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# FDMS86255ET150

## N 沟道屏蔽栅极 PowerTrench® MOSFET 150 V, 63 A, 12.4 mΩ

### 特性

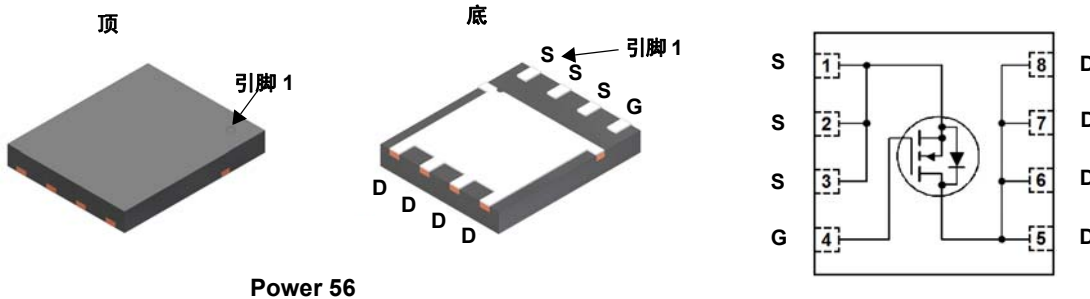
- 扩展额定  $T_J$  至 175°C
- 屏蔽栅极 MOSFET 技术
- 最大  $r_{DS(on)}$  = 12.4 mΩ ( $V_{GS} = 10 V, I_D = 10 A$ )
- 最大  $r_{DS(on)}$  = 15.5 mΩ ( $V_{GS} = 6 V, I_D = 8 A$ )
- 低  $r_{DS(on)}$  和高效的先进硅封装
- 下一代先进体二极管技术，专为软恢复设计
- MSL1 耐用封装设计
- 100% 经过 UIL 测试
- 符合 RoHS 标准

### 概述

本 N 沟道 MOSFET 采用飞兆半导体先进的 PowerTrench® 工艺制造而成，其中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

- OringFET / 负载开关
- 同步整流
- DC-DC 转换



Power 56

### 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
$V_{DS}$	Drain to Source Voltage	150	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)	63	A
	- 连续 $T_C = 100^\circ C$ (注 5)	44	
	- 连续 $T_A = 25^\circ C$ (注 1a)	10	
	- 脉冲 (注 4)	276	
$E_{AS}$	单脉冲雪崩能量 (注 3)	541	mJ
$P_D$	功耗 $T_C = 25^\circ C$	136	W
	功耗 $T_A = 25^\circ C$ (注 1a)	3.3	
$T_J, T_{STG}$	工作和存储结温范围	-55 至 +175	°C

### 热性能

$R_{\theta JC}$	结 - 壳体的热阻	1.1	°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
FDMS86255ET	FDMS86255ET150	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	$I_D = 250\ \mu\text{A}, V_{GS} = 0\ \text{V}$	150			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	$I_D = 250\ \mu\text{A}$ (相对 $25^\circ\text{C}$ )		109		$\text{mV}/^\circ\text{C}$
$I_{DSS}$	零栅极电压漏极电流	$V_{DS} = 120\ \text{V}, V_{GS} = 0\ \text{V}$			1	$\mu\text{A}$
$I_{GSS}$	栅极-源极漏电流	$V_{GS} = \pm 20\ \text{V}, V_{DS} = 0\ \text{V}$			$\pm 100$	$\text{nA}$

## 导通特性

$V_{GS(th)}$	栅极-源极阈值电压	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	2.0	3.0	4.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	栅极-源极阈值电压温度系数	$I_D = 250\ \mu\text{A}$ (相对 $25^\circ\text{C}$ )		-11		$\text{mV}/^\circ\text{C}$
$r_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\ \text{V}, I_D = 10\ \text{A}$ $V_{GS} = 6\ \text{V}, I_D = 8\ \text{A}$ $V_{GS} = 10\ \text{V}, I_D = 10\ \text{A}, T_J = 125^\circ\text{C}$		9.5 11.5 19	12.4 15.5 25	$\text{m}\Omega$
$g_{FS}$	正向跨导	$V_{DS} = 5\ \text{V}, I_D = 10\ \text{A}$		35		S

## 动态特性

$C_{iss}$	输入电容	$V_{DS} = 75\ \text{V}, V_{GS} = 0\ \text{V},$ $f = 1\ \text{MHz}$		3200	4480	$\text{pF}$
$C_{oss}$	输出电容			291	410	$\text{pF}$
$C_{rss}$	反向传输电容			11	20	$\text{pF}$
$R_g$	栅极阻抗		0.1	0.7	2.1	$\Omega$

## 开关特性

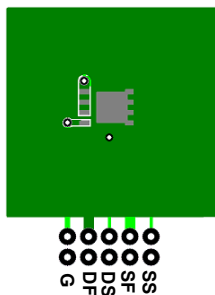
$t_{d(on)}$	导通延迟时间	$V_{DD} = 75\ \text{V}, I_D = 10\ \text{A},$ $V_{GS} = 10\ \text{V}, R_{GEN} = 6\ \Omega$		21	34	ns
$t_r$	上升时间			4.5	10	ns
$t_{d(off)}$	关断延迟时间			28	45	ns
$t_f$	下降时间			6.2	12	ns
$Q_g$	总栅极电荷	$V_{GS} = 0\ \text{V}$ 到 $10\ \text{V}$	$V_{DD} = 75\ \text{V},$ $I_D = 10\ \text{A}$	45	63	nC
$Q_g$	总栅极电荷	$V_{GS} = 0\ \text{V}$ 到 $6\ \text{V}$		29	41	nC
$Q_{gs}$	栅极-源极电荷			14		nC
$Q_{gd}$	栅极-漏极“米勒”电荷			8.8		nC

## 漏极-源极二极管特性

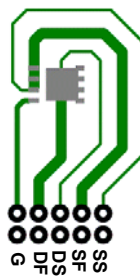
$V_{SD}$	源极-漏极二极管正向电压	$V_{GS} = 0\ \text{V}, I_S = 1.9\ \text{A}$ (注 2)		0.7	1.2	V
		$V_{GS} = 0\ \text{V}, I_S = 10\ \text{A}$ (注 2)		0.8	1.3	
$t_{rr}$	反向恢复时间	$I_F = 10\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		87	139	ns
$Q_{rr}$	反向恢复电荷			165	264	nC

## 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.  $541\ \text{mJ}$  的  $E_{AS}$  取决于起始  $T_J = 25^\circ\text{C}$ ,  $L = 3\ \text{mH}$ ,  $I_{AS} = 19\ \text{A}$ ,  $V_{DD} = 150\ \text{V}$ ,  $V_{GS} = 10\ \text{V}$ 。测试百分比 100%:  $L = 0.1\ \text{mH}$ ,  $I_{AS} = 60\ \text{A}$ 。

4. 脉冲  $I_d$  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  $T_J = 25\text{ }^\circ\text{C}$  除非另有说明

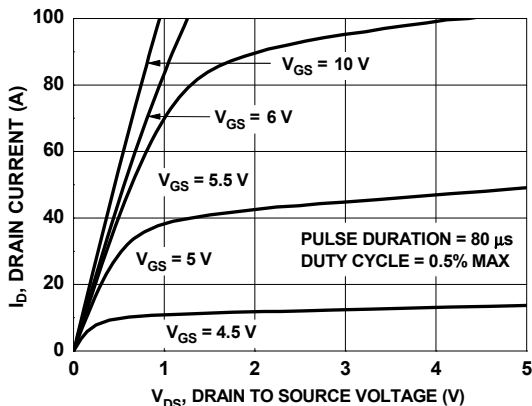


图 1. 导通区域特性

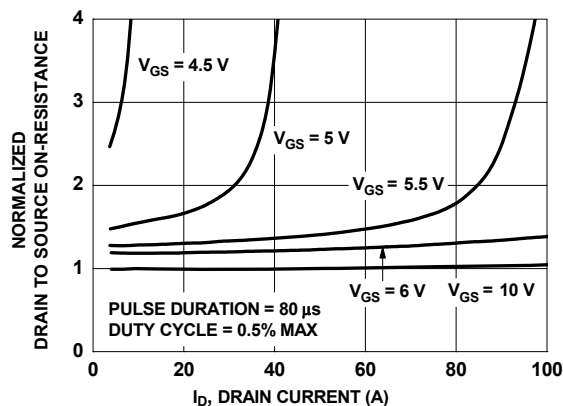


图 2. 标准化导通电阻 vs 漏极电流和栅极电压

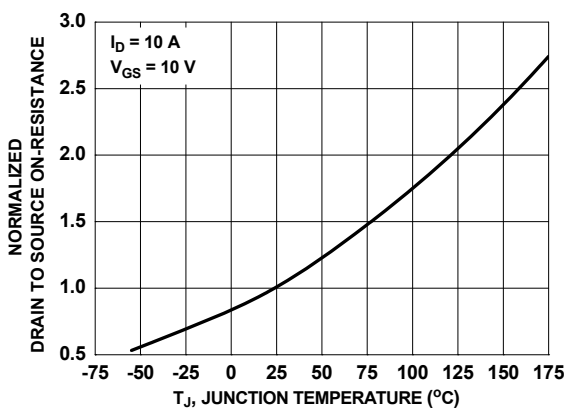


图 3. 标准化导通电阻 vs 结温

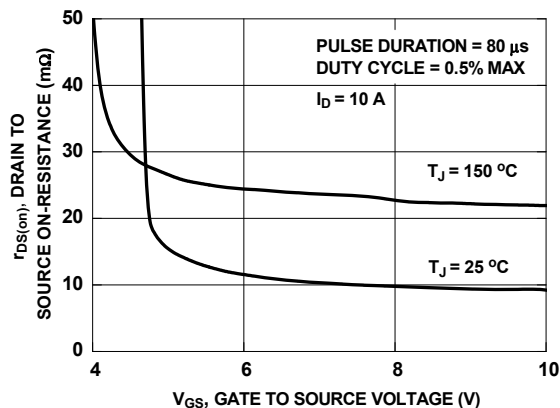


图 4. 导通电阻 vs 栅极-源极电压

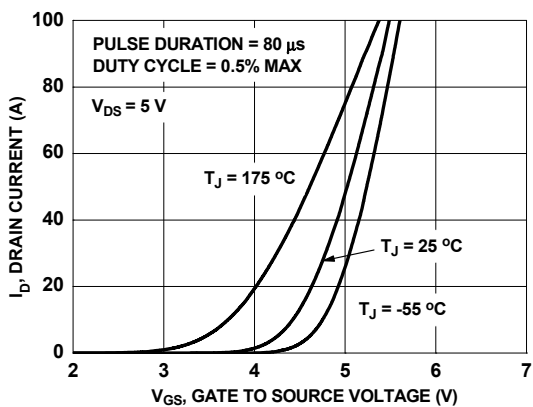


图 5. 转换特性

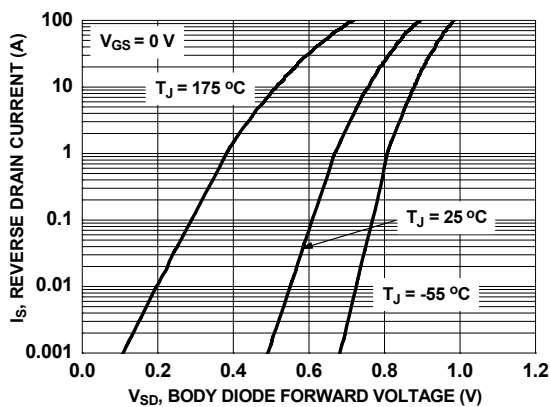


图 6. 源极-漏极二极管正向电压 vs 源极电流

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

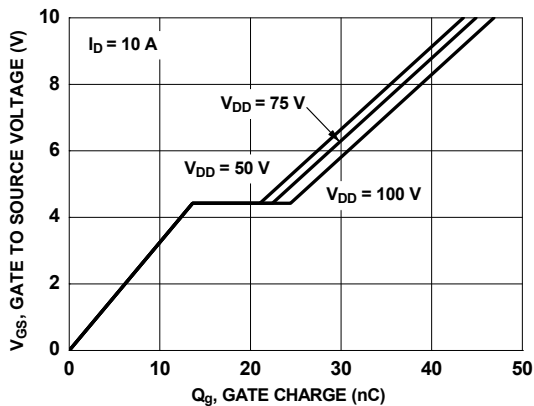


图 7. 栅极电荷特性

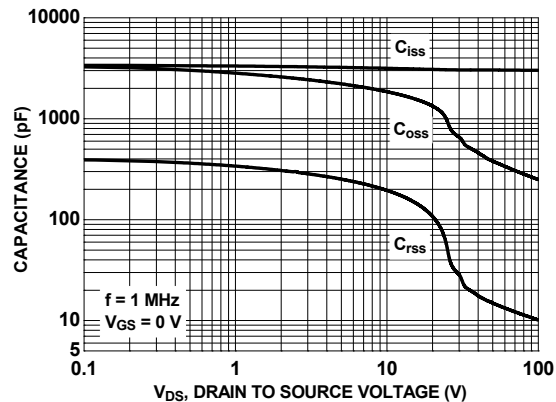


图 8. 电容 vs 漏极-源极电压

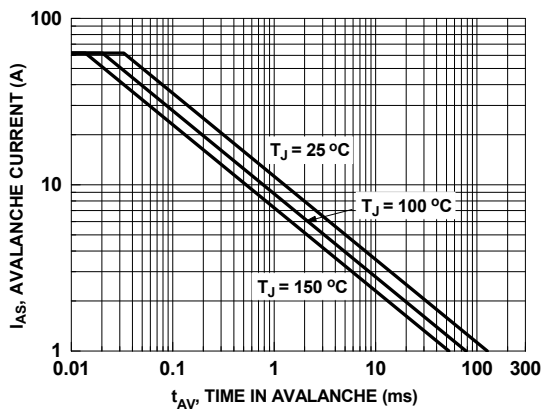


图 9. 非钳位感应开关能力

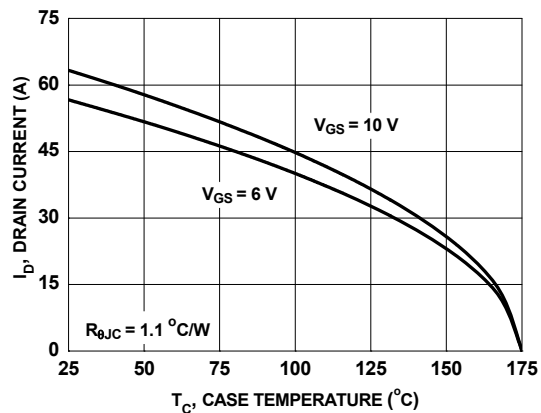


图 10. 最大连续漏极电流 vs 壳体温度

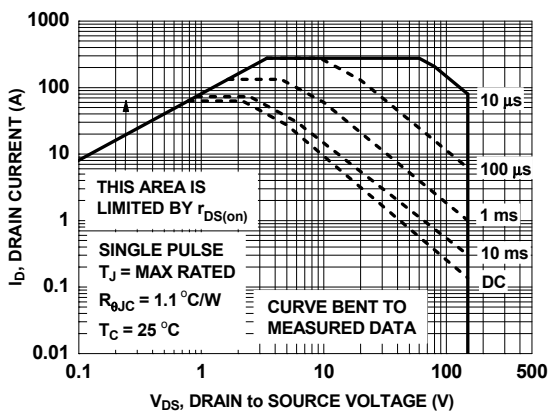


图 11. 正向偏置安全工作区

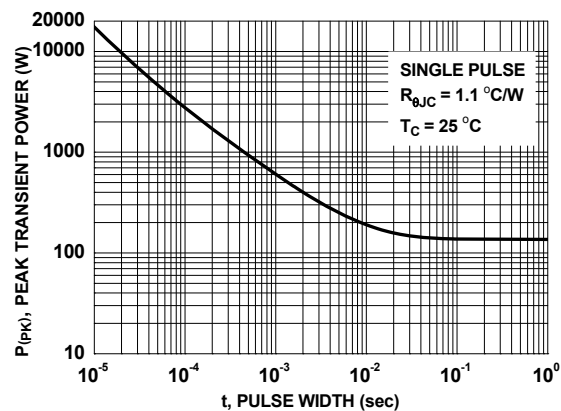


图 12. 单脉冲最大功耗

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

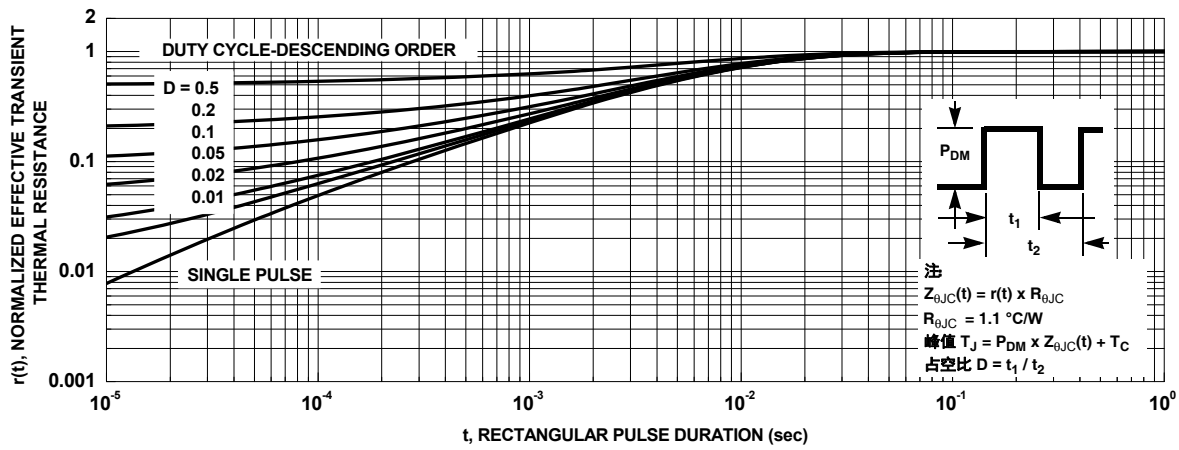
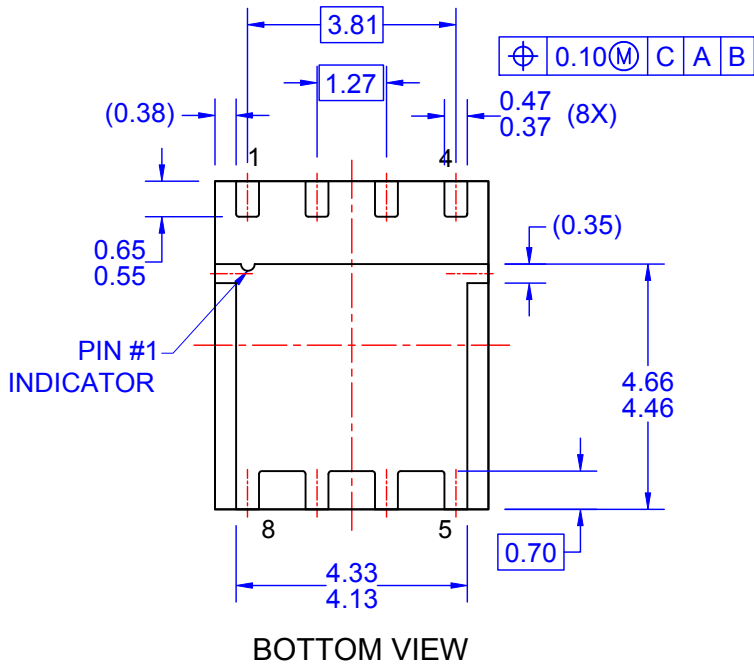
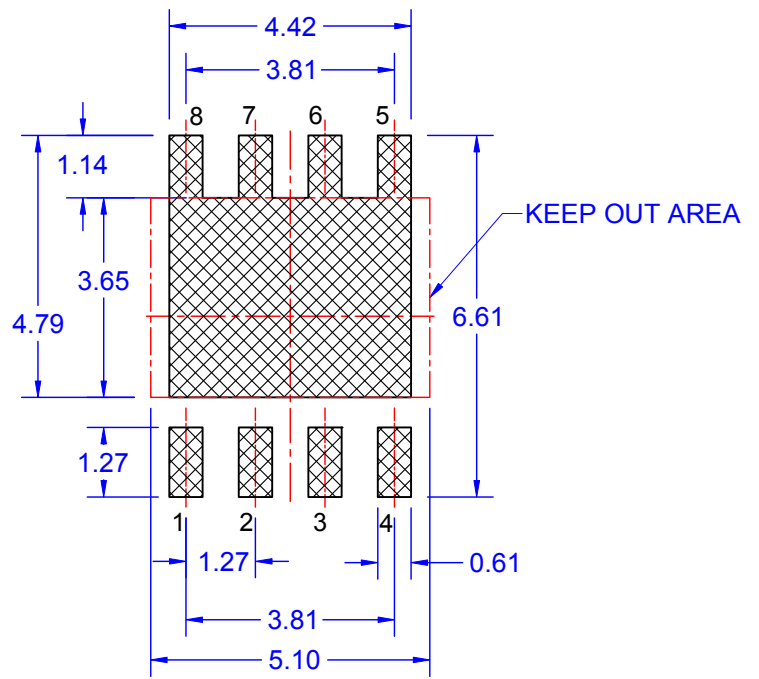
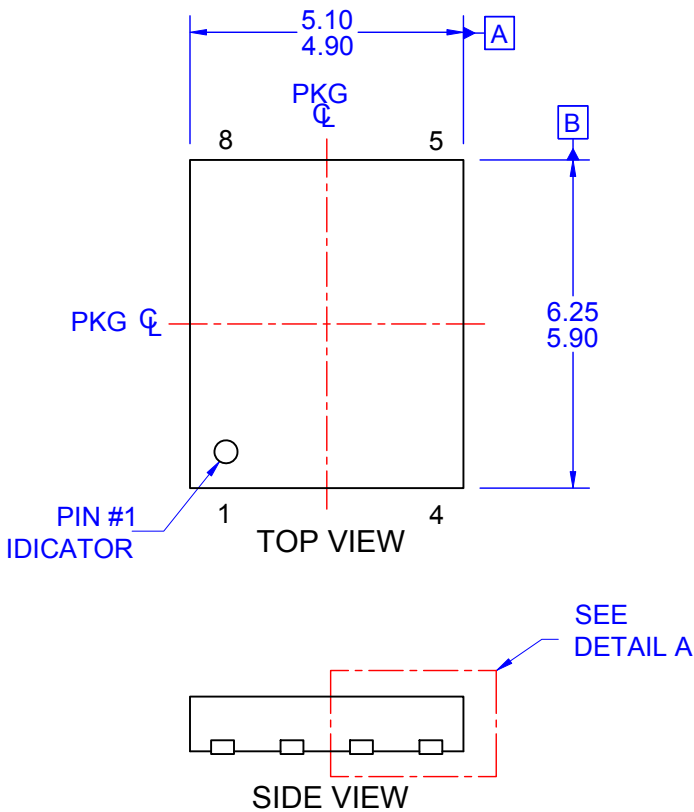


图 13. 瞬态热响应曲线



- NOTES: UNLESS OTHERWISE SPECIFIED
- A) PACKAGE STANDARD REFERENCE: JEDEC MO-240, ISSUE A, VAR. AA,
  - 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-2009.
  - E) IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.
  - F) DRAWING FILE NAME: PQFN08JREV3.



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