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# FDB047N10

## N 沟道 PowerTrench® MOSFET

100 V, 164 A, 4.7 mΩ

### 特性

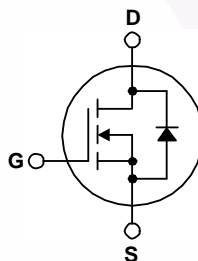
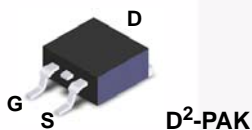
- $R_{DS(on)} = 3.9 \text{ m}\Omega$  (Typ.) @  $V_{GS} = 10 \text{ V}$ ,  $I_D = 75 \text{ A}$
- 快速开关速度
- 低栅极电荷
- 高性能沟道技术可实现极低的  $R_{DS(on)}$
- 高功率和高电流处理能力
- 符合 RoHS 标准

### 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电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
- 微型太阳能逆变器



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

符号	参数	FDB047N10	单位
$V_{DSS}$	漏极-源极电压	100	V
$V_{GSS}$	栅极-源极电压	$\pm 20$	V
$I_D$	漏极电流	- 连续 ( $T_C=25^\circ\text{C}$ , 硅片受限)	164*
		- 连续 ( $T_C=100^\circ\text{C}$ , 硅片受限)	116*
		- 连续 ( $T_C=25^\circ\text{C}$ , 封装受限)	120
$I_{DM}$	漏极电流	- 脉冲 (注 1)	656*
$E_{AS}$	单脉冲雪崩能量	(注 2)	1153
$dv/dt$	峰值二极管恢复 $dv/dt$	(注 3)	6.0
$P_D$	功耗	( $T_C = 25^\circ\text{C}$ )	375
		- 降低至 $25^\circ\text{C}$ 以上	2.5
$T_J, T_{STG}$	工作和存储温度范围	-55 至 +175	$^\circ\text{C}$
$T_L$	用于焊接的最大引线温度, 距离外壳 1/8", 持续 5 秒	300	$^\circ\text{C}$

\* 根据允许的最大结温计算连续电流。封装限流为 120 A。

### 热性能

符号	参数	FDB047N10	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.4	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	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 <sup>2</sup> 2 盎司焊盘) 最大值。	40	

## 封装标识与订购信息

器件编号	顶标	封装	包装方法	卷尺寸	带宽	数量
FDB047N10	FDB047N10	D <sup>2</sup> -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
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## 关断特性

$BV_{DSS}$	漏极-源极击穿电压	$I_D = 250 \mu A, V_{GS} = 0 V, T_J = 25^\circ C$	100	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	$I_D = 250 \mu A$ , 温度参考 25°C	-	0.1	-	V/°C
$I_{DSS}$	零栅极电压漏极电流	$V_{DS} = 100 V, V_{GS} = 0 V$	-	-	1	$\mu A$
		$V_{DS} = 100 V, V_{GS} = 0 V, T_C = 150^\circ C$	-	-	500	
$I_{GSS}$	栅极-体漏电流	$V_{GS} = \pm 20 V, V_{DS} = 0 V$	-	-	$\pm 100$	nA

## 导通特性

$V_{GS(th)}$	栅极阈值电压	$V_{GS} = V_{DS}, I_D = 250 \mu A$	2.5	3.5	4.5	V
$R_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10 V, I_D = 75 A$	-	3.9	4.7	m $\Omega$
$g_{FS}$	正向跨导	$V_{DS} = 10 V, I_D = 75 A$	-	170	-	S

## 动态特性

$C_{iss}$	输入电容	$V_{DS} = 25 V, V_{GS} = 0 V,$ $f = 1 MHz$	-	11500	15265	pF
$C_{oss}$	输出电容		-	1120	1500	pF
$C_{riss}$	反向传输电容		-	455	680	pF

## 开关特性

$t_{d(on)}$	导通延迟时间	$V_{DD} = 50 V, I_D = 75 A,$ $V_{GS} = 10 V, R_G = 25 \Omega$	-	174	358	ns
$t_r$	开通上升时间		-	386	782	ns
$t_{d(off)}$	关断延迟时间		-	344	698	ns
$t_f$	关断下降时间		(说明 4)	-	244	499
$Q_{g(tot)}$	10 V 的栅极电荷总量	$V_{DS} = 80 V, I_D = 75 A,$ $V_{GS} = 10 V$	-	160	210	nC
$Q_{gs}$	栅极-源极栅极电荷		-	56	-	nC
$Q_{gd}$	栅极-漏极“米勒”电荷		(说明 4)	-	36	-

## 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	-	-	164*	A	
$I_{SM}$	漏极-源极二极管最大正向脉冲电流	-	-	656	A	
$V_{SD}$	漏极-源极二极管正向电压	$V_{GS} = 0 V, I_{SD} = 75 A$	-	-	1.25	V
$t_{rr}$	反向恢复时间	$V_{GS} = 0 V, I_{SD} = 75 A,$ $di_F/dt = 100 A/\mu s$	-	88	-	ns
$Q_{rr}$	反向恢复电荷		-	245	-	nC

## 注意:

- 重复额定值: 脉冲宽度受限于最大结温。
- $L = 0.41 mH, I_{AS} = 75 A, V_{DD} = 50 V, R_G = 25 \Omega$ , 启动  $T_J = 25^\circ C$ 。
- $I_{SD} \leq 75 A, di/dt \leq 200 A/\mu s, V_{DD} \leq BV_{DSS}$ , 开始  $T_J = 25^\circ C$ 。
- 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

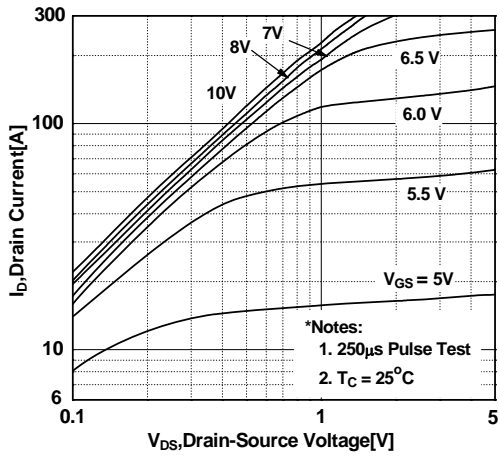


图 2. 传输特性

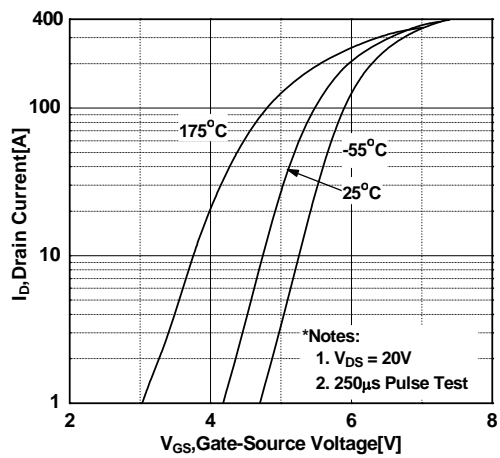


图 3. 导通电阻变化与漏极电流和栅极电压

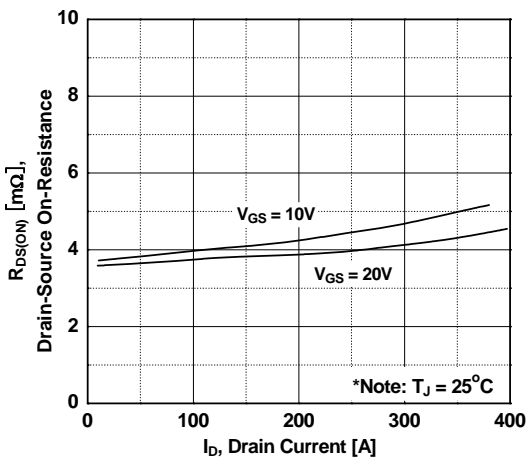


图 4. 体二极管正向电压变化与源极电流和温度

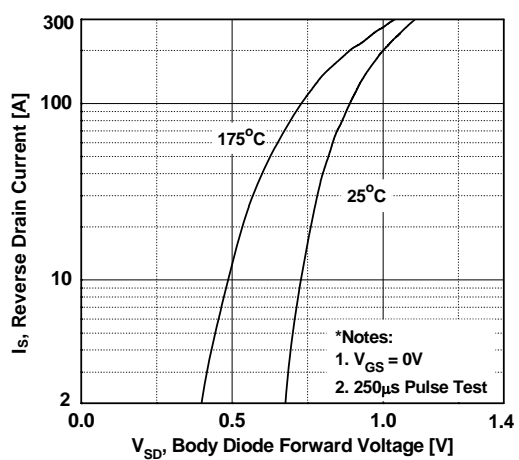


图 5. 电容特性

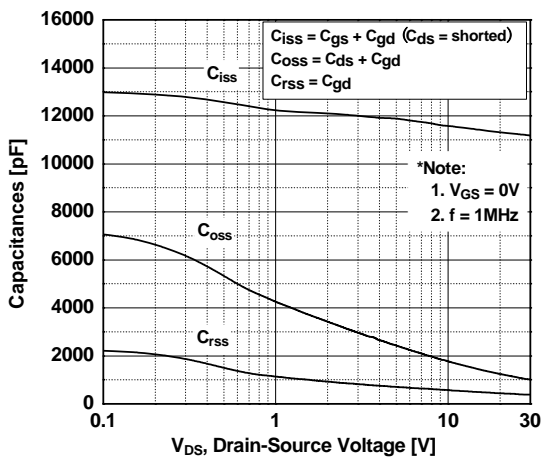
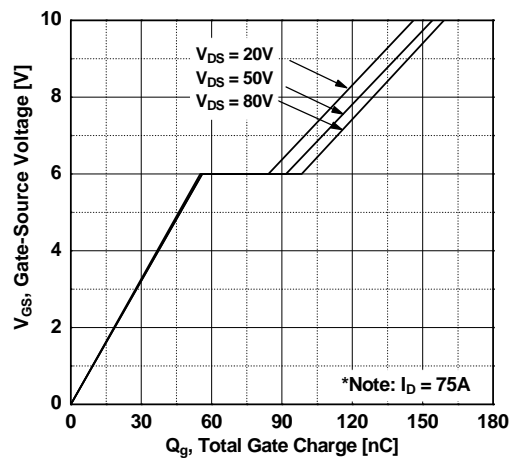


图 6. 栅极电荷特性



典型性能特征 (接上页)

图 7. 击穿电压变化与温度

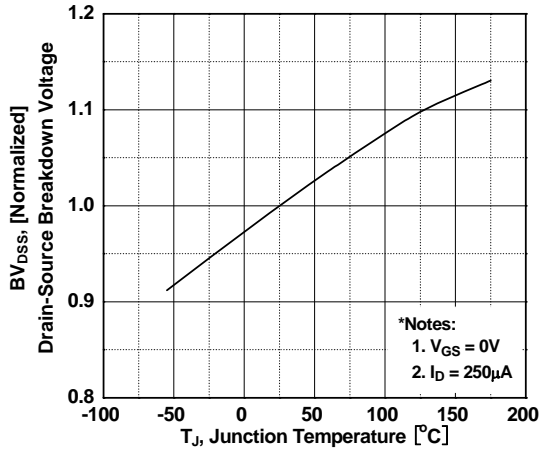


图 8. 导通电阻变化与温度

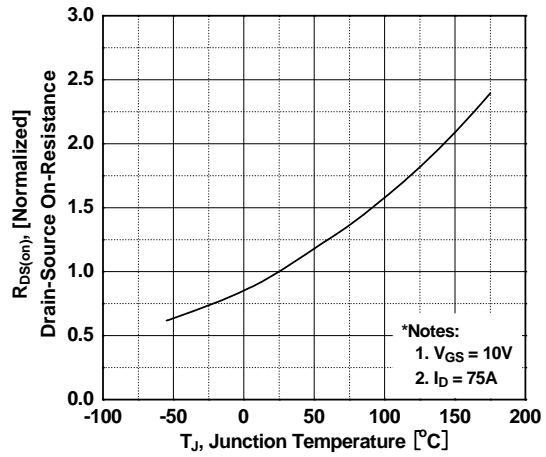


图 9. 最大安全工作区

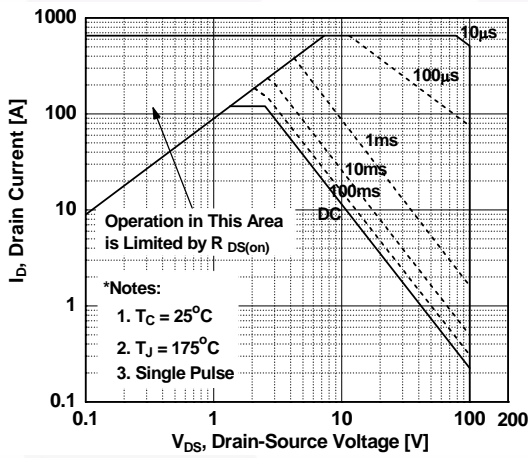


图 10. 最大漏极电流与温度外壳温度

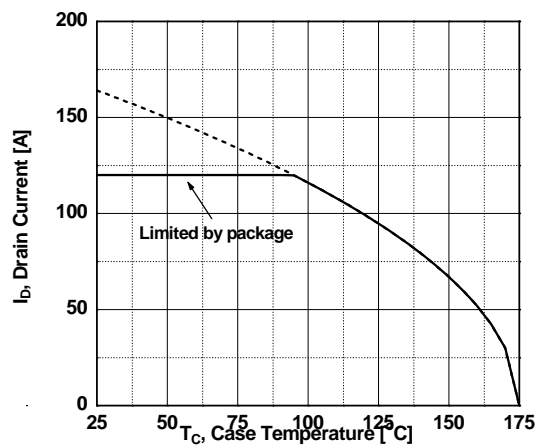
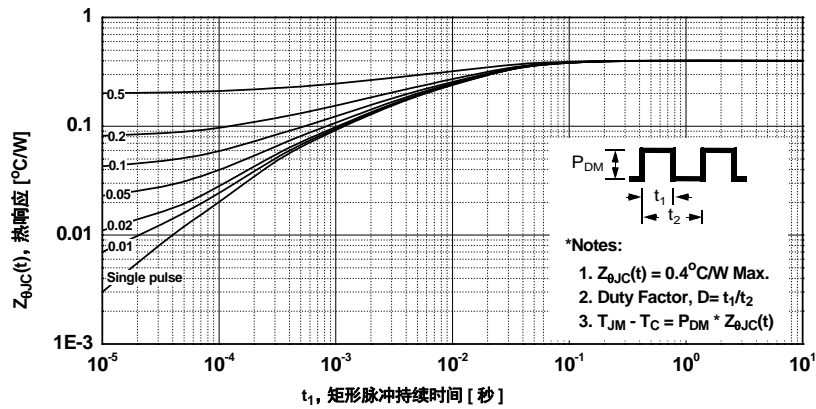


图 11. 瞬态热响应曲线



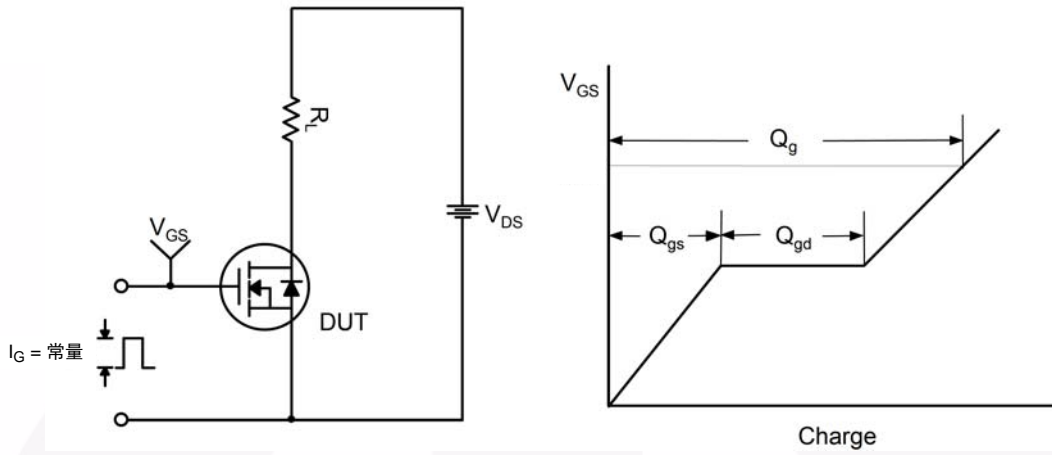


图 12. 栅极电荷测试电路与波形

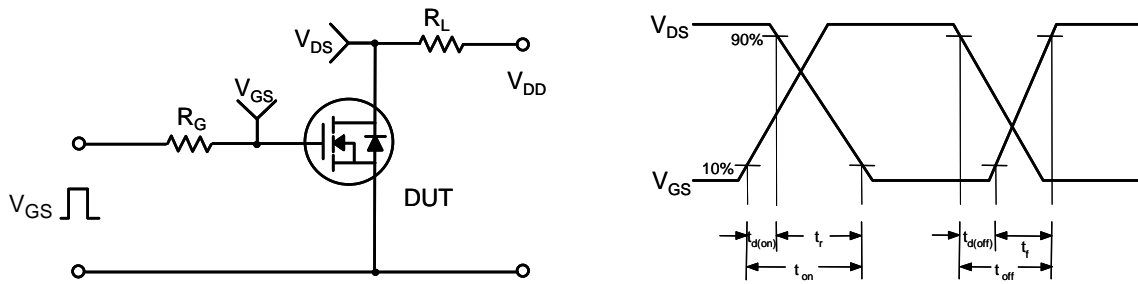


图 13. 阻性开关测试电路与波形

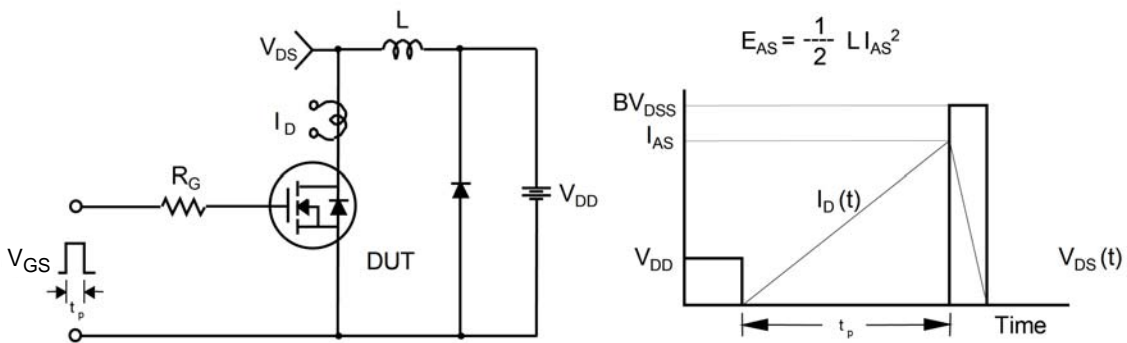


图 14. 非箝位感性开关测试电路与波形

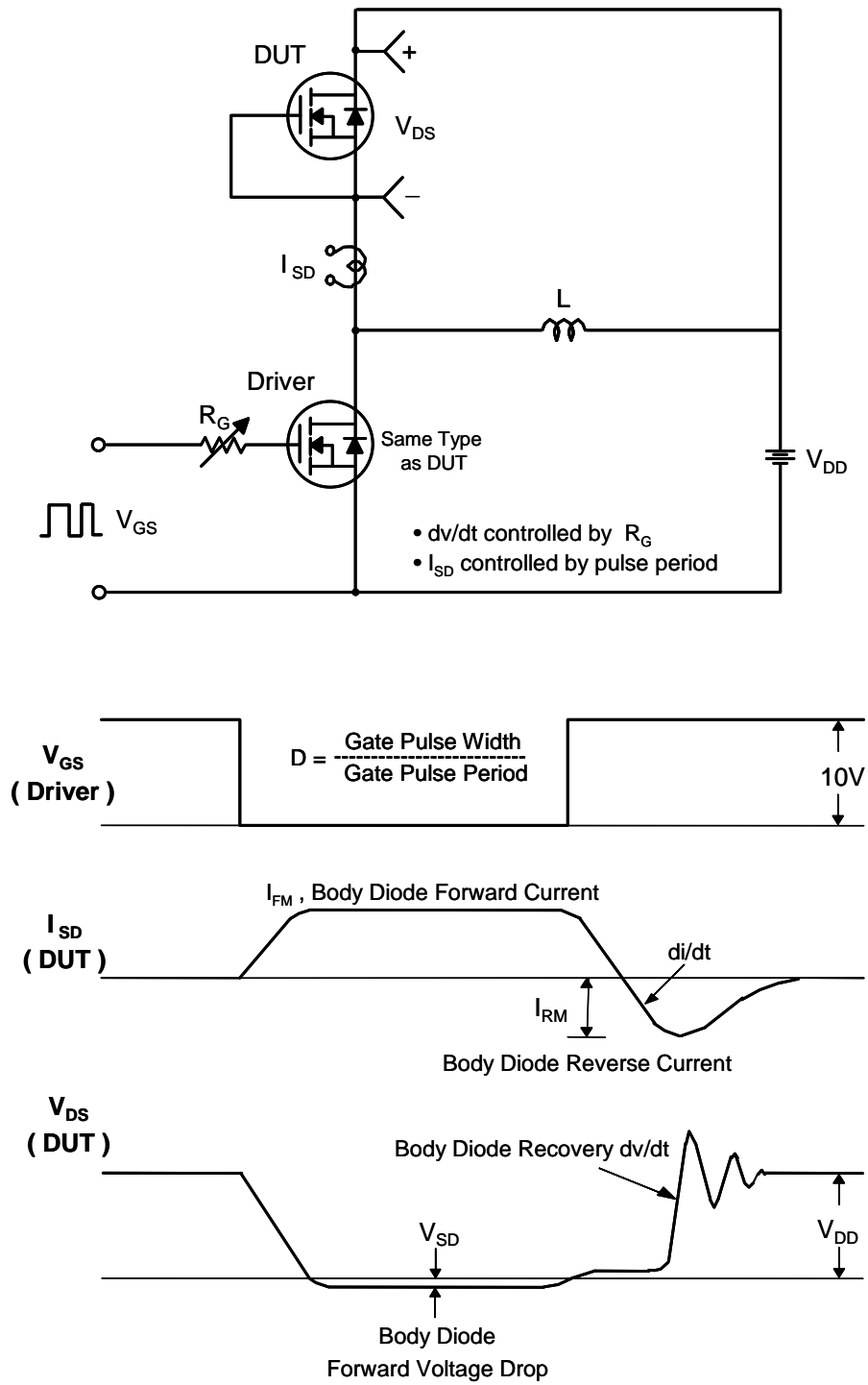


图 15. 峰值二极管恢复  $dv/dt$  测试电路与波形

机械尺寸

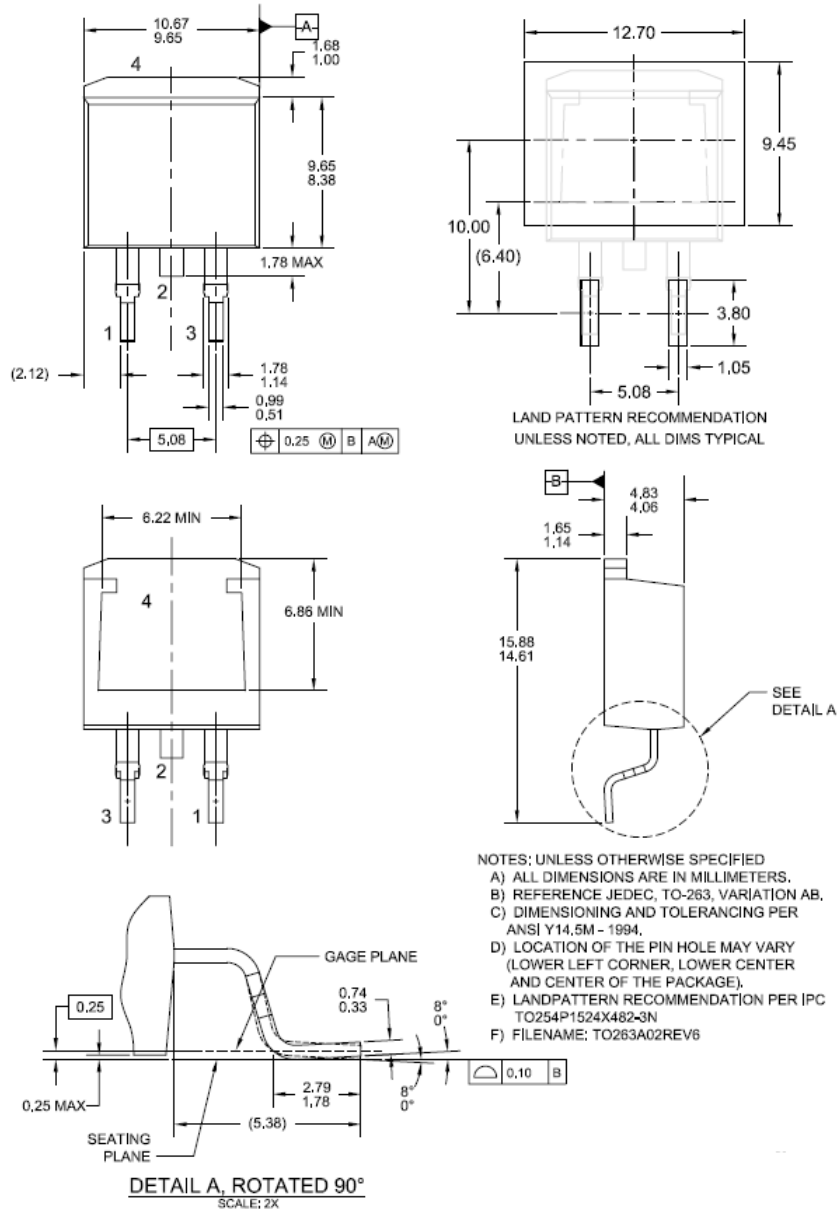


图 16. TO263 (D<sup>2</sup>PAK), 模塑, 2 引脚, 表面贴装

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