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FDMC86160ET100

N 沟道屏蔽栅极 Power Trench[®] MOSFET

100 V, 43 A, 14 mΩ

特性

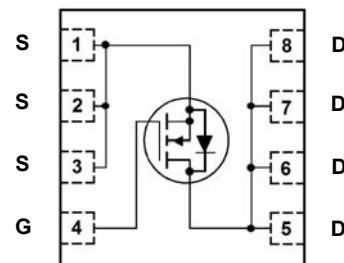
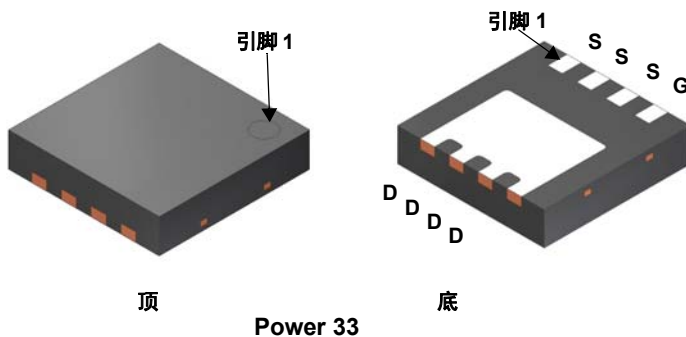
- T_J 额定值扩展: 175°C
- 屏蔽栅极 MOSFET 技术
- 最大 r_{DS(on)} = 14 mΩ (V_{GS} = 10 V, I_D = 9 A)
- 最大 r_{DS(on)} = 23 mΩ (V_{GS} = 6 V, I_D = 7 A)
- 高性能沟道技术可实现极低的 r_{DS(on)}
- 终端无引线且符合 RoHS 标准

概述

此 N 沟道 MOSFET 采用 Fairchild 带屏蔽栅极技术的先进 PowerTrench[®] 工艺生产。该工艺针对导通电阻进行了优化。此器件非常适合需要在小空间内实现超低 R_{DS(on)} 的应用, 例如高性能 VRM、POL 和 Orring 功能。

应用

- 桥式拓扑
- 同步整流器



MOSFET 最大额定值 T_A = 25 °C 除非另有说明

符号	参数	额定值	单位
V _{DS}	漏极-源极电压	100	V
V _{GS}	栅极-源极电压	±20	V
I _D	漏极电流 - 连续	T _C = 25 °C (注 5)	43
	- 连续	T _C = 100 °C (注 5)	31
	- 连续	T _A = 25 °C (注 1a)	9
	- 脉冲	(注 4)	204
E _{AS}	单脉冲雪崩能量 (注 3)	181	mJ
P _D	功耗	T _C = 25 °C	65
	功耗	T _A = 25 °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 _{θJC}	结至外壳热阻 (注 1)	2.3	°C/W
R _{θJA}	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
FDMC86160ET	FDMC86160ET100	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	$I_D = 250\ \mu\text{A}, V_{GS} = 0\ \text{V}$	100			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	$I_D = 250\ \mu\text{A}$, 参考温度为 25°C		73		$\text{mV}/^\circ\text{C}$
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 80\ \text{V}, V_{GS} = 0\ \text{V}$			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-源极阈值电压	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	2	2.9	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	栅极-源极阈值电压温度系数	$I_D = 250\ \mu\text{A}$, 参考温度为 25°C		-9		$\text{mV}/^\circ\text{C}$
$r_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\ \text{V}, I_D = 9\ \text{A}$		11.2	14	m Ω
		$V_{GS} = 6\ \text{V}, I_D = 7\ \text{A}$		16	23	
		$V_{GS} = 10\ \text{V}, I_D = 9\ \text{A}, T_J = 125^\circ\text{C}$		21	26	
g_{FS}	正向跨导	$V_{DD} = 10\ \text{V}, I_D = 9\ \text{A}$		43		S

动态特性

C_{iss}	输入电容	$V_{DS} = 50\ \text{V}, V_{GS} = 0\ \text{V}, f = 1\ \text{MHz}$		968	1290	pF
C_{oss}	输出电容			241	320	pF
C_{rss}	反向传输电容			11	20	pF
R_g	栅极阻抗		0.1	0.6	2.5	Ω

开关特性

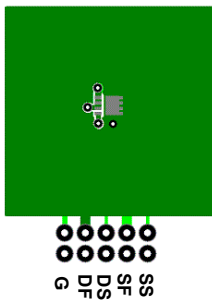
$t_{d(on)}$	导通延迟时间	$V_{DD} = 50\ \text{V}, I_D = 9\ \text{A}, V_{GS} = 10\ \text{V}, R_{GEN} = 6\ \Omega$		9.7	19	ns
t_r	上升时间			3.6	10	ns
$t_{d(off)}$	关断延迟时间			16	30	ns
t_f	下降时间			3.4	10	ns
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0\ \text{V}$ 至 $10\ \text{V}$	$V_{DD} = 50\ \text{V}, I_D = 9\ \text{A}$	15	22	nC
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0\ \text{V}$ 至 $6\ \text{V}$		9.8	15	nC
Q_{gs}	总栅极电荷			4.4		nC
Q_{gd}	栅极-漏极“米勒”电荷			3.5		nC

漏极-源极二极管特性

V_{SD}	源极-漏极二极管正向电压	$V_{GS} = 0\ \text{V}, I_S = 9\ \text{A}$ (注2)		0.79	1.3	V
		$V_{GS} = 0\ \text{V}, I_S = 1.9\ \text{A}$ (注2)		0.72	1.2	V
t_{rr}	反向恢复时间	$I_F = 9\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		47	75	ns
Q_{rr}	反向恢复电荷			45	73	nC

注意:

1. $R_{\theta JA}$ 取决于安装在一平方英寸衬垫, 2 oz 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。



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



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 $181\ \text{mJ}$, 根据起始 $T_J = 25^\circ\text{C}$, $L = 3\ \text{mH}$, $I_{AS} = 11\ \text{A}$, $V_{DD} = 100\ \text{V}$, $V_{GS} = 10\ \text{V}$ 。在 $L = 0.1\ \text{mH}$, $I_{AS} = 35\ \text{A}$ 时进行 100% 测试。

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

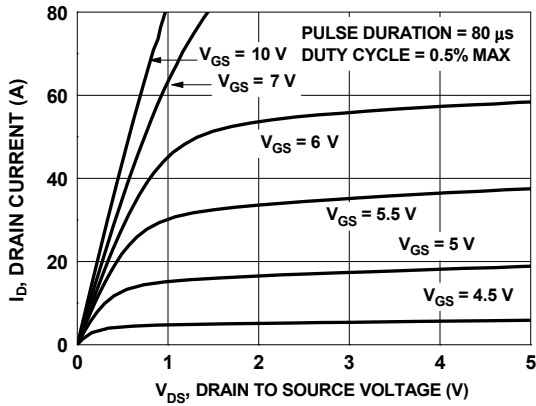


图 1. 通态区域特性

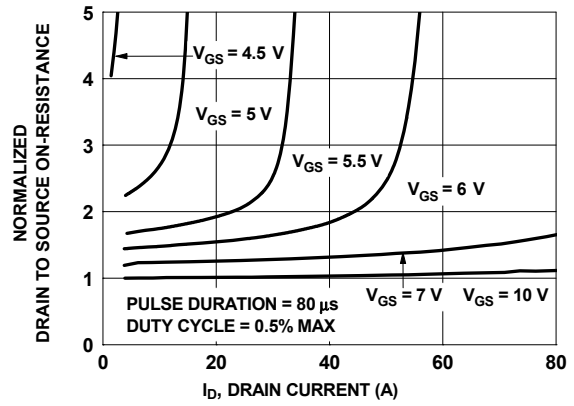


图 2. 标准化导通电阻与漏极电流和栅极电压的关系

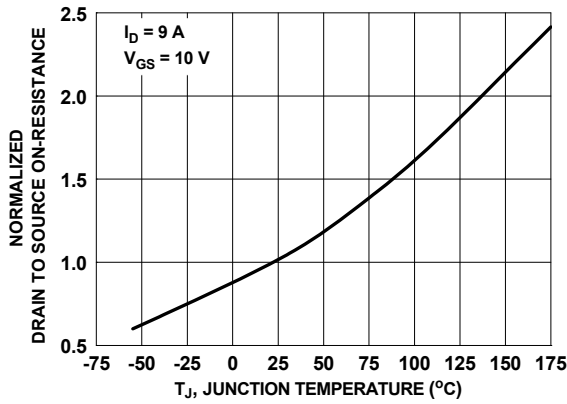


图 3. 标准化导通电阻与结温的关系

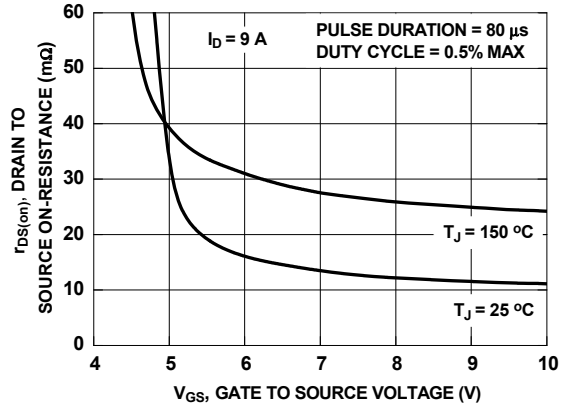


图 4. 导通电阻与栅极 - 源极电压的关系

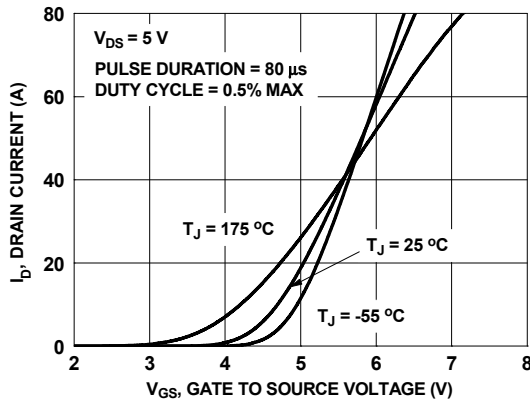


图 5. 转换特性

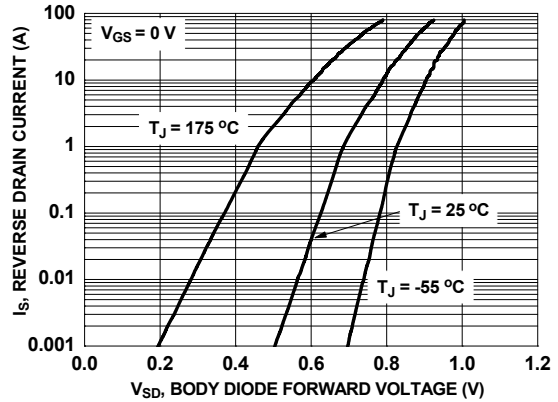


图 6. 源极 - 漏极二极管正向电压与源电流的关系

典型特性 $T_J = 25^\circ\text{C}$ 除非另有说明

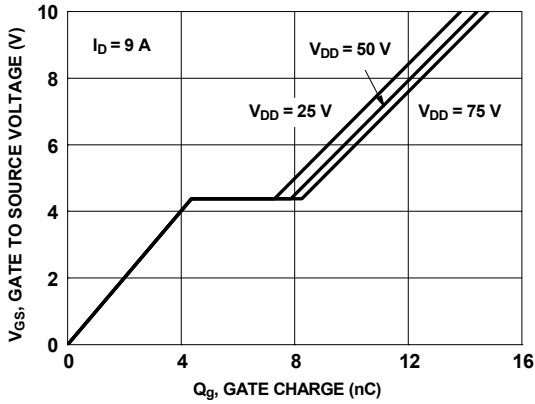


图 7. 栅极电荷特性

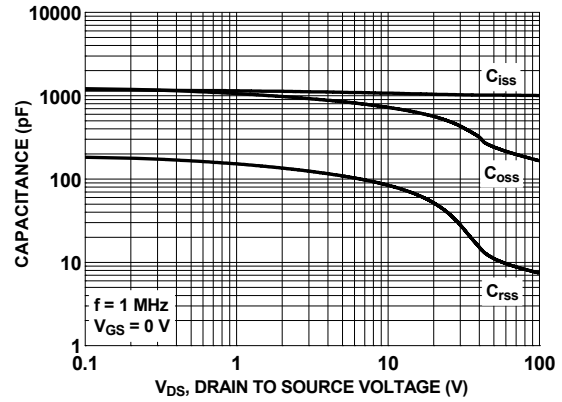


图 8. 电容与漏极 - 源极电压的关系

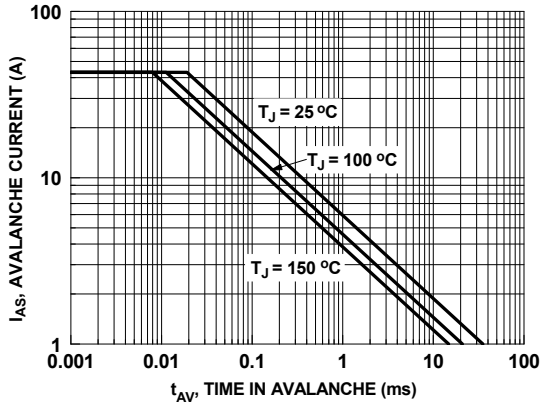


图 9. 非箝位电感开关能力

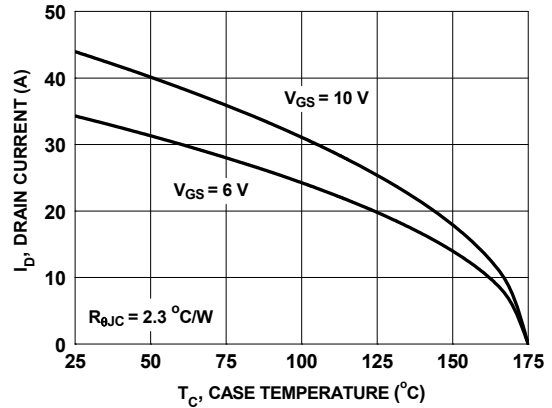


图 10. 最大连续漏极电流与壳温的关系

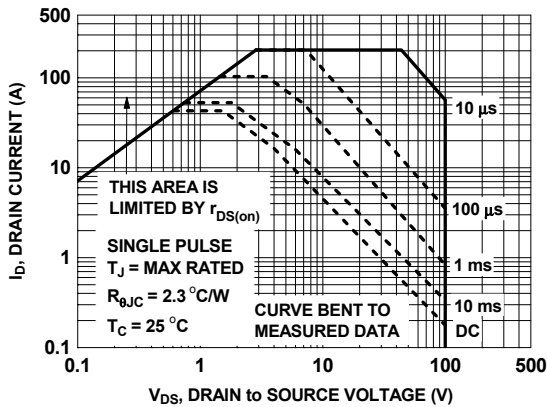


图 11. 正向偏压安全工作区

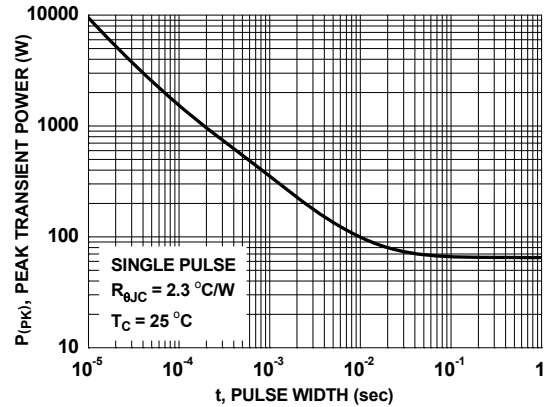


图 12. 单个脉冲最大功耗

典型特性 $T_J = 25^\circ\text{C}$ 除非另有说明

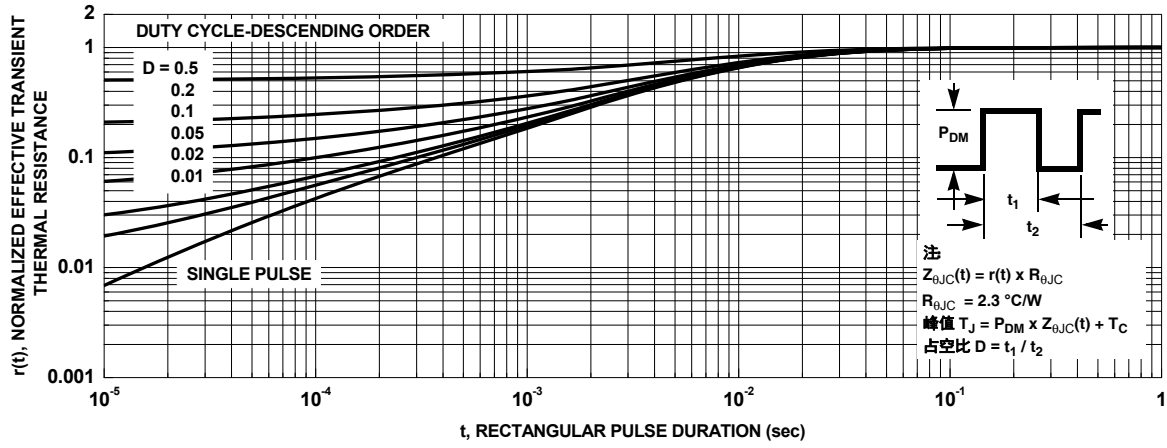


图 13. 结至外壳瞬态热响应曲线

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