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2015 年 1 月

FDMC86340ET80

N 沟道屏蔽栅极 Power[®] MOSFET

80 V, 68 A, 6.5 mΩ

特性

- 扩展额定 T_J 至 175 °C
- 屏蔽栅极 MOSFET 技术
- 最大值 $r_{DS(on)} = 6.5 \text{ m}\Omega$, 在 $V_{GS} = 10 \text{ V}$ 、 $I_D = 14 \text{ A}$ 时
- 最大值 $r_{DS(on)} = 8.5 \text{ m}\Omega$, 在 $V_{GS} = 8 \text{ V}$ 、 $I_D = 12 \text{ A}$ 时
- 高性能技术可实现极低的 $r_{DS(on)}$
- 终端为无铅产品
- 符合 RoHS 标准

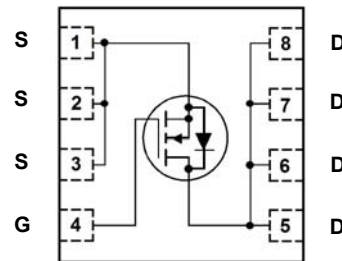
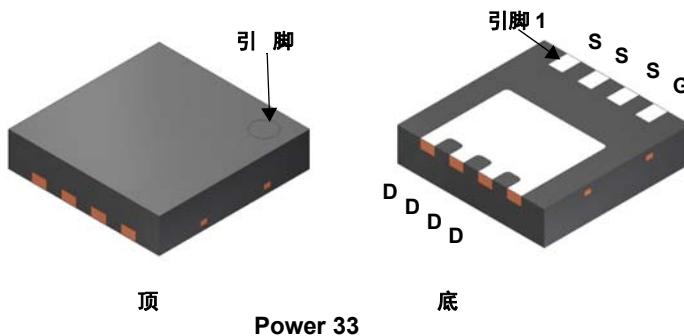


概述

N 通道 MOSFET 采用了飞兆的先进 PowerTrench[®] 工艺制造而成, 该工艺集成了栅极屏蔽技术。该工艺经优化以减小导通电阻, 却仍保持卓越的开关性能。

应用

- DC-DC 转换



MOSFET 最大额定, $T_A = 25 \text{ °C}$ 除非另有说明

符号	参数	额定值	单位
V_{DS}	漏极-源极电压	80	V
V_{GS}	栅极-源极电压	± 20	V
I_D	漏极电流 - 连续 $T_C = 25 \text{ °C}$ (注 5)	68	A
	- 连续 $T_C = 100 \text{ °C}$ (注 5)	48	
	- 连续 $T_A = 25 \text{ °C}$ (注 1a)	14	
	- 脉冲 (注 4)	316	
E_{AS}	单脉冲雪崩能量 (注 3)	216	mJ
P_D	功率耗散 $T_C = 25 \text{ °C}$	65	W
	功率耗散 $T_A = 25 \text{ °C}$ (注 1a)	2.8	
T_J, T_{STG}	工作和存储结温范围	-55 至 +175	°C

热性能

$R_{\theta JC}$	结至外壳的热阻 (注 1)	2.3	°C/W
$R_{\theta JA}$	结至环境的热阻 (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
FDMC86340ET	FDMC86340ET80	Power33	13 "	12 mm	3000 个

电气特性都是在, $T_J = 25^\circ\text{C}$ 下测定除非另有说明

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	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0\ \text{V}$	80			V
$\frac{DBV_{DSS}}{DT_J}$	击穿电压温度系数	$I_D = 250\ \mu\text{A}$, 参考温度为 25°C		46		mV/ $^\circ\text{C}$
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 64\ \text{V}$, $V_{GS} = 0\ \text{V}$			1	μA
I_{GSS}	栅极-源极漏电流	$V_{GS} = \pm 20\ \text{V}$, $V_{DS} = 0\ \text{V}$			± 100	nA

导通特性

$V_{GS(th)}$	栅极至源极的阈值电压	$V_{GS} = V_{DS}$, $I_D = 250\ \mu\text{A}$	2.0	3.4	4.0	V
$\frac{DV_{GS(th)}}{DT_J}$	栅极至源极的阈值电压温度系数	$I_D = 250\ \mu\text{A}$, 参考温度为 25°C		-10		mV/ $^\circ\text{C}$
$r_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\ \text{V}$, $I_D = 14\ \text{A}$		5.0	6.5	m Ω
		$V_{GS} = 8\ \text{V}$, $I_D = 12\ \text{A}$		6.0	8.5	
		$V_{GS} = 10\ \text{V}$, $I_D = 14\ \text{A}$, $T_J = 125^\circ\text{C}$		8.5	11	
g_{FS}	正向跨导	$V_{DD} = 10\ \text{V}$, $I_D = 14\ \text{A}$		36		S

动态特性

C_{iss}	输入电容	$V_{DS} = 40\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$		2775		pF
C_{oss}	输出电容			468		pF
C_{rss}	反向传输电容			15		pF
R_g	栅极阻抗		0.1	0.7	2.1	Ω

开关特性

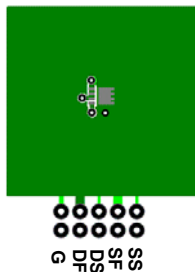
$t_{d(on)}$	导通延迟时间	$V_{DD} = 40\text{ V},\ I_D = 14\text{ A},$ $V_{GS} = 10\text{ V},\ R_{GEN} = 6\ \Omega$		20	32	ns	
t_r	上升时间			7.9	16	ns	
$t_{d(off)}$	关断延迟时间			23	37	ns	
t_f	下降时间			5.1	10	ns	
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0\text{ V 至 }10\text{ V}$	$V_{DD} = 40\text{ V},$ $I_D = 14\text{ A}$	30	38	49	nC
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0\text{ V 至 }8\text{ V}$		20	31	44	nC
Q_{gs}	栅极至源极电荷				14		nC
Q_{gd}	栅极至漏极“米勒”电荷				8.0		nC
Q_{oss}	输出电荷	$V_{DD} = 40\text{ V},\ V_{GS} = 0\text{ V}$		42			nC

漏极-源极二极管特性

V_{SD}	源极-漏极二极管正向电压	$V_{GS} = 0\ \text{V}$, $I_S = 14\ \text{A}$ (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	$I_F = 14\ \text{A}$, $di/dt = 100\ \text{A/ms}$		41	66	ns
Q_{rr}	反向恢复电荷			25	40	nC

注意:

1. $R_{\theta JA}$ 取决于安装在 FR-4 材质 1.5 x 1.5 in. 电路板上 1 in² 2 盎司铜焊盘上的器件。 $R_{\theta CA}$ 取决于用户的板设计。



a. 53 $^\circ\text{C/W}$ 安装在 1 in² 2 oz 铜焊盘



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

2. 脉冲测试: 脉冲宽度 < 300 μs , 占空比 < 2.0 %。

3. E_{AS} 为 216 mJ, 这是基于初始 $T_J = 25^\circ\text{C}$, $L = 3\ \text{mH}$, $I_{AS} = 12\ \text{A}$, $V_{DD} = 80\ \text{V}$, $V_{GS} = 10\ \text{V}$ 。在 $L = 0.1\ \text{mH}$, $I_{AS} = 37\ \text{A}$ 时, 进行 100 % 的测试。

4. 关于脉冲 I_d 的更多细节, 请参见图 11 的 SOA 图。

5. 计算的连续电流仅被限制为最大结温, 而实际的连续电流将会受到热和机电应用板设计的限制。

参考温度为, $T_J = 25^\circ\text{C}$ 除非另有说明

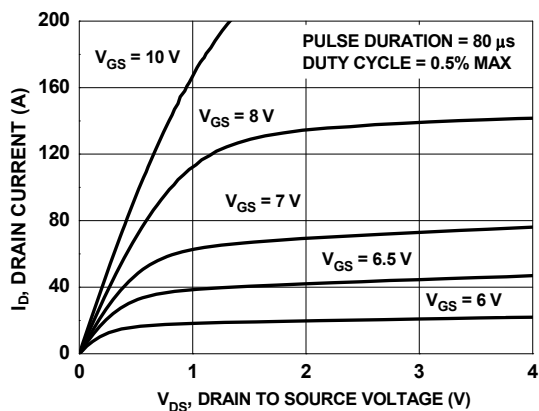


图 1. 导通区域特征

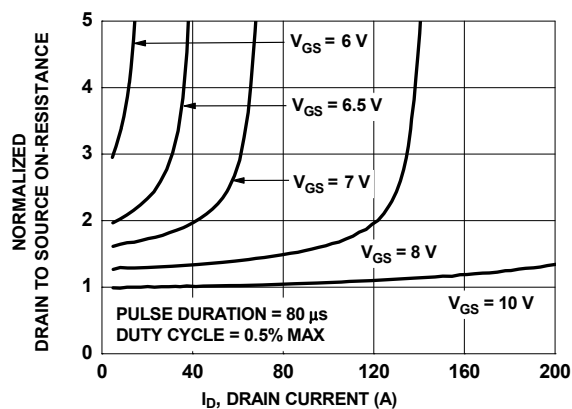


图 2. 归一化的导通电阻与漏极电流和栅极电压

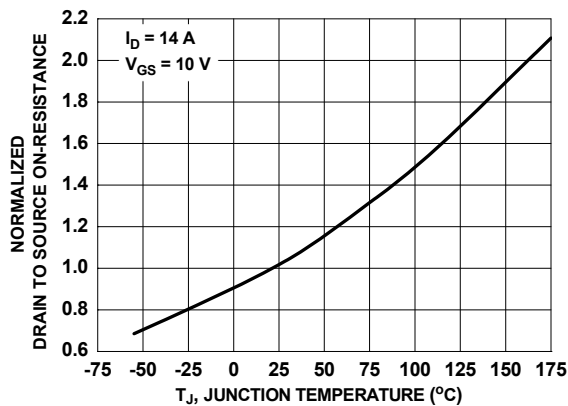


图 3. 归一化的导通电阻与结温

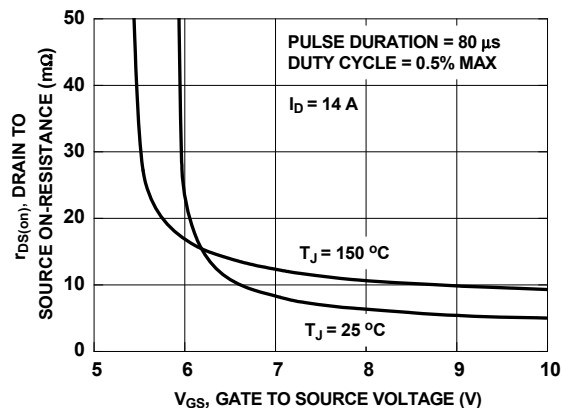


图 4. 导通电阻与栅极至源极电压

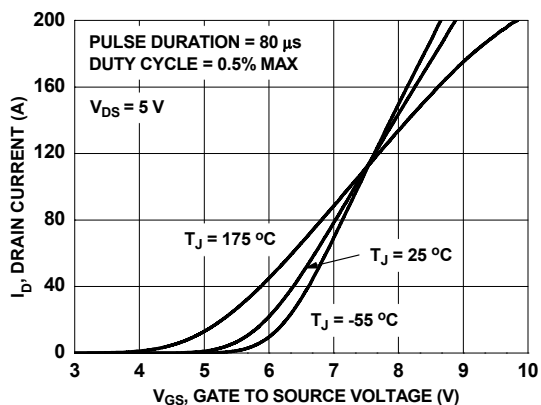


图 5. 转换特性

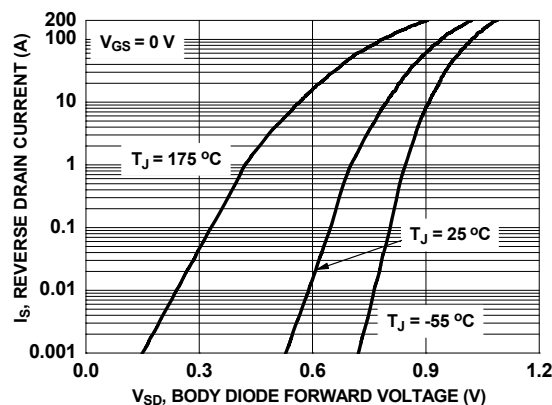


图 6. 源极至漏极二极管的正向电压与源极电流

参考温度为, $T_J = 25^\circ\text{C}$ 除非另有说明

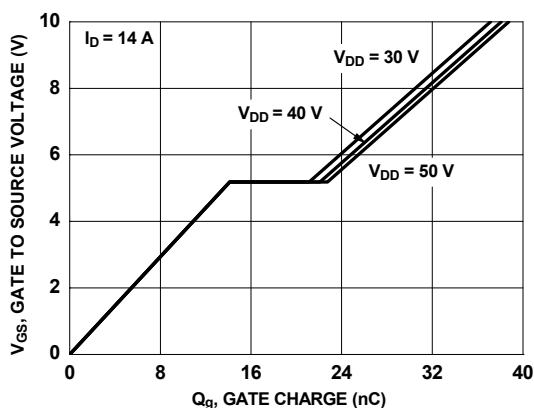


图 7. 栅极电荷特性

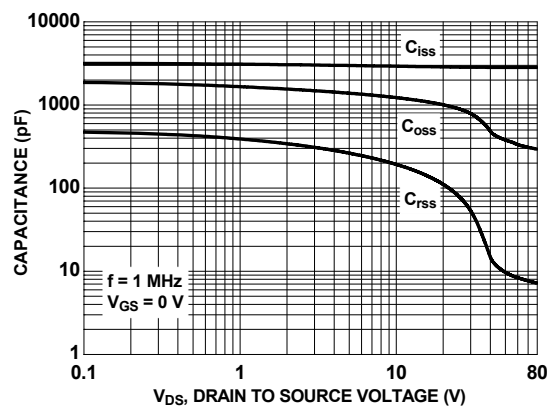


图 8. 电容与漏极至源极电压

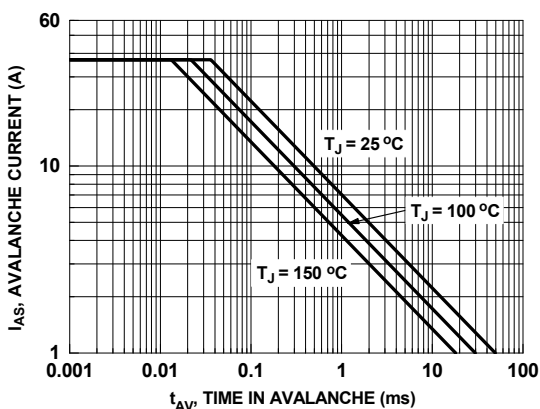


图 9. 非钳位感应开关能力

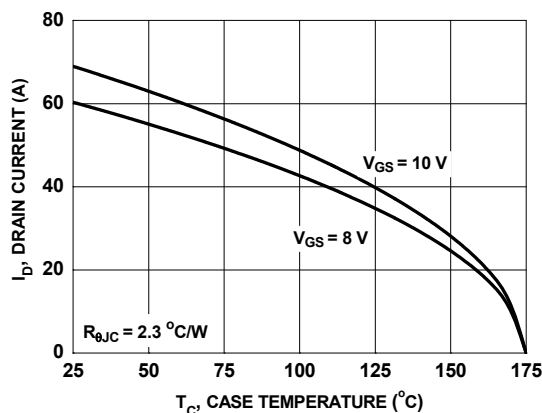


图 10. 最大连续漏极电流与外壳温度

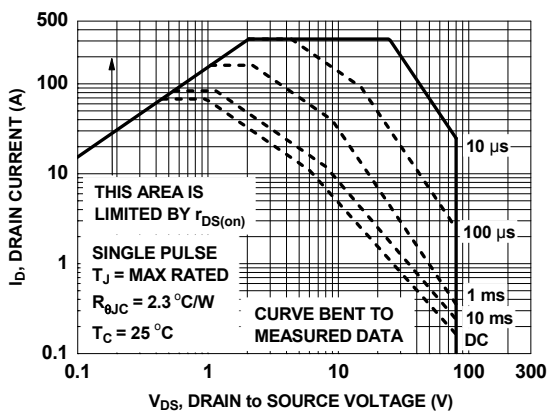


图 11. 正向偏置安全工作区

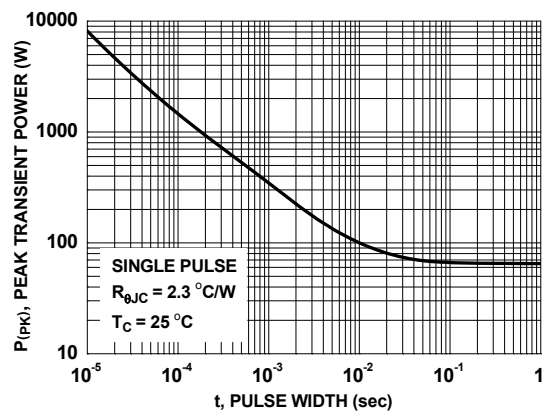


图 12. 单脉冲最大功率耗散

参考温度为, $T_J = 25\text{ }^{\circ}\text{C}$ 除非另有说明

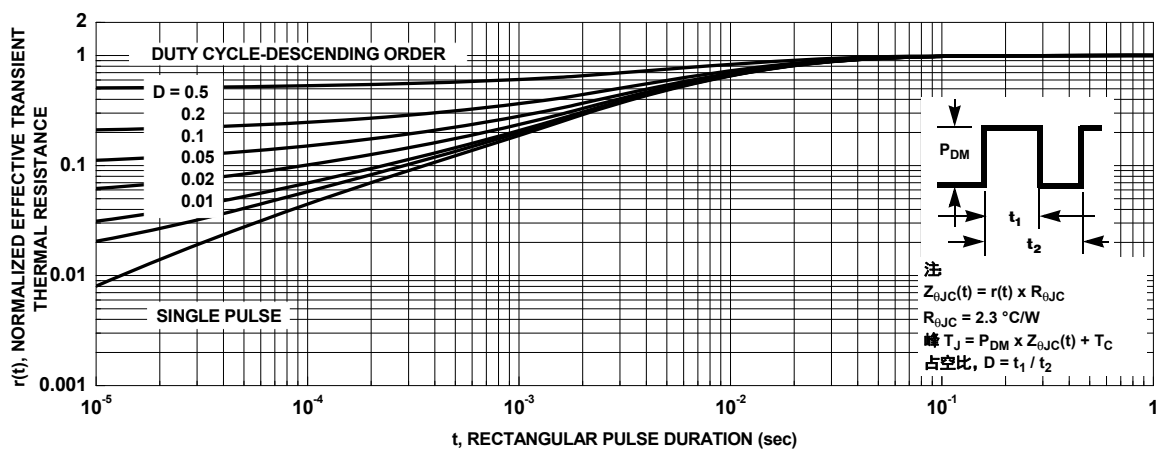
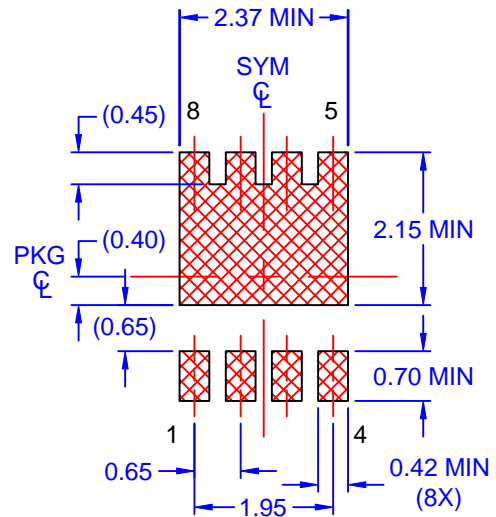
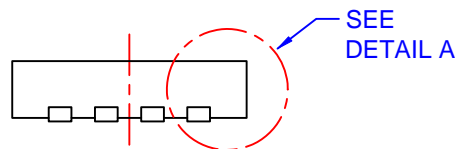
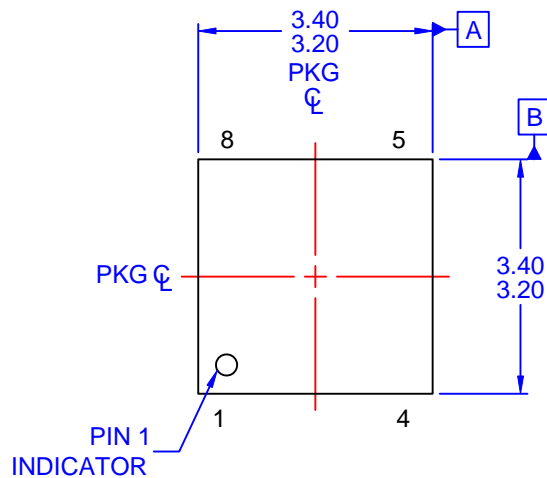
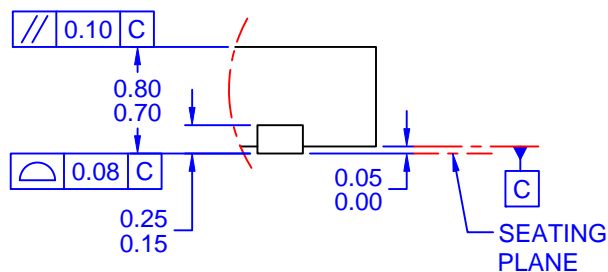
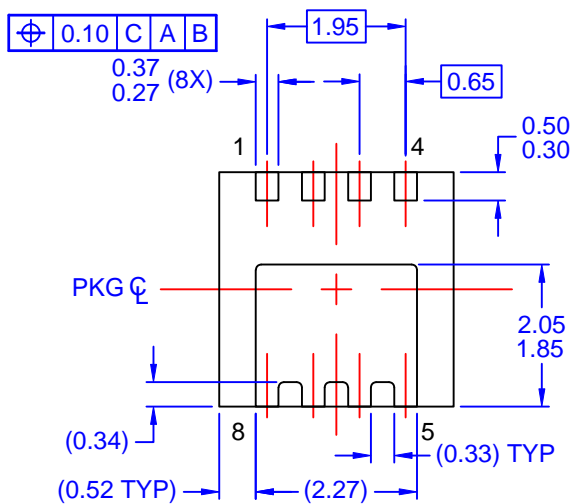


图 13. 结至外壳的瞬态热响应曲线



LAND PATTERN
RECOMMENDATION



DETAIL A
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) PACKAGE STANDARD REFERENCE:
JEDEC MO-240, ISSUE A, VAR. BA,
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- D) DIMENSIONING AND TOLERANCING PER
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