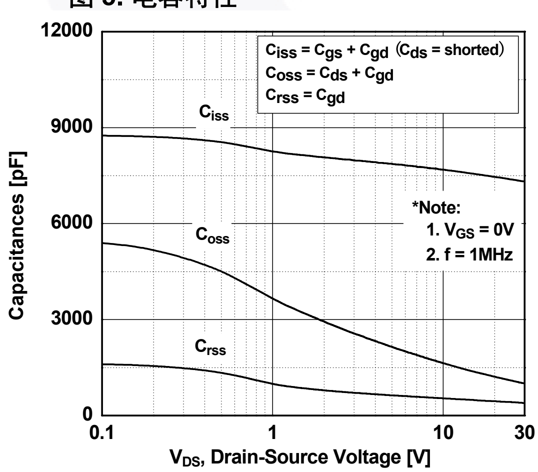
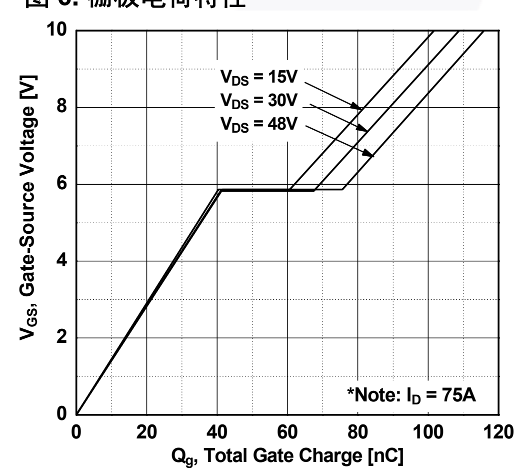


图 6. 栅极电荷特性



典型性能特征 （接上页）

图 7. 击穿电压变化vs. 温度

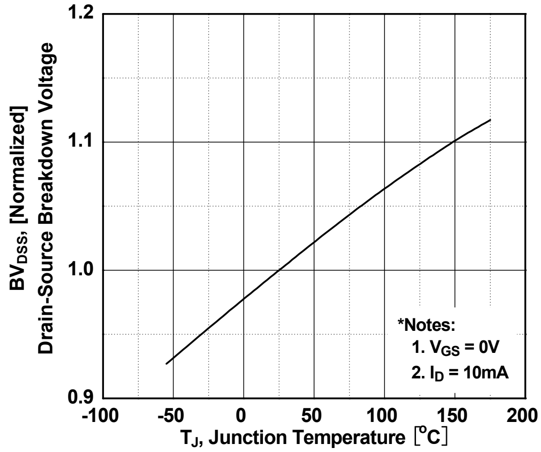


图 8. 导通电阻变化 vs. 温度

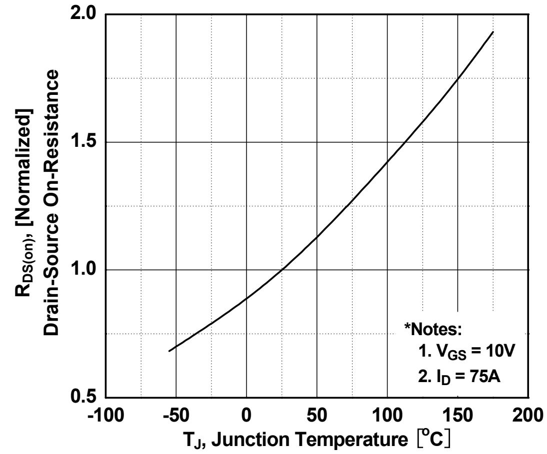


图 9. 最大安全工作区

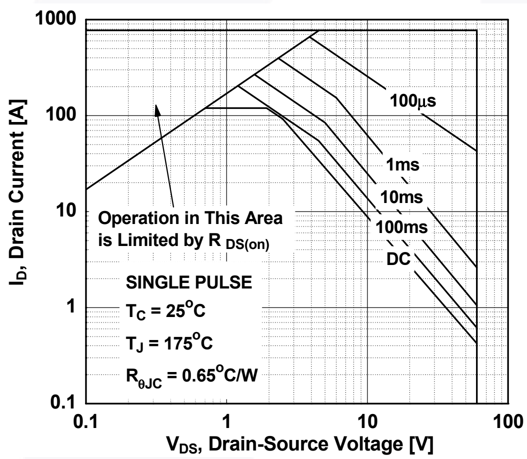


图 10. 最大漏极电流 vs. 外壳温度

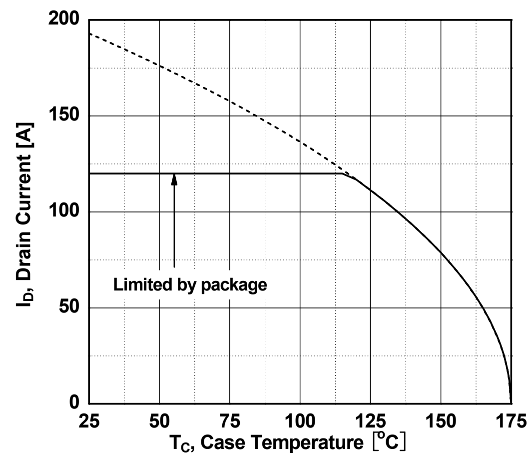
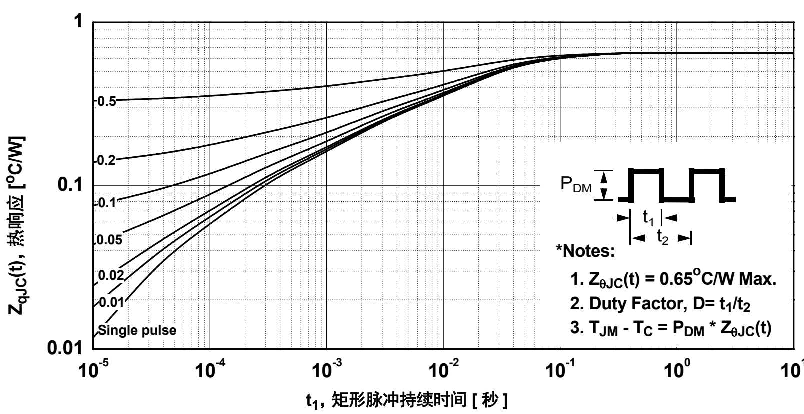


图 11. 瞬态热响应曲线



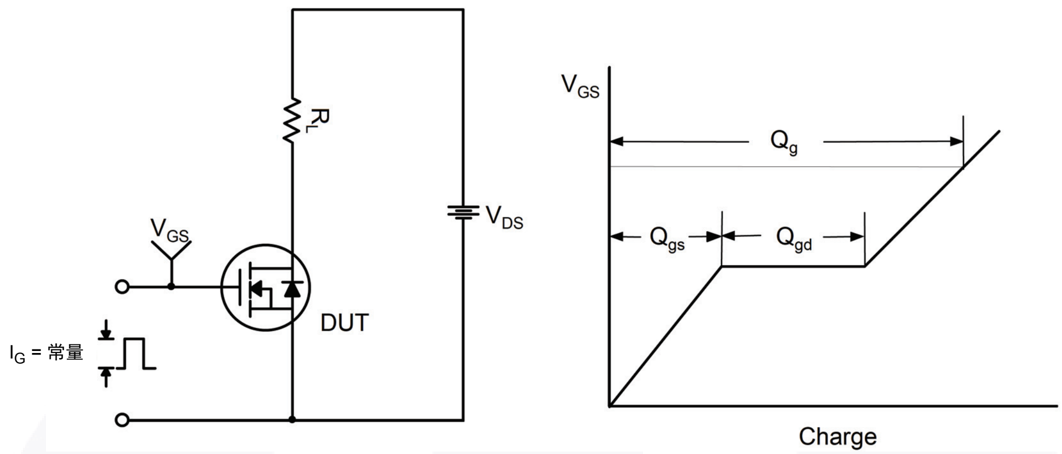


图 12. 栅极电荷测试电路与波形

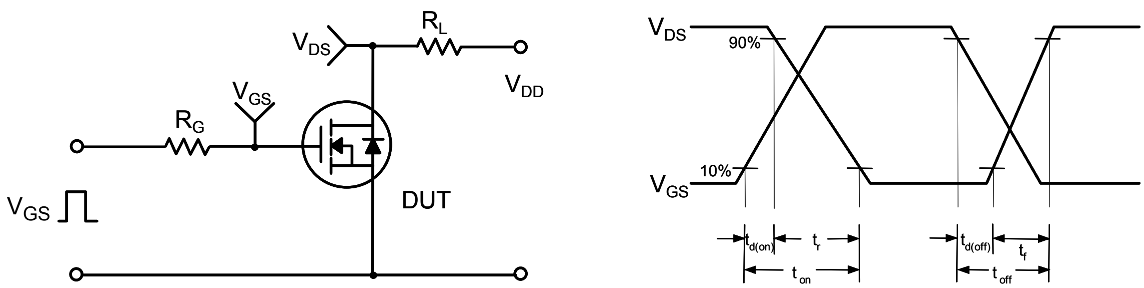


图 13. 阻性开关测试电路与波形

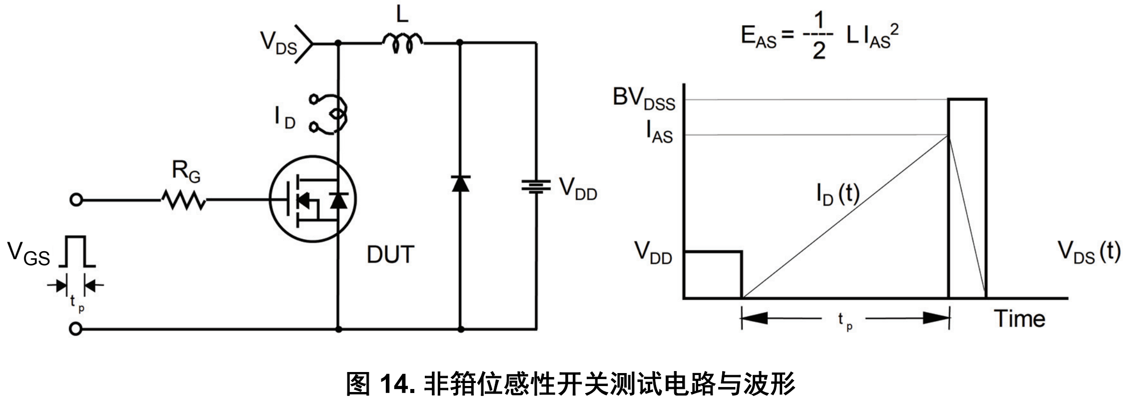


图 14. 非箝位感性开关测试电路与波形

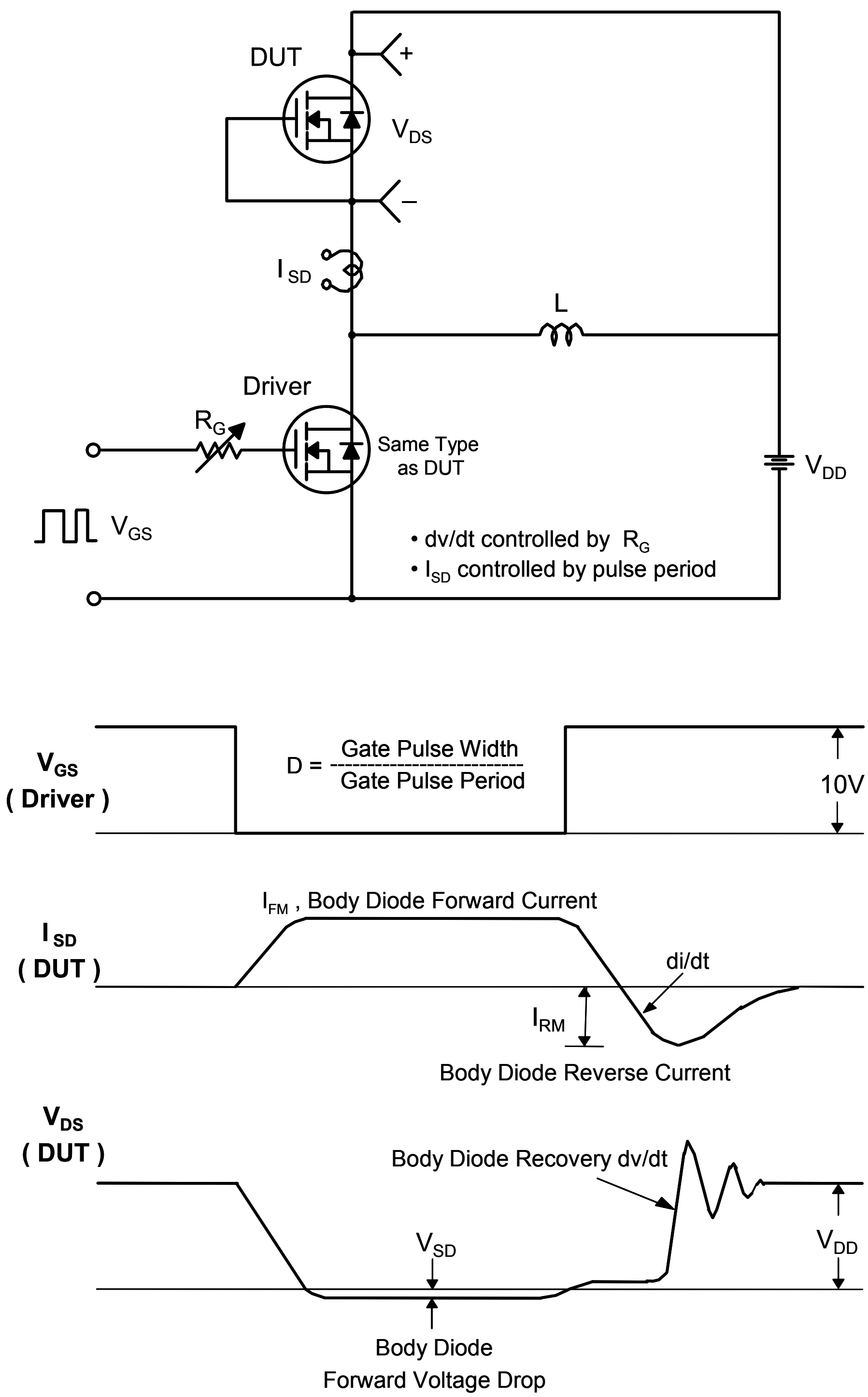


图 15. 峰值二极管恢复 dv/dt 测试电路与波形

机械尺寸

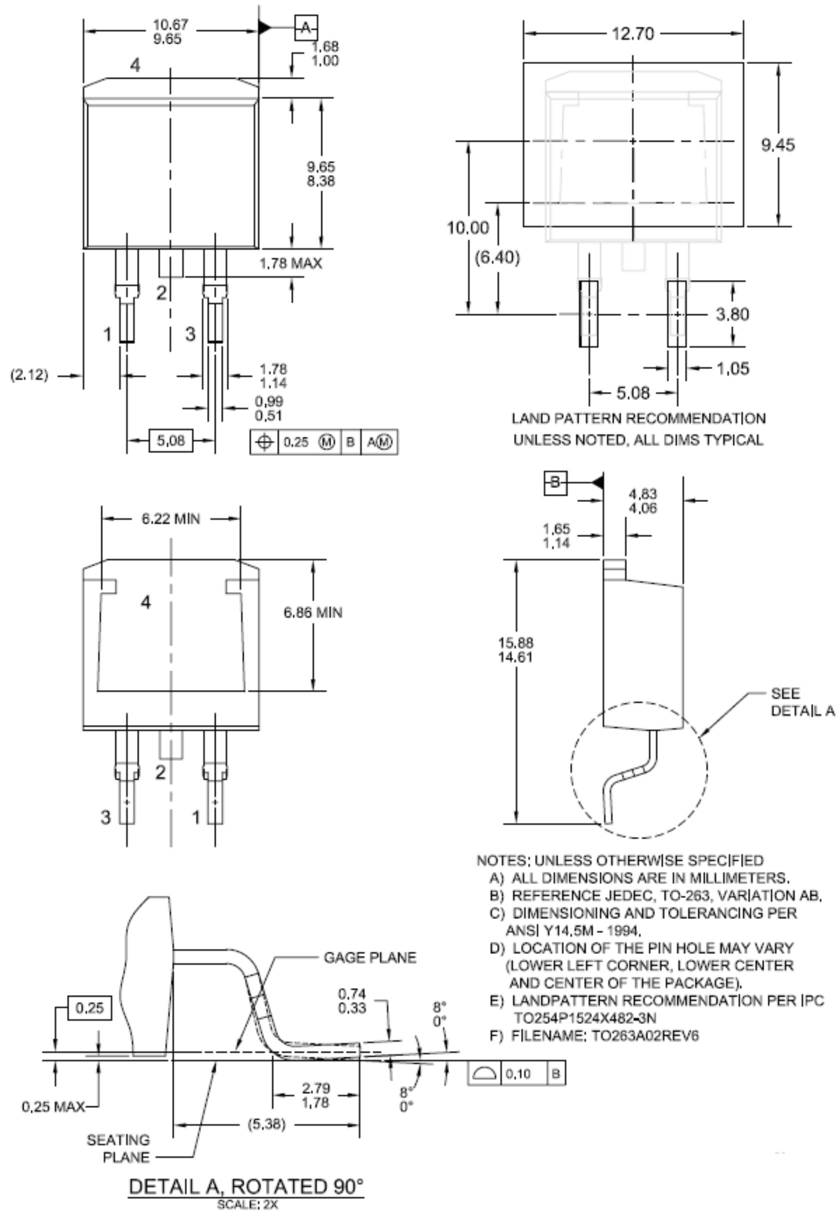


图 16. TO263 (D²PAK)，模塑， 2 引脚，表面贴装

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