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2015年8月

FDMT800120DC

N-Channel Dual Cool™ 88 PowerTrench® MOSFET

120 V, 128 A, 4.2 mΩ

特性

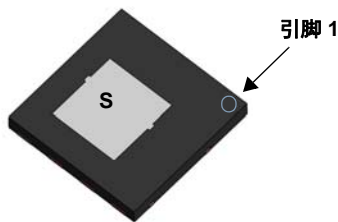
- 最大值 $r_{DS(on)} = 4.2 \text{ m}\Omega$ ($V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$)
- 最大值 $r_{DS(on)} = 6.4 \text{ m}\Omega$ ($V_{GS} = 6 \text{ V}$, $I_D = 16 \text{ A}$)
- 低 $r_{DS(on)}$ 和高效的先进硅封装
- 下一代先进体二极管技术, 专为软恢复设计
- 薄型 8x8mm MLP 封装
- MSL1 强健封装设计
- 100% 经过 UIL 测试
- 符合 RoHS 标准

概述

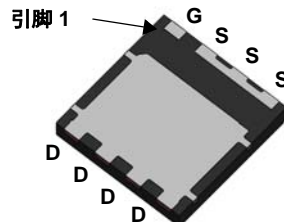
此 N 沟道 MOSFET 采用 Fairchild 先进的 PowerTrench® 工艺生产。先进的硅技术和 Dual Cool™ 封装技术完美融合, 可在提供最小 $r_{DS(on)}$ 的同时通过极低的结至环境热阻保持卓越的开关性能。

应用

- OringFET/ 负载开关
- 同步整流
- DC-DC 转换

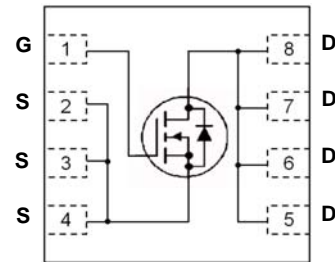


顶



底

Dual Cool™ 88



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	120	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)	128
	— 连续	$T_C = 100 \text{ }^\circ\text{C}$ (注 5)	81
	— 连续	$T_A = 25 \text{ }^\circ\text{C}$ (注 1a)	20
	— 脉冲	(注 4)	767
E_{AS}	单脉冲雪崩能量	(注 3)	1350
P_D	功耗	$T_C = 25 \text{ }^\circ\text{C}$	156
	功耗	$T_A = 25 \text{ }^\circ\text{C}$ (注 1a)	3.2
T_J, T_{STG}	工作和保存结温范围	-55 to +150	$^\circ\text{C}$

热特性

$R_{\theta JC}$	结至外壳热阻	(顶部源极)	1.6	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	结至外壳热阻	(底部漏极)	0.8	
$R_{\theta JA}$	结至环境热阻	(注 1a)	38	
$R_{\theta JA}$	结至环境热阻	(注 1b)	81	
$R_{\theta JA}$	结至环境热阻	(注 1i)	15	
$R_{\theta JA}$	结至环境热阻	(注 1j)	21	
$R_{\theta JA}$	结至环境热阻	(注 1k)	9	

封装标识与订购信息

器件封装	器件	封装	卷盘大小	卷带宽度	数量
800120DC	FDMT800120DC	Dual Cool™ 88	13"	13.3 mm	3000 件

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	$I_D = 250\ \mu\text{A}, V_{GS} = 0\ \text{V}$	120			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	$I_D = 250\ \mu\text{A}$, 参考 25°C		97		mV/°C
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 96\ \text{V}, V_{GS} = 0\ \text{V}$			1	μA
I_{GSS}	栅 — 源极漏电流	$V_{GS} = \pm 20\ \text{V}, V_{DS} = 0\ \text{V}$			100	nA

导通特性

$V_{GS(th)}$	栅极至源极阈值电压	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	2.0	3.1	4.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	栅极至源极阈值电压温度系数	$I_D = 250\ \mu\text{A}$, 参考 25°C		-12		mV/°C
$r_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\ \text{V}, I_D = 20\ \text{A}$		3.45	4.2	m Ω
		$V_{GS} = 6\ \text{V}, I_D = 16\ \text{A}$		4.6	6.4	
		$V_{GS} = 10\ \text{V}, I_D = 20\ \text{A}, T_J = 125^\circ\text{C}$		6.3	7.7	
g_{FS}	正向跨导	$V_{DS} = 5\ \text{V}, I_D = 20\ \text{A}$		69		S

动态特性

C_{iss}	输入电容	$V_{DS} = 60\ \text{V}, V_{GS} = 0\ \text{V},$ $f = 1\ \text{MHz}$		5605	7850	pF
C_{oss}	输出电容			778	1090	pF
C_{rss}	反向传输电容			27	40	pF
R_g	栅极阻抗		0.1	1.4	3.5	Ω

开关特性

$t_{d(on)}$	导通延迟时间	$V_{DD} = 60\ \text{V}, I_D = 20\ \text{A},$ $V_{GS} = 10\ \text{V}, R_{GEN} = 6\ \Omega$		29	47	ns	
t_r	上升时间			18	33	ns	
$t_{d(off)}$	关断延迟时间			40	64	ns	
t_f	下降时间			9.5	19	ns	
$Q_{g(TOT)}$	总栅极电荷		$V_{GS} = 0\ \text{V}$ 至 $10\ \text{V}$		76	107	nC
$Q_{g(TOT)}$	总栅极电荷	$V_{GS} = 0\ \text{V}$ 至 $6\ \text{V}$	$V_{DD} = 60\ \text{V},$ $I_D = 20\ \text{A}$		48	68	nC
Q_{gs}	栅极 — 源极电荷				25		nC
Q_{gd}	栅极 — 漏极“米勒”电荷				15		nC

漏极 — 源极二极管特性

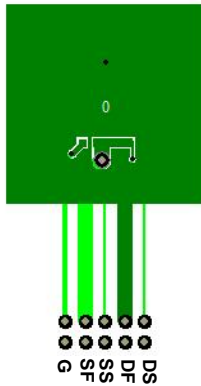
V_{SD}	源极 — 漏极二极管正向电压	$V_{GS} = 0\ \text{V}, I_S = 2.9\ \text{A}$ (注 2)		0.7	1.1	V
		$V_{GS} = 0\ \text{V}, I_S = 20\ \text{A}$ (注 2)		0.8	1.2	
t_{rr}	反向恢复时间	$I_F = 20\ \text{A}, di/dt = 100\ \text{A/ms}$		87	139	ns
Q_{rr}	反向恢复电荷			164	263	nC

热特性

$R_{\theta JC}$	结至外壳热阻	(顶部源极)	1.6	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	结至外壳热阻	(底部漏极)	0.8	
$R_{\theta JA}$	结至环境热阻	(注 1a)	38	
$R_{\theta JA}$	结至环境热阻	(注 1a)	81	
$R_{\theta JA}$	结至环境热阻	(注 1c)	26	
$R_{\theta JA}$	结至环境热阻	(注 1d)	34	
$R_{\theta JA}$	结至环境热阻	(注 1e)	14	
$R_{\theta JA}$	结至环境热阻	(注 1f)	16	
$R_{\theta JA}$	结至环境热阻	(注 1g)	26	
$R_{\theta JA}$	结至环境热阻	(注 1h)	60	
$R_{\theta JA}$	结至环境热阻	(注 1i)	15	
$R_{\theta JA}$	结至环境热阻	(注 1j)	21	
$R_{\theta JA}$	结至环境热阻	(注 1k)	9	
$R_{\theta JA}$	结至环境热阻	(注 1l)	11	

注:

1. $R_{\theta JA}$ 通过安装在 FR-4 电路板上的器件确定, 该电路板使用指定的 2 oz 铜焊盘, 如下图所示。 $R_{\theta CA}$ 由用户的电路板设计确定。



a. 38 $^{\circ}\text{C}/\text{W}$ (安装于 a 1 平方英寸 2 oz 铜焊盘)



b. 81 $^{\circ}\text{C}/\text{W}$ (安装于最小 2 oz 铜焊盘)

- c. 静止空气, 20.9x10.4x12.7mm 铝质散热器, 1 平方英寸 2 oz 铜焊盘
- d. 静止空气, 20.9x10.4x12.7mm 铝质散热器, 最小 2 oz 铜焊盘
- e. 静止空气, 45.2x41.4x11.7mm Aavid Thermalloy 器件号 10-L41B-11 散热器, 1 平方英寸 2 oz 铜焊盘
- f. 静止空气, 45.2x41.4x11.7mm Aavid Thermalloy 器件号 10-L41B-11 散热器, 最小 2 oz 铜焊盘
- g. 200FPM 气流, 无散热器, 1 平方英寸 2 oz 铜焊盘
- h. 200FPM 气流, 无散热器, 最小 2 oz 铜焊盘
- i. 200FPM 气流, 20.9x10.4x12.7mm 铝质散热器, 1 平方英寸 2 oz 铜焊盘
- j. 200FPM 气流, 20.9x10.4x12.7mm 铝质散热器, 最小 2 oz 铜焊盘
- k. 200FPM 气流, 45.2x41.4x11.7mm Aavid Thermalloy 器件号 10-L41B-11 散热器, 1 平方英寸 2 oz 铜焊盘
- l. 200FPM 气流, 45.2x41.4x11.7mm Aavid Thermalloy 器件号 10-L41B-11 散热器, 最小 2 oz 铜焊盘

2. 脉冲测试: 脉冲宽度: < 300 ms, 占空比: < 2.0%。

3. E_{AS} 为 1350 mJ, 基于起始 $T_J = 25^{\circ}\text{C}$; N-ch: $L = 3\text{ mH}$, $I_{AS} = 30\text{ A}$, $V_{DD} = 120\text{ V}$, $V_{GS} = 10\text{ V}$. 100% 经过测试 ($L = 0.1\text{ mH}$, $I_{AS} = 93\text{ A}$.)

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。

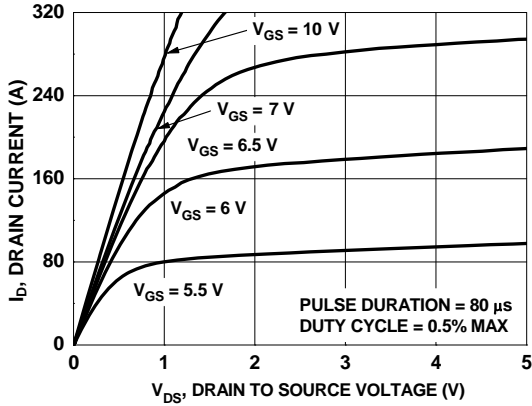


图 1. 通态区域特性

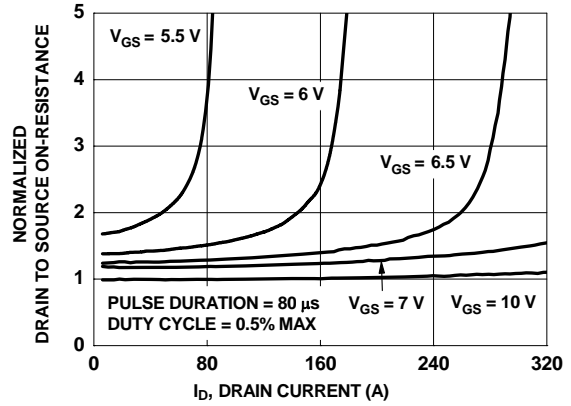


图 2. 标准化导通电阻与漏极电流和栅极电压的关系

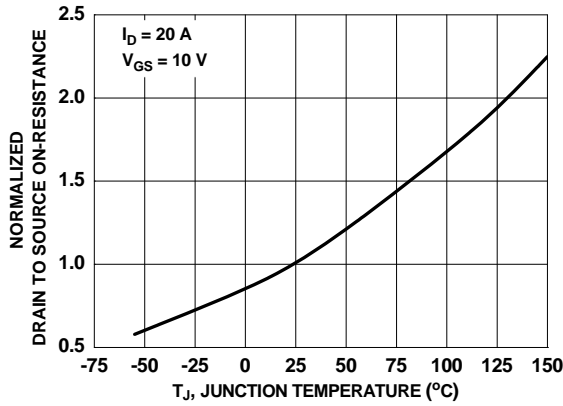


图 3. 标准化导通电阻与结温的关系

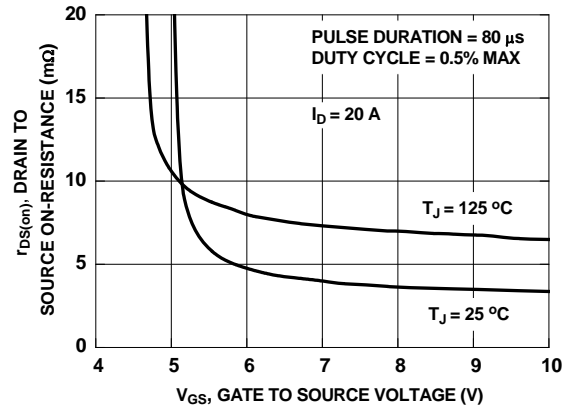


图 4. 导通电阻与栅极—源极电压的关系

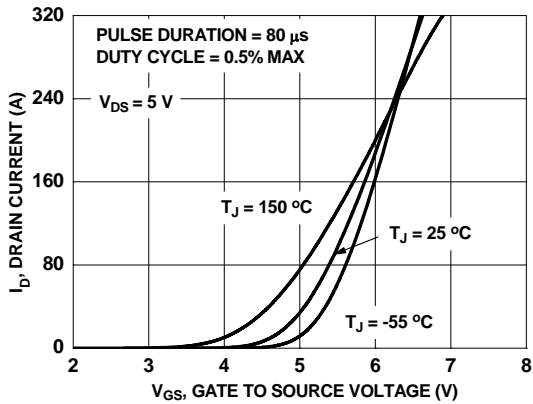


图 5. 传输特性

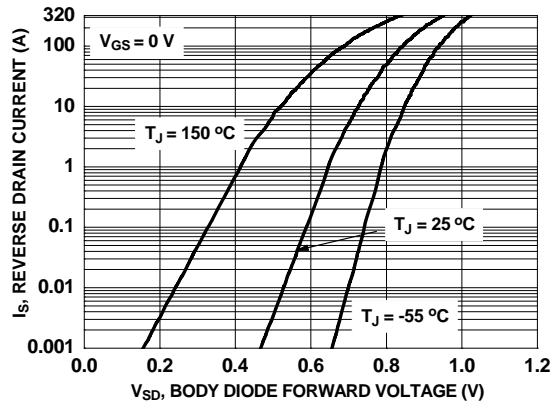


图 6. 源极—漏极二极管正向电压与源极电流的关系

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

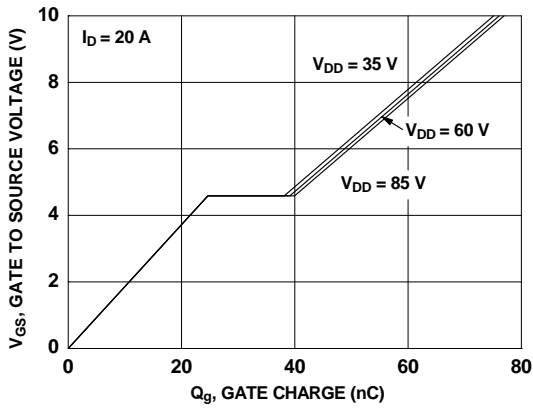


图 7. 栅极电荷特性

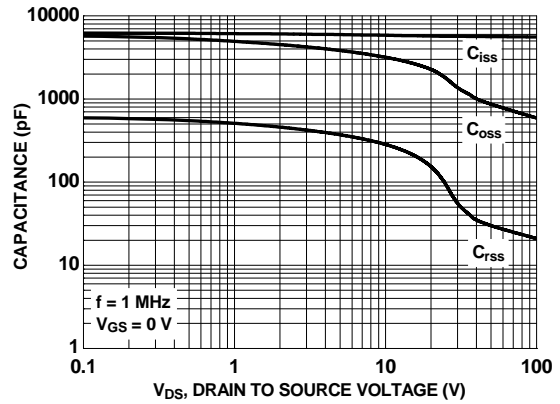


图 8. 电容与漏极 — 源极电压的关系

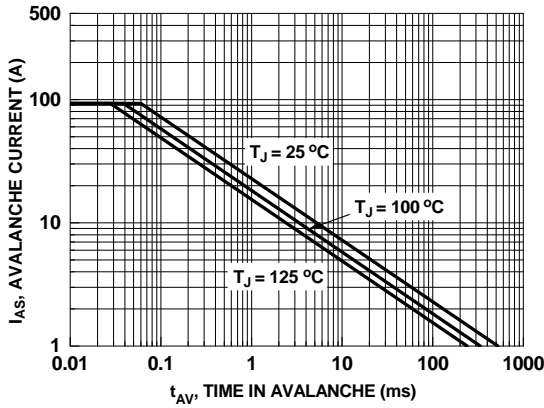


图 9. 非箱位电感开关能力

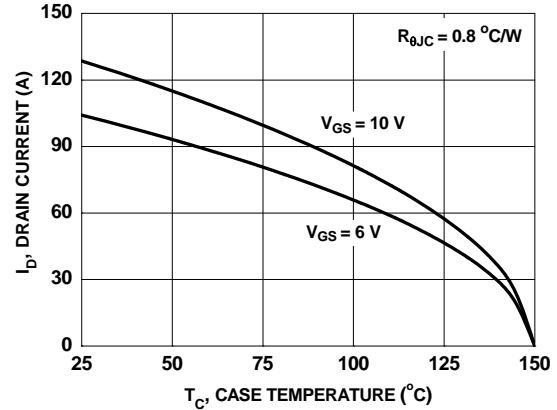


图 10. 最大连续漏极电流与壳温的关系

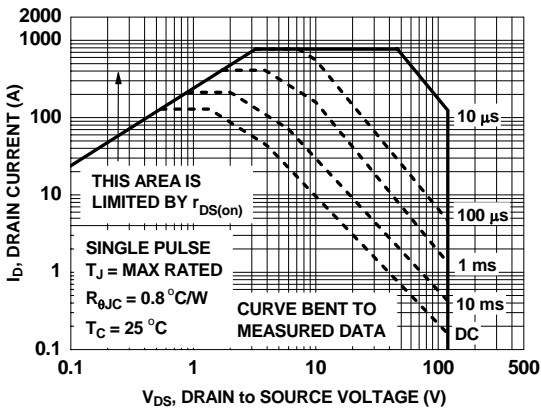


图 11. 正向偏压安全工作区

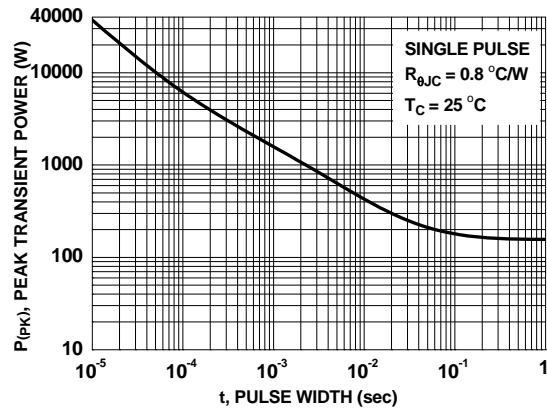


图 12. 单个脉冲最大功耗

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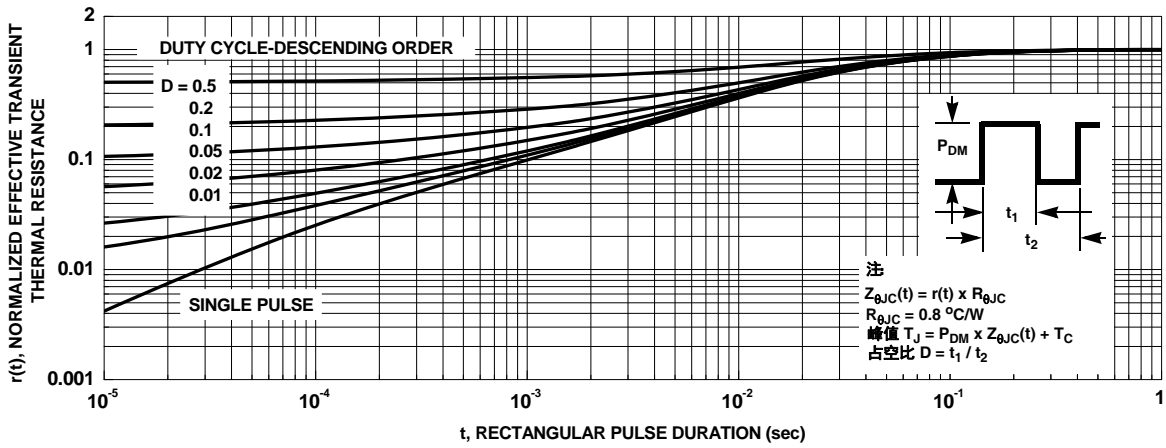
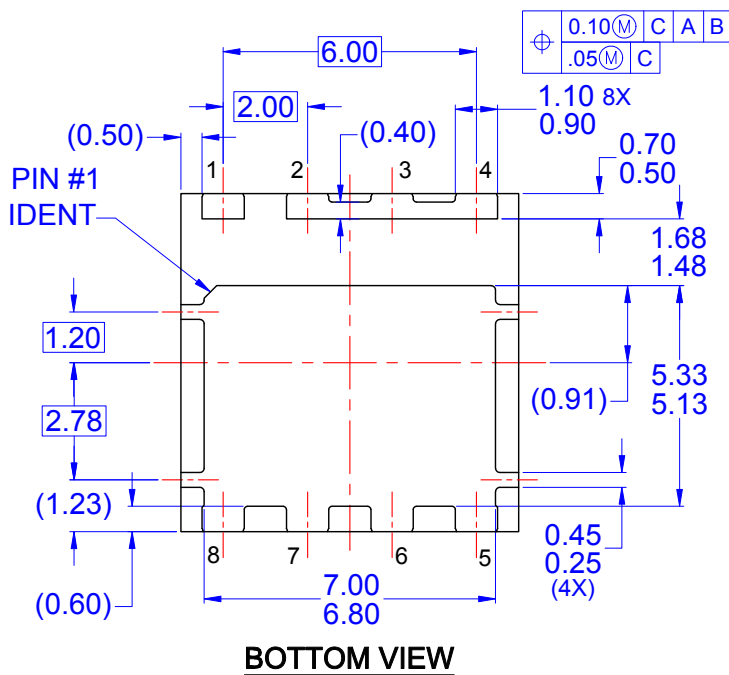
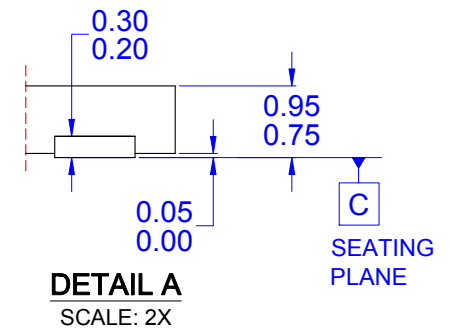
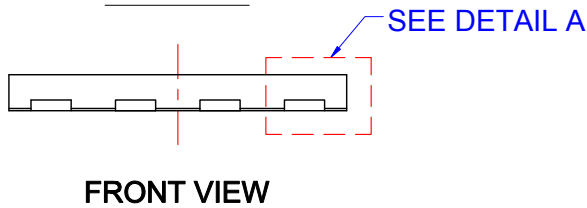
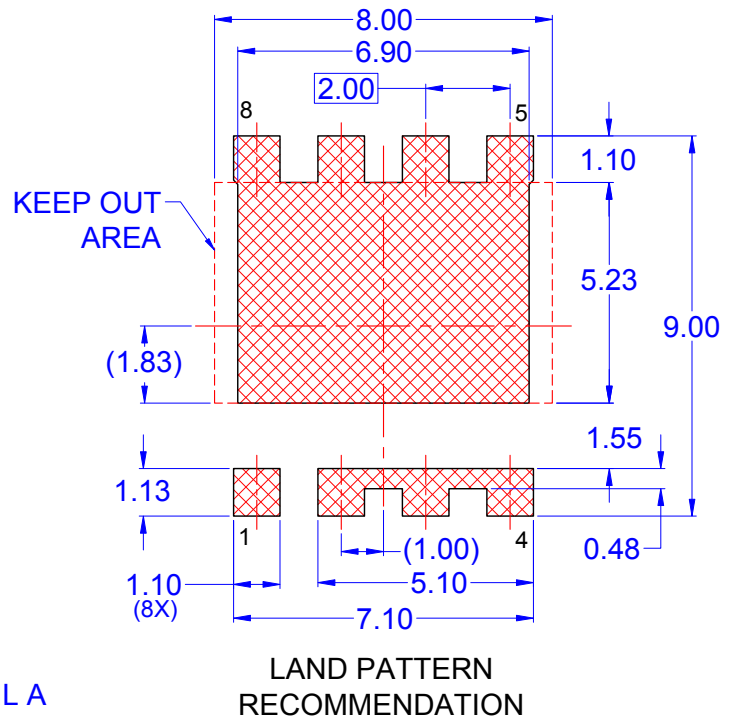
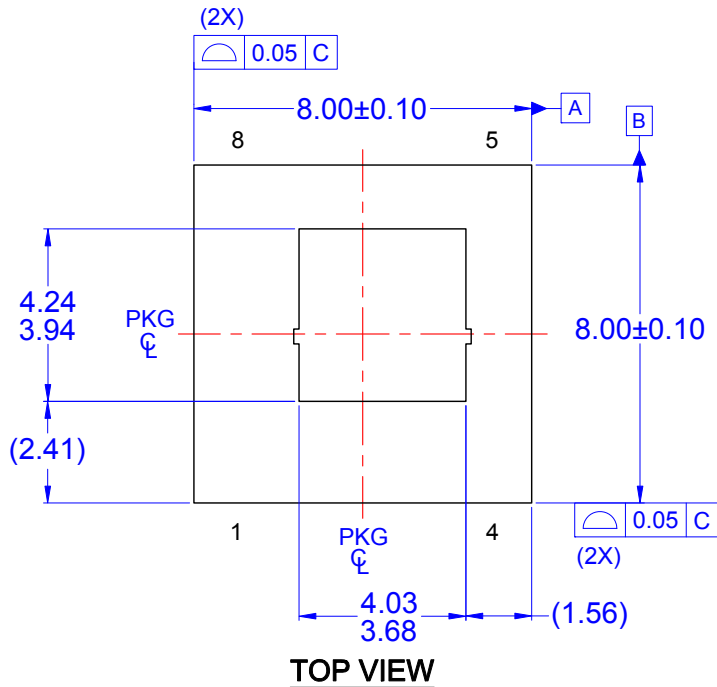


图 13. 结至外壳瞬态热响应曲线



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