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FDMC86340ET80

N 沟道屏蔽栅极 Power® MOSFET
80 V, 68 A, 6.5 mΩ

2015 年 1 月



特性

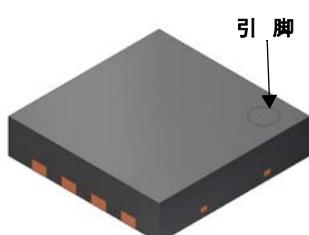
- 扩展额定 T_J 至 175 °C
- 屏蔽栅极 MOSFET 技术
- 最大值 $r_{DS(on)} = 6.5 \text{ m}\Omega$, 在 $V_{GS} = 10 \text{ V}$ 、 $I_D = 14 \text{ A}$ 时
- 最大值 $r_{DS(on)} = 8.5 \text{ m}\Omega$, 在 $V_{GS} = 8 \text{ V}$ 、 $I_D = 12 \text{ A}$ 时
- 高性能技术可实现极低的 $r_{DS(on)}$
- 端子为无铅产品
- 符合 RoHS 标准

概述

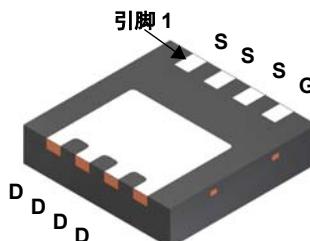
N 通道 MOSFET 采用了飞兆的先进 PowerTrench® 工艺制造而成, 该工艺集成了栅极屏蔽技术。该工艺经优化以减小导通电阻, 却仍保持卓越的开关性能。

应用

- DC-DC 转换

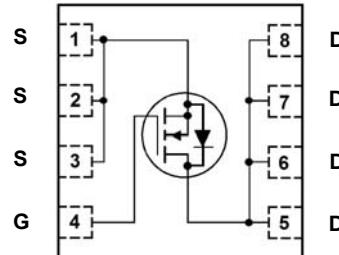


顶



底

Power 33



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

符号	参数			额定值	单位
V_{DS}	漏极-源极电压			80	V
V_{GS}	栅极-源极电压			± 20	V
I_D	漏极电流	- 连续	$T_C = 25 \text{ }^\circ\text{C}$	(注 5)	A
		- 连续	$T_C = 100 \text{ }^\circ\text{C}$	(注 5)	
		- 连续	$T_A = 25 \text{ }^\circ\text{C}$	(注 1a)	
		- 脉冲		316	
E_{AS}	单脉冲雪崩能量			216	mJ
P_D	功率耗散		$T_C = 25 \text{ }^\circ\text{C}$	65	W
	功率耗散		$T_A = 25 \text{ }^\circ\text{C}$	(注 1a)	
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	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	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
$\frac{\text{DV}_{\text{DSS}}}{\text{DT}_J}$	击穿电压温度系数	$I_D = 250 \mu\text{A}$, 参考温度为 25°C		46		$\text{mV/}^\circ\text{C}$
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

$V_{GS(\text{th})}$	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
$\frac{\text{DV}_{GS(\text{th})}}{\text{DT}_J}$	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		$\text{mV/}^\circ\text{C}$
$r_{DS(\text{on})}$	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	$\text{m}\Omega$
		$V_{GS} = 8 \text{ V}, I_D = 12 \text{ A}$		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

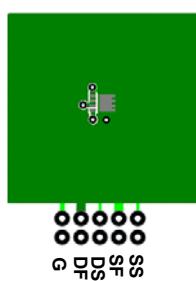
$t_{d(on)}$	导通延迟时间	$V_{DD} = 40 \text{ V}, I_D = 14 \text{ A}, V_{GS} = 10 \text{ V}, R_{\text{GEN}} = 6 \Omega$		20	32	ns
t_r	上升时间			7.9	16	ns
$t_{d(off)}$	关断延迟时间			23	37	ns
t_f	下降时间			5.1	10	ns
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0 \text{ V} \text{ 至 } 10 \text{ V}$	30	38	49	nC
$Q_{g(TOT)}$	总栅极电荷		20	31	44	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
				25	40	nC

注意:

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



a. 53°C/W 安装在 1 in^2 2 oz 铜焊盘



b. 125°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 $< 300 \mu\text{s}$, 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

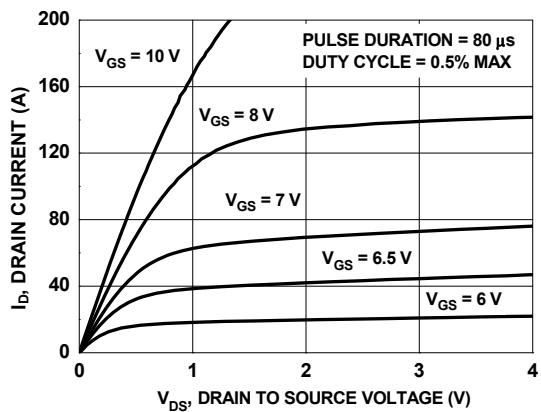


图 1. 导通区域特征

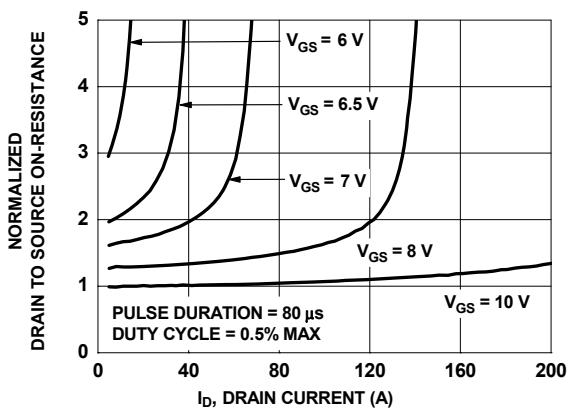


图 2. 归一化的导通电阻与漏极电流和栅极电压

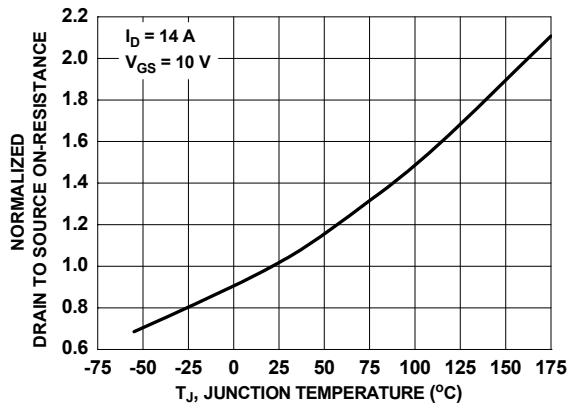


图 3. 归一化的导通电阻与结温

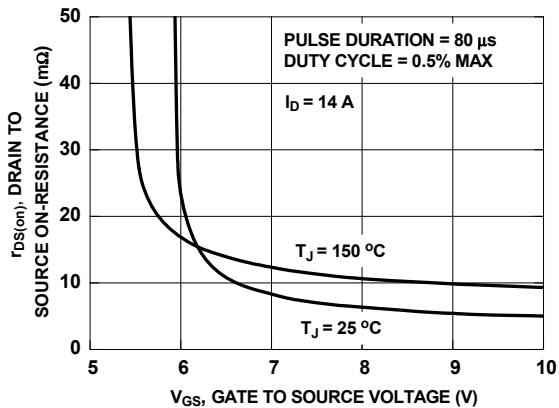


图 4. 导通电阻与栅极至源极电压

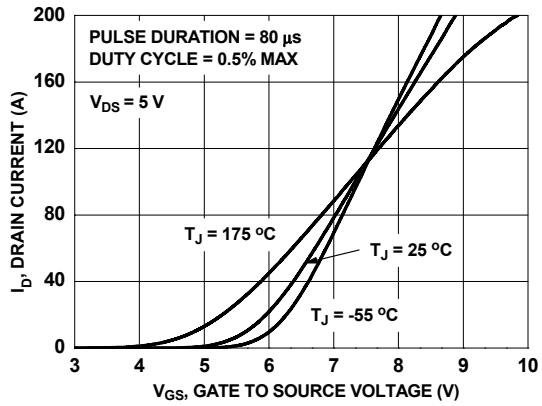


图 5. 转换特性

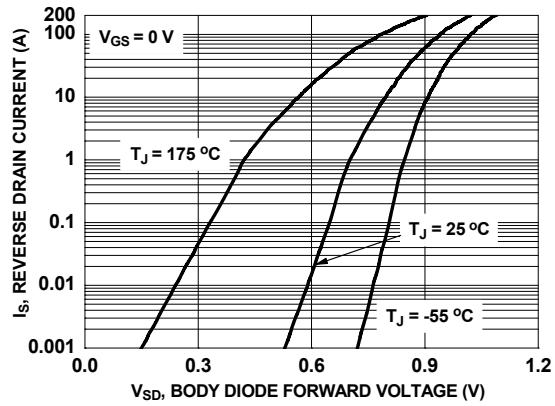


图 6. 源极至漏极二极管的正向电压与源极电流

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

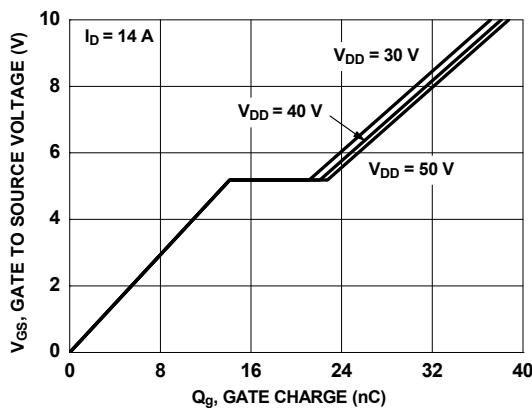


图 7. 栅极电荷特性

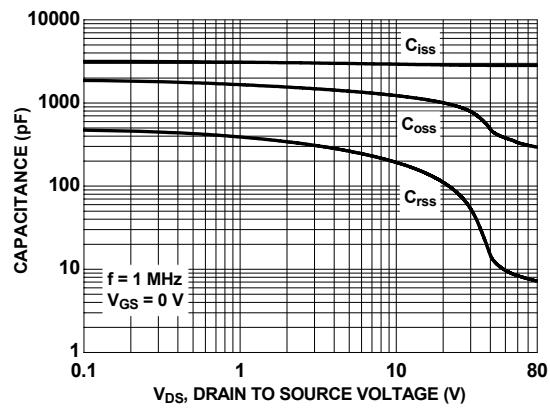


图 8. 电容与漏极至源极电压

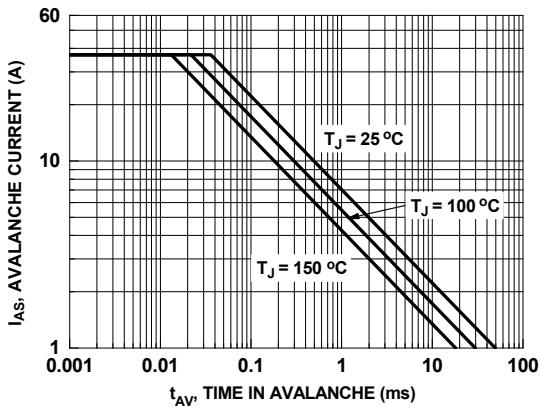


图 9. 非钳位感应开关能力

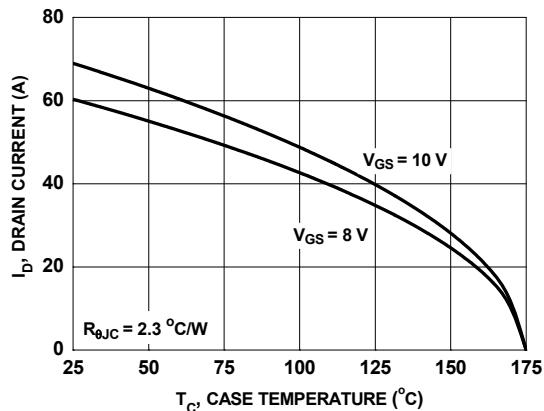


图 10. 最大连续漏极电流与外壳温度

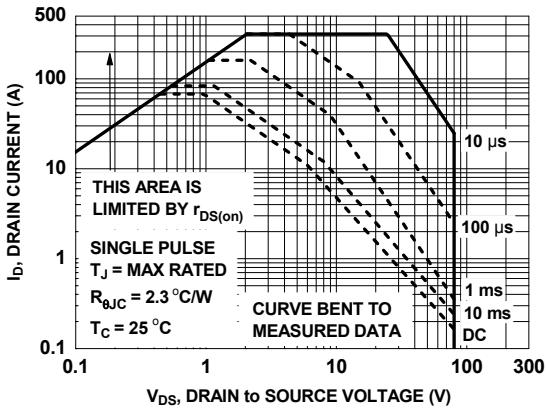


图 11. 正向偏置安全工作区

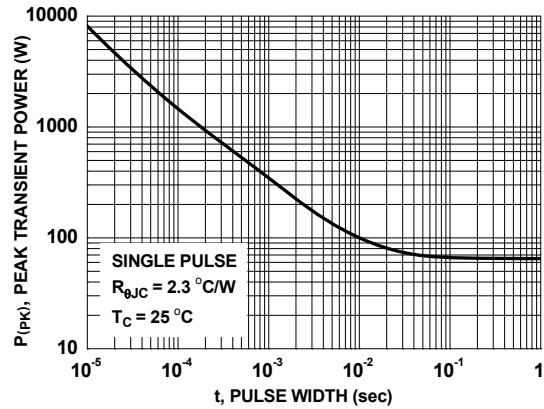


图 12. 单脉冲最大功率耗散

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

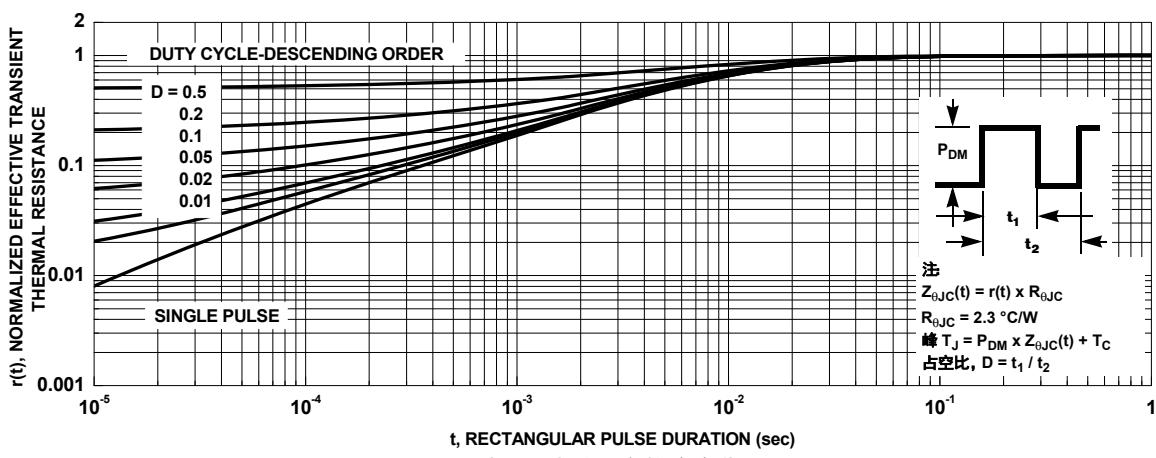
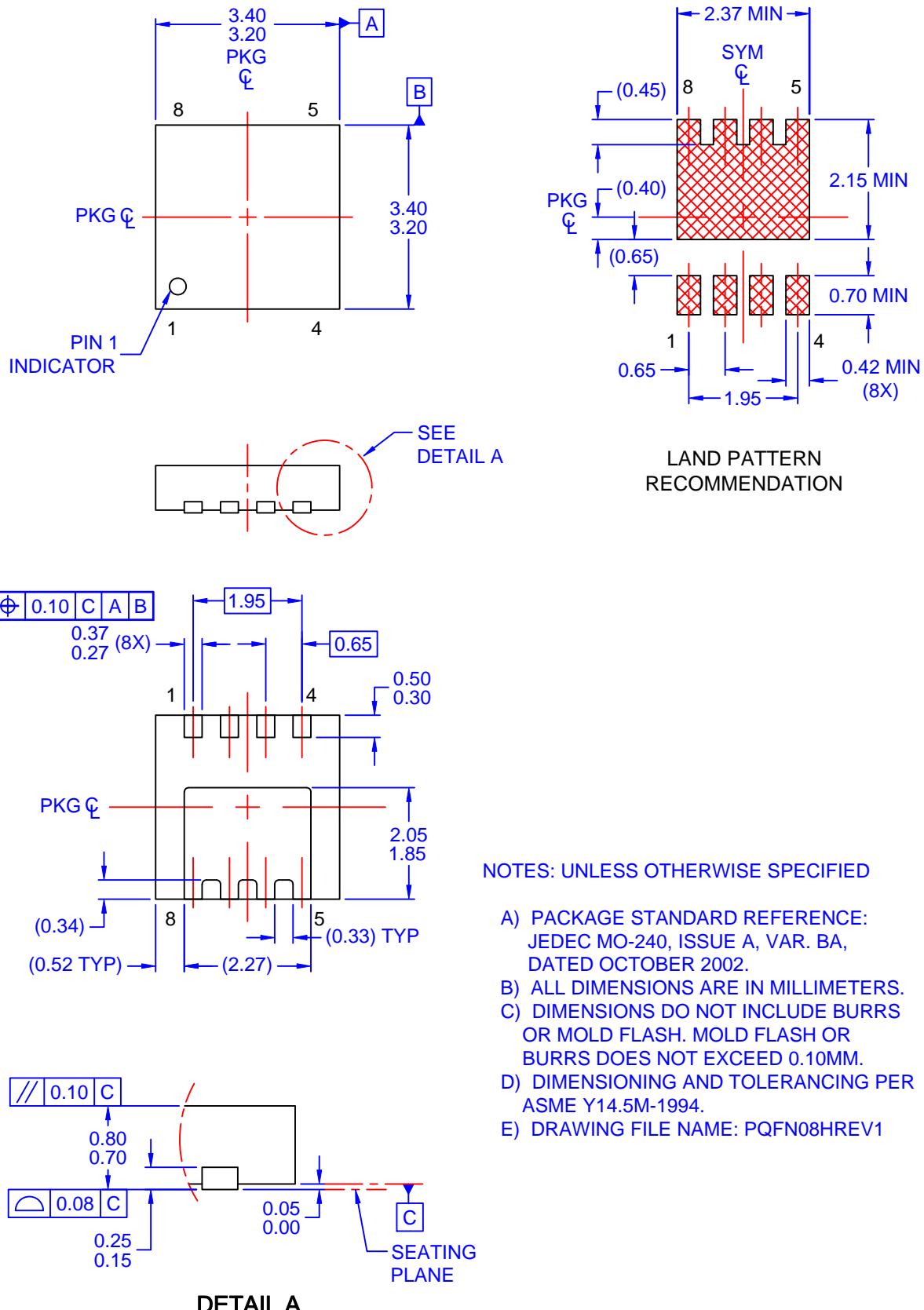


图 13. 结至外壳的瞬态热响应曲线



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