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2015 年 3 月

# FDMS86550ET60

N 沟道 PowerTrench® MOSFET  
60 V, 245 A, 1.65 mΩ

## 特性

- 扩展额定  $T_J$  至 175°C
- 最大  $r_{DS(on)} = 1.65\text{ m}\Omega$  ( $V_{GS} = 10\text{ V}$ ,  $I_D = 32\text{ A}$ )
- 最大  $r_{DS(on)} = 2.2\text{ m}\Omega$  ( $V_{GS} = 8\text{ V}$ ,  $I_D = 27\text{ A}$ )
- $r_{DS(on)}$  和高效的先进硅封装
- MSL1 耐用封装设计
- 100% 经过 UIL 测试
- 符合 RoHS 标准

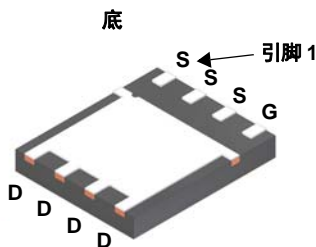
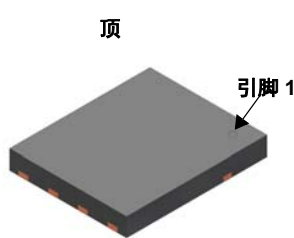


## 概述

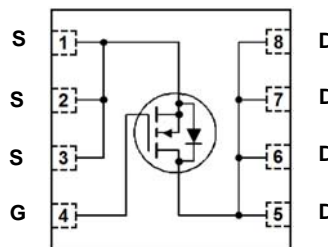
此 N 沟道 MOSFET 采用 Fairchild 先进的 Power Trench® 工艺生产，这一先进工艺是专为最大限度地降低导通电阻并保持卓越开关性能而定制的。

## 应用

- 初级端 DC-DC MOSFET
- 次级端同步整流器
- 负载开关



Power 56



## MOSFET 最大额定值 $T_A = 25\text{ }^\circ\text{C}$ 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	$\pm 20$	V
$I_D$	漏极电流 - 连续 $T_C = 25\text{ }^\circ\text{C}$ (注 5)	245	A
	- 连续 $T_C = 100\text{ }^\circ\text{C}$ (注 5)	173	
	- 连续 $T_A = 25\text{ }^\circ\text{C}$ (注 1a)	32	
	- 脉冲 (注 4)	1068	
$E_{AS}$	单脉冲雪崩能量 (注 3)	937	mJ
$P_D$	功耗 $T_C = 25\text{ }^\circ\text{C}$	187	W
	功耗 $T_A = 25\text{ }^\circ\text{C}$ (注 1a)	3.3	
$T_J, T_{STG}$	工作和存储结温范围	-55 至 +175	$^\circ\text{C}$

## 热性能

$R_{\theta JC}$	结-壳体的热阻	0.8	$^\circ\text{C/W}$
$R_{\theta JA}$	结至环境热阻最大值 (注 1a)	45	

## 封装标识与订购信息

器件标识	器件	封装	卷尺寸	带宽	数量
FDMS86550ET	FDMS86550ET60	Power 56	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	$I_D = 250\ \mu\text{A}$ (相对 $25^\circ\text{C}$ )		31		mV/ $^\circ\text{C}$
$I_{BSS}$	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	$V_{GS} = V_{DS}$ , $I_D = 250\ \mu\text{A}$	2.5	3.3	4.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	栅极-源极阈值电压温度系数	$I_D = 250\ \mu\text{A}$ (相对 $25^\circ\text{C}$ )		-12		mV/ $^\circ\text{C}$
$r_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\ \text{V}$ , $I_D = 32\ \text{A}$		1.4	1.65	m $\Omega$
		$V_{GS} = 8\ \text{V}$ , $I_D = 27\ \text{A}$		1.7	2.2	
		$V_{GS} = 10\ \text{V}$ , $I_D = 32\ \text{A}$ , $T_J = 125^\circ\text{C}$		2.2	2.6	
$g_{FS}$	正向跨导	$V_{DS} = 5\ \text{V}$ , $I_D = 32\ \text{A}$		96		S

**动态特性**

$C_{iss}$	输入电容	$V_{DS} = 30\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $f = 1\ \text{MHz}$		8235		pF
$C_{oss}$	输出电容			2140		pF
$C_{rss}$	反向传输电容			70		pF
$R_g$	栅极阻抗		0.1	0.9	2.7	$\Omega$

**开关特性**

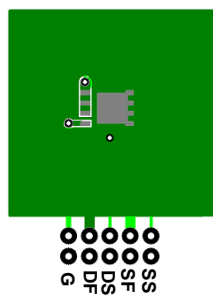
$t_{d(on)}$	导通延迟时间	$V_{DD} = 30\ \text{V}$ , $I_D = 32\ \text{A}$ , $V_{GS} = 10\ \text{V}$ , $R_{GEN} = 6\ \Omega$		43	69	ns
$t_r$	上升时间			27	43	ns
$t_{d(off)}$	关断延迟时间			42	67	ns
$t_f$	下降时间			11	20	ns
$Q_g$	总栅极电荷	$V_{GS} = 0\ \text{V}$ 到 $10\ \text{V}$	$V_{DD} = 30\ \text{V}$ , $I_D = 32\ \text{A}$	110	154	nC
$Q_g$	总栅极电荷	$V_{GS} = 0\ \text{V}$ 到 $8\ \text{V}$		90	126	nC
$Q_{gs}$	栅极-源极电荷			40		nC
$Q_{gd}$	栅极-漏极“米勒”电荷			20		nC

**漏极 - 源极二极管特性**

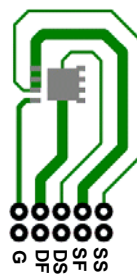
$V_{SD}$	源极 - 漏极二极管正向电压	$V_{GS} = 0\ \text{V}$ , $I_S = 2.1\ \text{A}$ (注 2)		0.7	1.2	V
		$V_{GS} = 0\ \text{V}$ , $I_S = 32\ \text{A}$ (注 2)		0.8	1.3	
$t_{rr}$	反向恢复时间	$I_F = 32\ \text{A}$ , $di/dt = 100\ \text{A}/\mu\text{s}$		68	109	ns
$Q_{rr}$	反向恢复电荷			62	99	nC

**注意:**

1.  $R_{\theta JA}$  取决于安装在 FR-4 材质 1.5 x 1.5 英寸电路板上 1 英寸<sup>2</sup> 2 盎司铜焊盘上的器件。 $R_{\theta CA}$  取决于使用者的电路板设计。



a.  $45^\circ\text{C}/\text{W}$  (安装于 1 英寸<sup>2</sup> 的 2 盎司铜焊盘。



b.  $115^\circ\text{C}/\text{W}$  (安装于最小尺寸的 2 盎司铜焊盘。

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

3. 937 mJ 的  $E_{AS}$  取决于起始  $T_J = 25^\circ\text{C}$ ,  $L = 3\ \text{mH}$ ,  $I_{AS} = 25\ \text{A}$ ,  $V_{DD} = 60\ \text{V}$ ,  $V_{GS} = 10\ \text{V}$ 。测试百分比 100%:  $L = 0.1\ \text{mH}$ ,  $I_{AS} = 79\ \text{A}$ 。

4. 脉冲  $I_d$  详情请参见图 11 SOA 曲线。

5. 直流理论值仅受限于最大结温, 直流实际值则同时受限于热和机电电路板的设计。

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

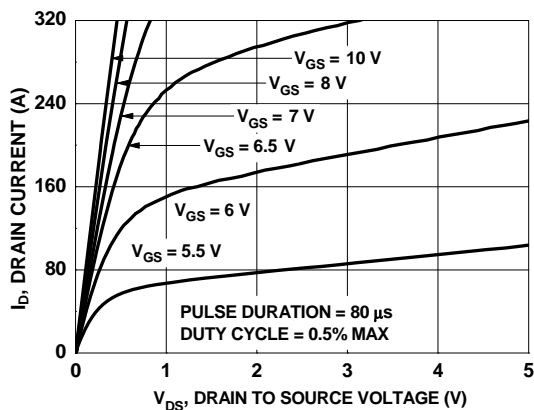


图 1. 导通区域特性

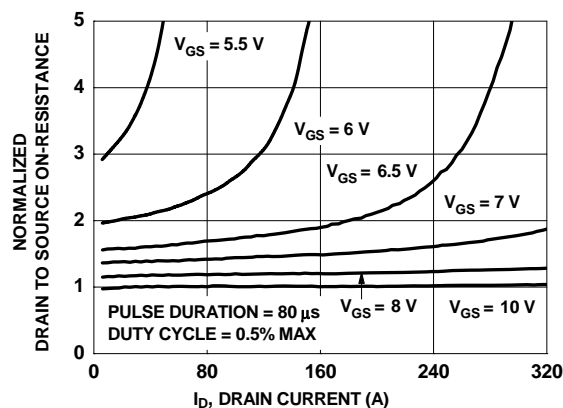


图 2. 标准化导通电阻 vs 漏极电流和栅极电压

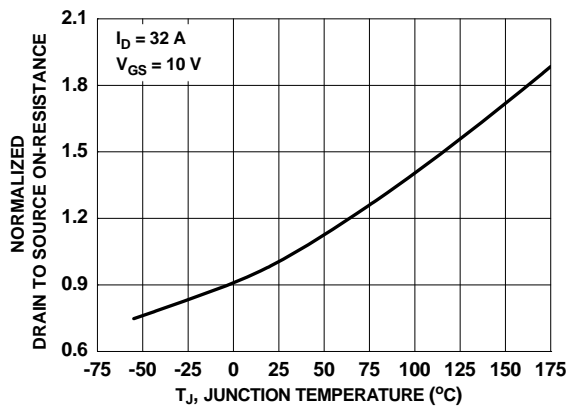


图 3. 标准化导通电阻 vs 结温

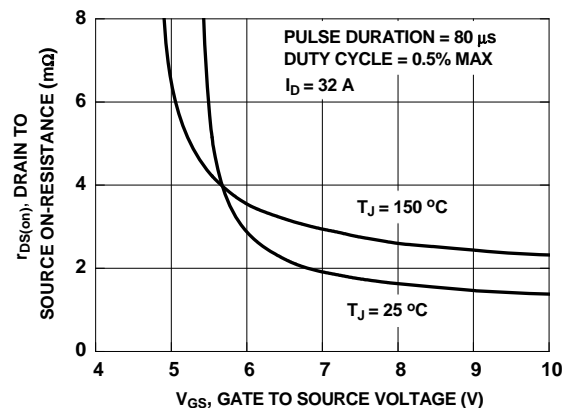


图 4. 导通电阻 vs 栅极-源极电压

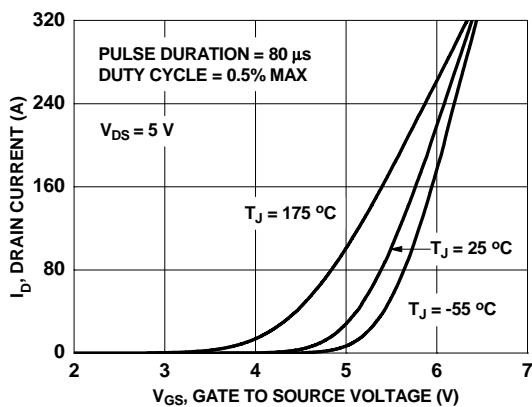


图 5. 转换特性

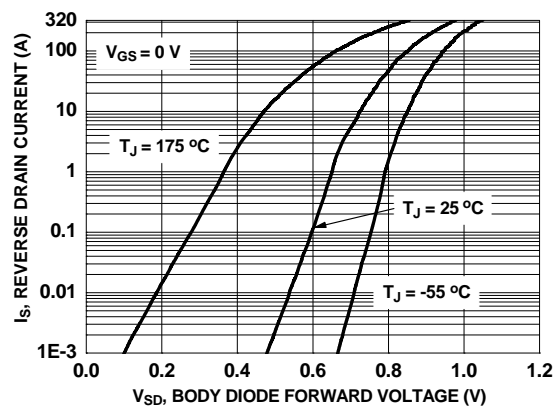


图 6. 源极-漏极二极管正向电压 vs 源极电流

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

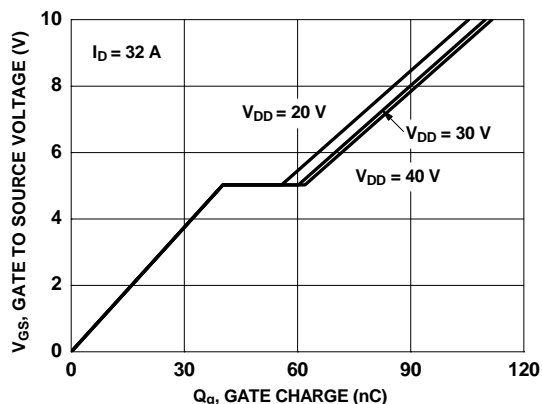


图 7. 栅极电荷特性

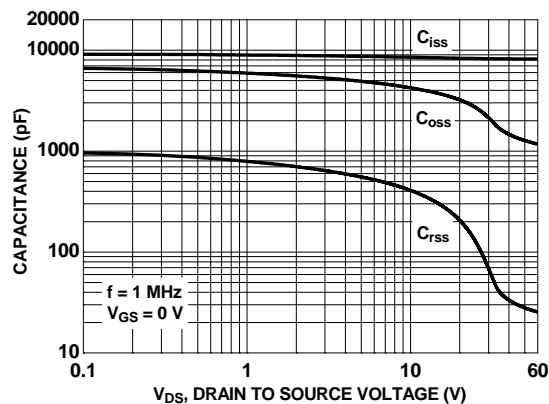


图 8. 电容 vs 漏极-源极电压

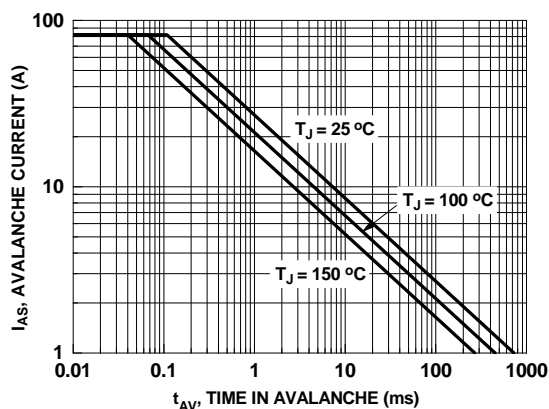


图 9. 非钳位感应开关能力

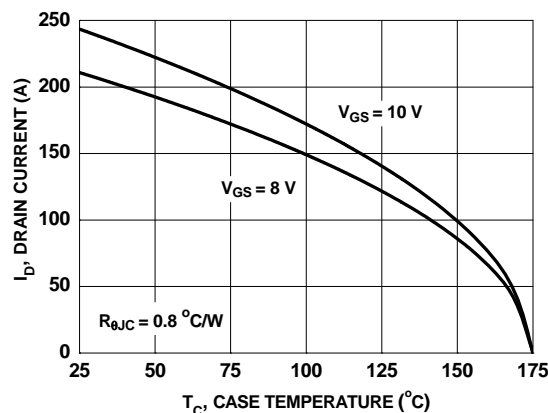


图 10. 最大连续漏极电流 vs 壳体温度

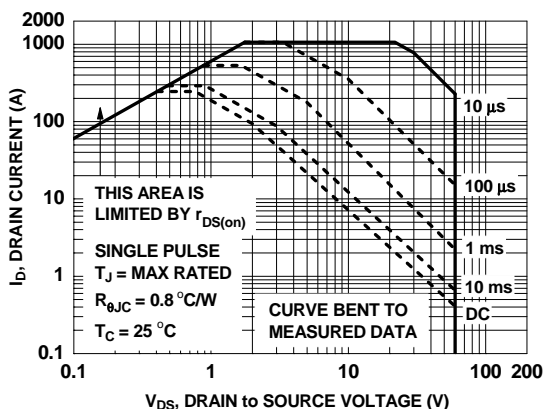


图 11. 正向偏置安全工作区

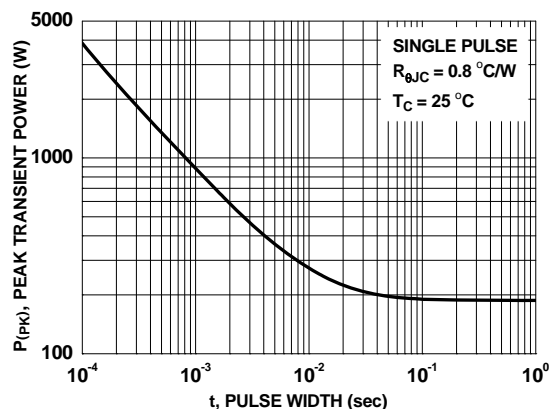


图 12. 单脉冲最大功耗

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

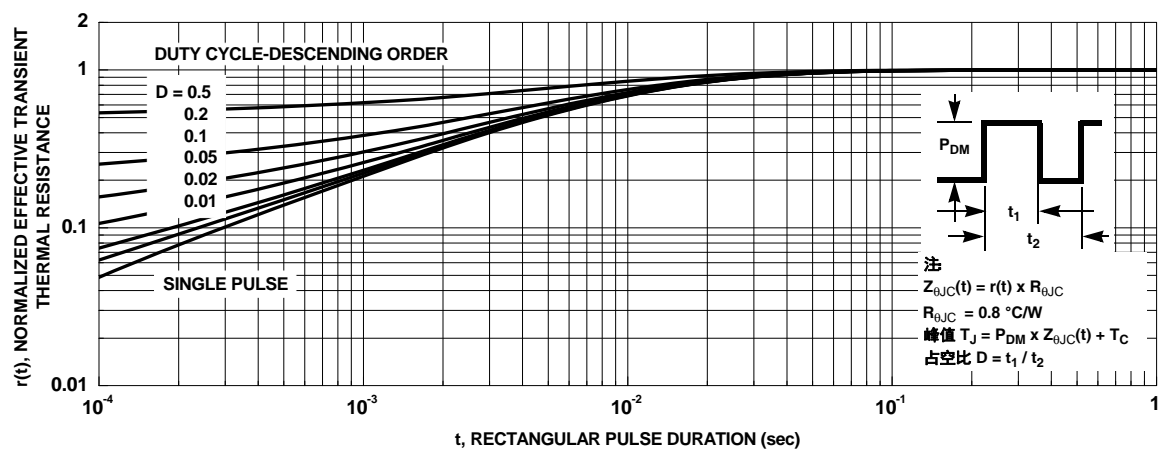


图 13. 瞬态热响应曲线



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