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# FDMC86570LET60

## N 沟道屏蔽栅极 PowerTrench<sup>®</sup> MOSFET

60 V, 87 A, 4.3 mΩ

### 特性

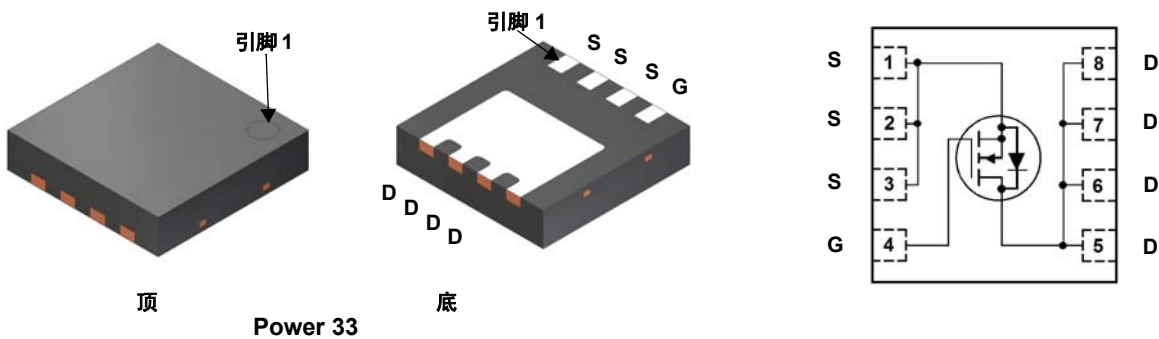
- $T_J$  额定值扩展: 175°C
- 屏蔽栅极 MOSFET 技术
- 最大  $r_{DS(on)}$  = 4.3 mΩ ( $V_{GS} = 10 V, I_D = 18 A$ )
- 最大  $r_{DS(on)}$  = 6.5 mΩ ( $V_{GS} = 4.5 V, I_D = 15 A$ )
- 高性能沟道技术可实现极低的  $r_{DS(on)}$
- 终端为无铅产品
- 符合 RoHS 标准

### 概述

此 N 沟道 MOSFET 采用飞兆带屏蔽栅极技术的先进 PowerTrench<sup>®</sup> 工艺生产。该工艺针对导通阻抗优化, 可保持卓越开关性能。

### 应用

- DC-DC 转换



### MOSFET 最大额定值 $T_A = 25^\circ C$ 除非另有说明。

符号	参数	额定值	单位
$V_{DS}$	漏极-源极电压	60	V
$V_{GS}$	栅极-源极电压	±20	V
$I_D$	漏极电流 - 连续	$T_C = 25^\circ C$ (注 5)	87
	- 连续	$T_C = 100^\circ C$ (注 5)	62
	- 连续	$T_A = 25^\circ C$ (注 1a)	18
	- 脉冲	(注 4)	436
$E_{AS}$	单脉冲雪崩能量 (注 3)	253	mJ
$P_D$	功耗	$T_C = 25^\circ C$	65
	功耗	$T_A = 25^\circ C$ (注 1a)	2.8
$T_J, T_{STG}$	工作和存储结温范围	-55 至 +175	°C

### 热性能

$R_{\theta JC}$	结至外壳热阻 (注 1)	2.3	°C/W
$R_{\theta JA}$	结至环境热阻 (注 1a)	53	

### 封装标识与订购信息

器件标识	器件	封装	卷尺寸	带宽	数量
FDMC86570LT	FDMC86570LET60	Power33	13"	12 mm	3000 个

### 电气特性 $T_J = 25^\circ\text{C}$ 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	$I_D = 250 \mu\text{A}, V_{GS} = 0 \text{ V}$	60			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	$I_D = 250 \mu\text{A}$ , 参考 $25^\circ\text{C}$		30		$\text{mV}/^\circ\text{C}$
$I_{DSS}$	零栅极电压漏极电流	$V_{DS} = 48 \text{ V}, V_{GS} = 0 \text{ V}$			1	$\mu\text{A}$
$I_{GSS}$	栅极-源极漏电流	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$			$\pm 100$	nA

#### 导通特性

$V_{GS(th)}$	栅极-源极阈值电压	$V_{GS} = V_{DS}, I_D = 250 \mu\text{A}$	1.0	1.8	3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	栅极-源极阈值电压温度系数	$I_D = 250 \mu\text{A}$ , 参考 $25^\circ\text{C}$		-7		$\text{mV}/^\circ\text{C}$
$r_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10 \text{ V}, I_D = 18 \text{ A}$ $V_{GS} = 4.5 \text{ V}, I_D = 15 \text{ A}$ $V_{GS} = 10 \text{ V}, I_D = 18 \text{ A}, T_J = 125^\circ\text{C}$		3.1 4.7 5.0	4.3 6.5 6.9	$\text{m}\Omega$
$g_{FS}$	正向跨导	$V_{DD} = 5 \text{ V}, I_D = 18 \text{ A}$		75		S

#### 动态特性

$C_{iss}$	输入电容	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		4790		pF
$C_{oss}$	输出电容			821		pF
$C_{rss}$	反向传输电容			19		pF
$R_g$	栅极阻抗		0.1	0.9	2.7	$\Omega$

#### 开关特性

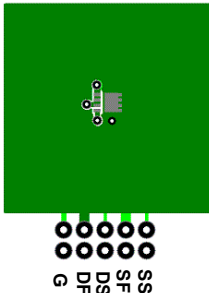
$t_{d(on)}$	导通延迟时间	$V_{DD} = 30 \text{ V}, I_D = 18 \text{ A}, V_{GS} = 10 \text{ V}, R_{GEN} = 6 \Omega$		19	34	ns
$t_r$	上升时间			6.2	12	ns
$t_{d(off)}$	关断延迟时间			38	61	ns
$t_f$	下降时间			3.9	10	ns
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0 \text{ V}$ 至 $10 \text{ V}$	$V_{DD} = 30 \text{ V}, I_D = 18 \text{ A}$	63	88	nC
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0 \text{ V}$ 至 $4.5 \text{ V}$		29	41	nC
$Q_{gs}$	栅极-源极电荷			14		nC
$Q_{gd}$	栅极-漏极“米勒”电荷			6.3		nC

#### 漏极-源极二极管特性

$V_{SD}$	源极-漏极二极管正向电压	$V_{GS} = 0 \text{ V}, I_S = 18 \text{ A}$ (注2)		0.8	1.3	V
		$V_{GS} = 0 \text{ V}, I_S = 1.9 \text{ A}$ (注2)		0.7	1.2	V
$t_{rr}$	反向恢复时间	$I_F = 18 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$		43	69	ns
$Q_{rr}$	反向恢复电荷			26	42	nC

注意:

1.  $R_{\theta JA}$  取决于安装在一平方英寸衬垫, 2oz 铜焊盘以及 FR-4 材质尺寸  $1.5 \times 1.5 \text{ in.}$  的衬垫上的器件。  $R_{\theta CA}$  由用户的电路板设计确定。



a. 53 安装在 2 oz 最小  $1 \text{ in}^2$  铜焊盘上时的  $^\circ\text{C}/\text{W}$



b. 125 安装在 2 oz 最小铜焊盘上的  $^\circ\text{C}/\text{W}$

2. 脉冲测试: 脉冲宽度:  $< 300 \mu\text{s}$ , 占空比:  $< 2.0\%$ 。

3.  $E_{AS}$  为  $253 \text{ mJ}$ , 依据起始  $T_J = 25^\circ\text{C}$ ,  $L = 3 \text{ mH}$ ,  $I_{AS} = 13 \text{ A}$ ,  $V_{DD} = 60 \text{ V}$ ,  $V_{GS} = 10 \text{ V}$ 。100% 经过测试 ( $L = 0.1 \text{ mH}$ ,  $I_{AS} = 43 \text{ A}$ )。

4. 有关脉冲编号的更多详情, 请参考图 11 中的 SOA 图形。

5. 计算得到的连续电流仅限于最大结温, 实际连续电流将受限于散热以及电气机械应用的电路板设计。

典型特性  $T_J = 25^\circ\text{C}$  除非另有说明

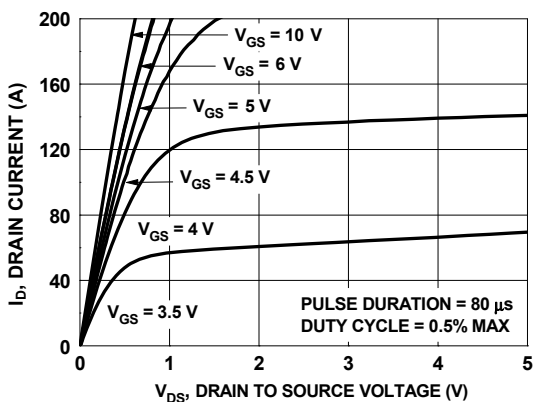


图 1. 通态区域特性

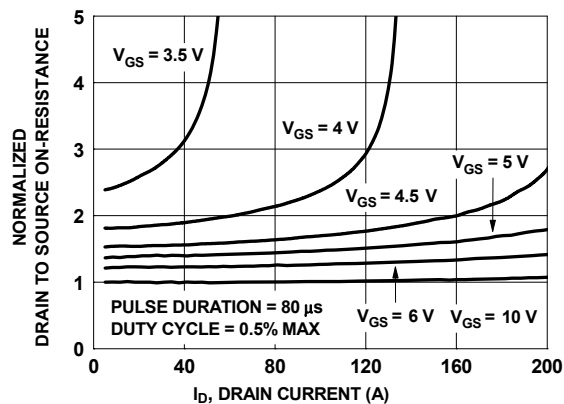


图 2. 标准化导通电阻与漏极电流和栅极电压的关系

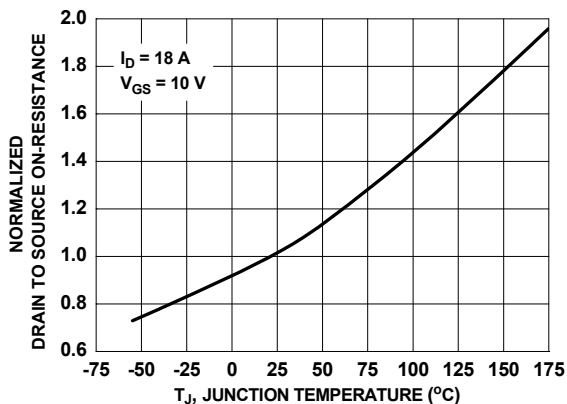


图 3. 标准化导通电阻与结温的关系

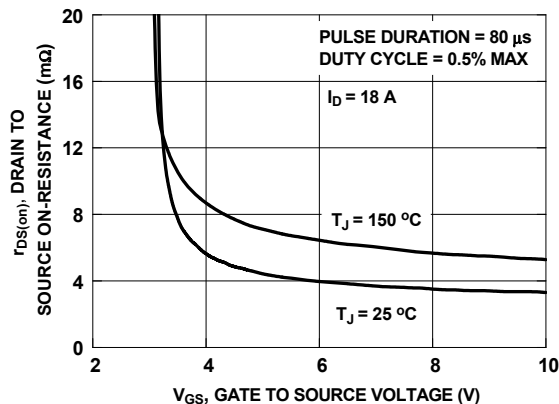


图 4. 导通电阻与栅极 - 源极电压的关系

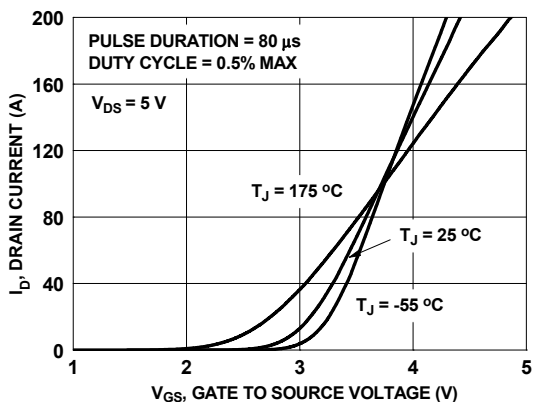


图 5. 转换特性

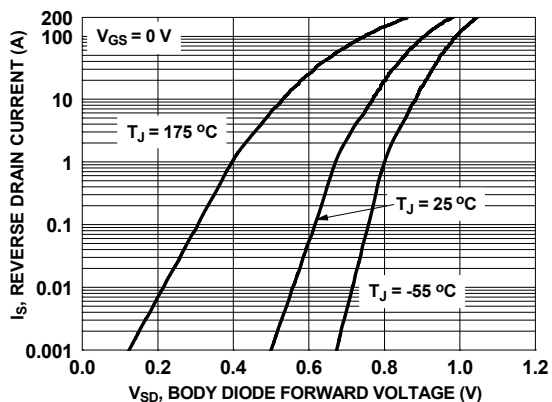


图 6. 源极 - 漏极二极管正向电压与源电流的关系

典型特性  $T_J = 25^\circ\text{C}$  除非另有说明

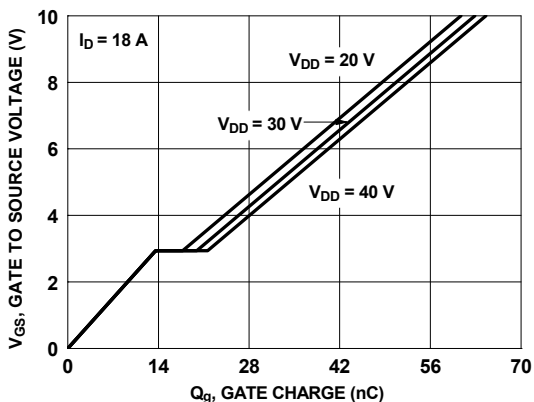


图 7. 栅极电荷特性

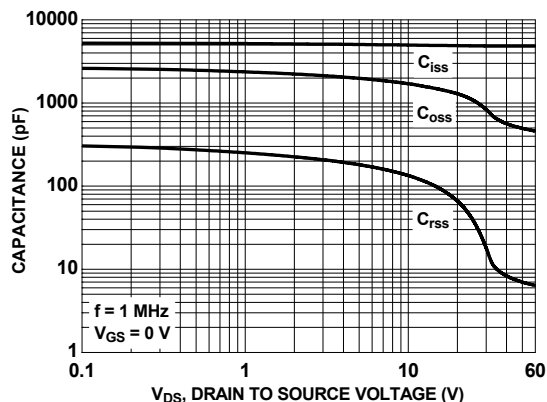


图 8. 电容与漏极 - 源极电压的关系

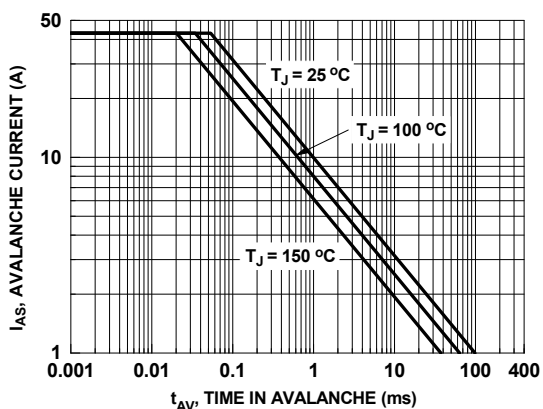


图 9. 非箝位电感开关能力

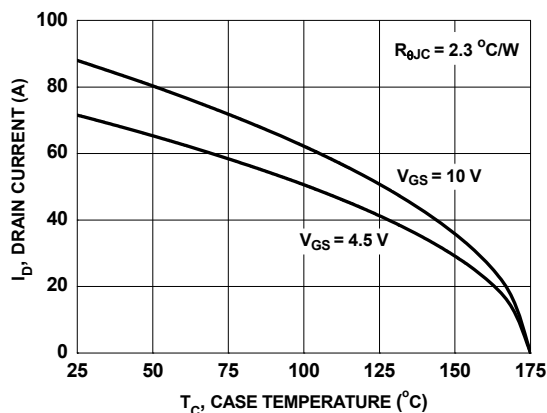


图 10. 最大连续漏极电流与壳温的关系

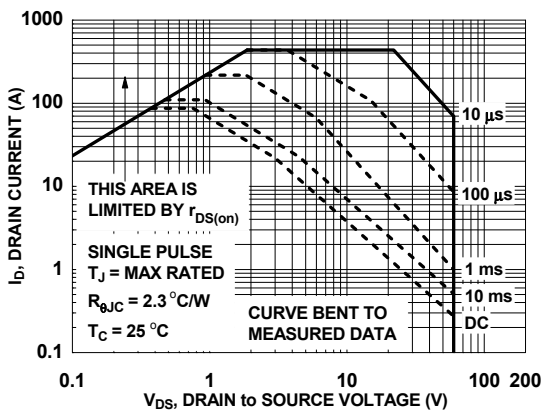


图 11. 正向偏压安全工作区

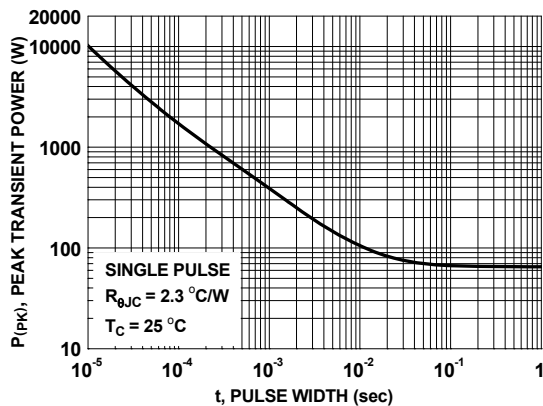


图 12. 单个脉冲最大功耗

典型特性  $T_J = 25^\circ\text{C}$  除非另有说明

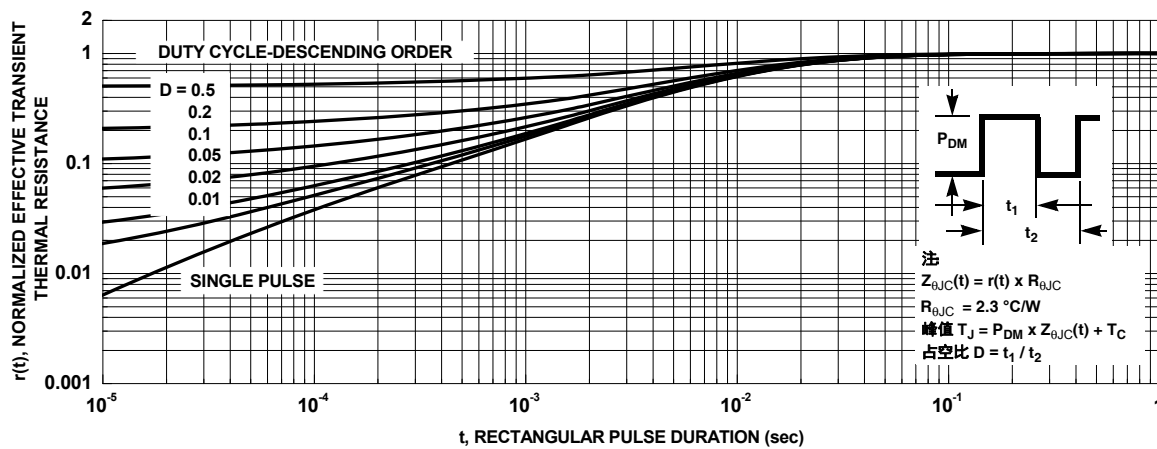
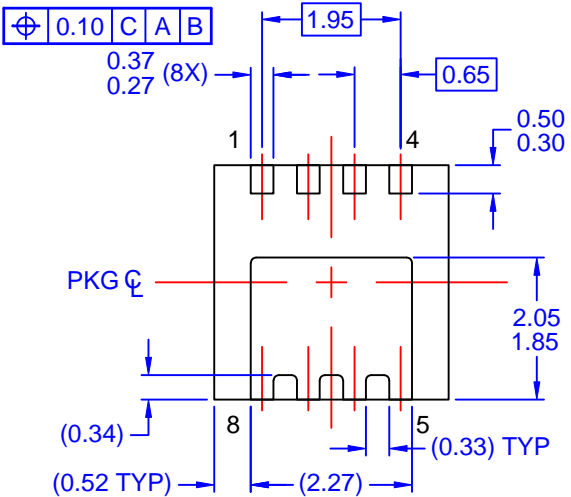
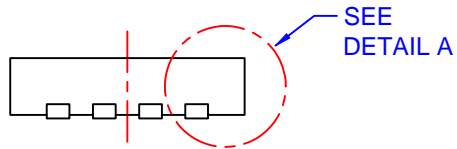
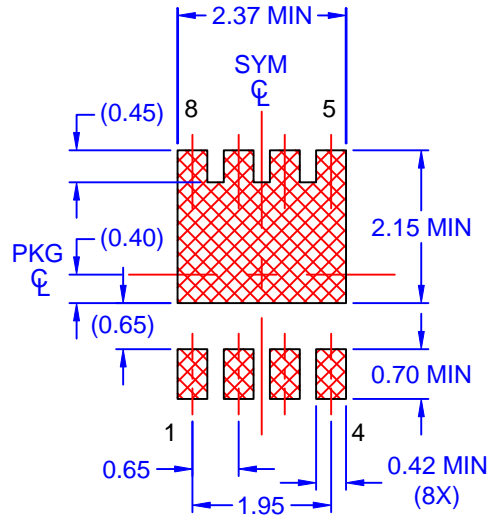
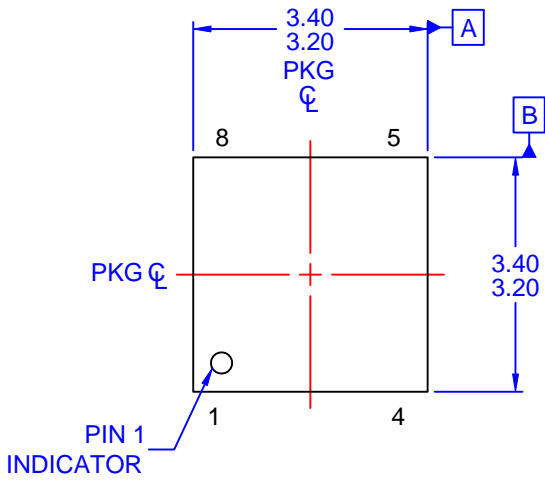
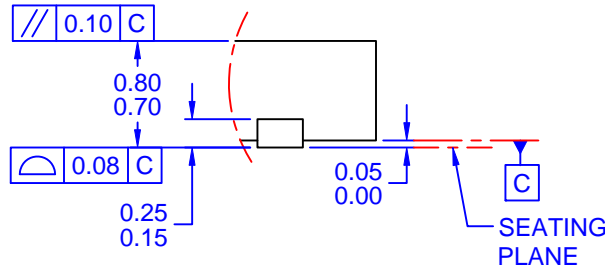


图 13. 结至外壳瞬态热响应曲线



NOTES: UNLESS OTHERWISE SPECIFIED

- A) PACKAGE STANDARD REFERENCE: JEDEC MO-240, ISSUE A, VAR. BA, DATED OCTOBER 2002.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- E) DRAWING FILE NAME: PQFN08HREV1



**DETAIL A**  
SCALE: 2X

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