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2014 年 11 月

# FDBL0120N40

## N 沟道 PowerTrench<sup>®</sup> MOSFET

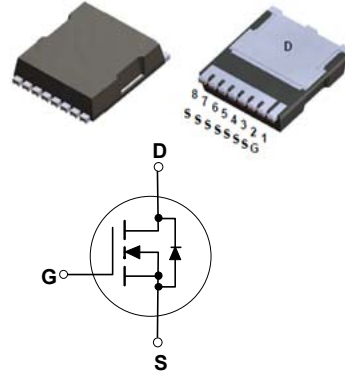
40 V, 240 A, 1.2 mΩ

### 特性

- 典型值  $R_{DS(on)} = 0.9 \text{ m}\Omega$  ( $V_{GS} = 10 \text{ V}$ ,  $I_D = 80 \text{ A}$ )
- 典型值  $Q_g(\text{tot}) = 90 \text{ nC}$  ( $V_{GS} = 10 \text{ V}$ ,  $I_D = 80 \text{ A}$ )
- UIS 能力
- 符合 RoHS 标准

### 应用

- 工业电机驱动器
- 工业电源
- 工业自动化
- 电动工具
- 电池保护
- 太阳能逆变器
- UPS 和能源逆变器
- 储能
- 负载开关



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

符号	参数	额定值	单位
$V_{DSS}$	漏极至源极电压的关系	40	V
$V_{GS}$	栅极至源极电压	$\pm 20$	V
$I_D$	漏极电流—连续 ( $V_{GS}=10$ ) (注 1)	$T_C = 25^\circ\text{C}$	240
	脉冲漏电流	$T_C = 25^\circ\text{C}$	见图 4
$E_{AS}$	单脉冲雪崩能量 (注 2)	316	mJ
$P_D$	功耗	300	W
	超过 $25^\circ\text{C}$ 时降额	2.0	W/ $^\circ\text{C}$
$T_J, T_{STG}$	工作和存储温度	-55 至 + 175	$^\circ\text{C}$
$R_{\theta JC}$	结点—壳体的热阻	0.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻最大值 (注 3)	43	$^\circ\text{C}/\text{W}$

### 注意:

- 1: 电流受接线配置限制。
- 2: 电感充电期间, 起始  $T_J = 25^\circ\text{C}$ ,  $L = 0.1 \text{ mH}$ ,  $I_{AS} = 79.5 \text{ A}$ ,  $V_{DD} = 40 \text{ V}$ , 雪崩时间  $V_{DD} = 0 \text{ V}$ 。
- 3:  $R_{\theta JA}$  等于结至壳体和壳体至环境热阻之和, 其中, 壳体热参考定义为漏极引脚的焊料安装表面。 $R_{\theta JC}$  具备设计保证, 其中  $R_{\theta JA}$  由电路板设计确定。此处的最大额定值基于安装在 2oz 铜的  $1 \text{ in}^2$  焊盘上。

### 封装标识与订购信息

器件标识	器件	封装			
FDBL0120N40	FDBL0120N40	MO-299A	-	-	-

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

$B_{V_{DS}}$	漏极至源极击穿电	$I_D = 250\ \mu\text{A}$ , $V_{GS} = 0\ \text{V}$	40	-	-	V
$I_{DSS}$	漏极至源极漏电流	$V_{DS} = 40\ \text{V}$ , $T_J = 25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{GS} = 0\ \text{V}$ , $T_J = 175^\circ\text{C}$ (注 4)	-	-	1	mA
$I_{GSS}$	栅极至源极漏电流	$V_{GS} = \pm 20\ \text{V}$	-	-	$\pm 100$	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	3.2	4.0	V
$R_{DS(on)}$	漏极至源极导通电阻	$I_D = 80\ \text{A}$ , $T_J = 25^\circ\text{C}$	-	0.90	1.20	m $\Omega$
		$V_{GS} = 10\ \text{V}$ , $T_J = 175^\circ\text{C}$ (注 4)	-	1.64	1.86	m $\Omega$

### 动态特性

$C_{iss}$	输入电容	$V_{DS} = 25\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $f = 1\ \text{MHz}$	-	7735	-	pF
$C_{oss}$	输出电容		-	2160	-	pF
$C_{riss}$	反向传输电容		-	129	-	pF
$R_g$	栅极阻抗	$f = 1\ \text{MHz}$	-	2.5	-	$\Omega$
$Q_{g(ToT)}$	在 10 V 的栅极总电荷	$V_{GS} = 0$ 至 $10\ \text{V}$	-	90	107	nC
$Q_{g(th)}$	阈值栅极电荷	$V_{GS} = 0$ 至 $2\ \text{V}$				
$Q_{gs}$	栅极至源极栅极电荷	$V_{DD} = 32\ \text{V}$ $I_D = 80\ \text{A}$	-	43	-	nC
$Q_{gd}$	栅极至漏极“米勒”电荷		-	10	-	nC

### 开关特性

$t_{on}$	导通时间	$V_{DD} = 20\ \text{V}$ , $I_D = 80\ \text{A}$ , $V_{GS} = 10\ \text{V}$ , $R_{GEN} = 6\ \Omega$	-	-	102	ns
$t_{d(on)}$	导通延迟		-	33	-	ns
$t_r$	上升时间		-	40	-	ns
$t_{d(off)}$	关断延迟		-	47	-	ns
$t_f$	下降时间		-	23	-	ns
$t_{off}$	关断时间		-	-	91	ns

### 漏极 - 源极二极管特性

$V_{SD}$	源极至漏极二极管电压	$I_{SD} = 80\ \text{A}$ , $V_{GS} = 0\ \text{V}$	-	-	1.25	V
		$I_{SD} = 40\ \text{A}$ , $V_{GS} = 0\ \text{V}$	-	-	1.2	V
$t_{rr}$	反向恢复时间	$I_F = 80\ \text{A}$ , $di_{SD}/dt = 100\ \text{A}/\mu\text{s}$ , $V_{DD} = 32\ \text{V}$	-	91	107	ns
$Q_{rr}$	反向恢复电荷		-	128	167	nC

#### 说明:

4: 其最大值根据  $T_J = 175^\circ\text{C}$  时的设计确定。在生产中，未对此条件测试产品。

典型特性

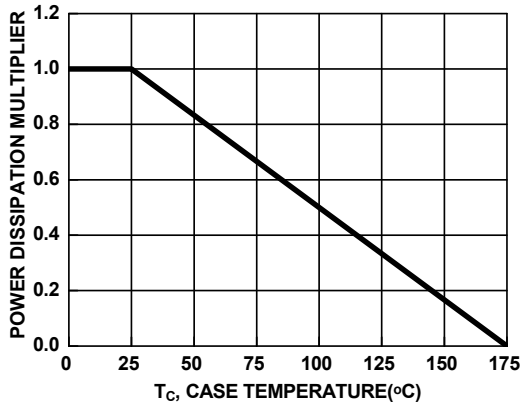


图 1. 标准化功耗与壳体温度的关系

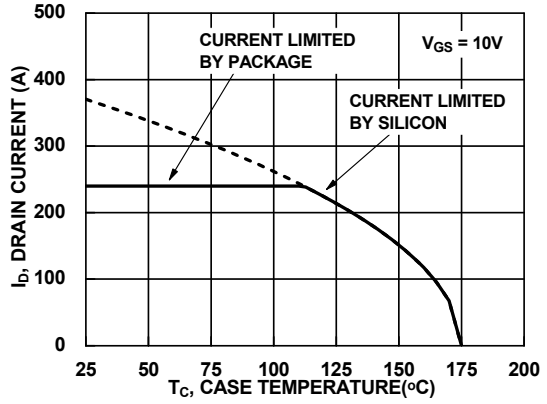


图 2. 最大连续漏电流与壳体温度的关系

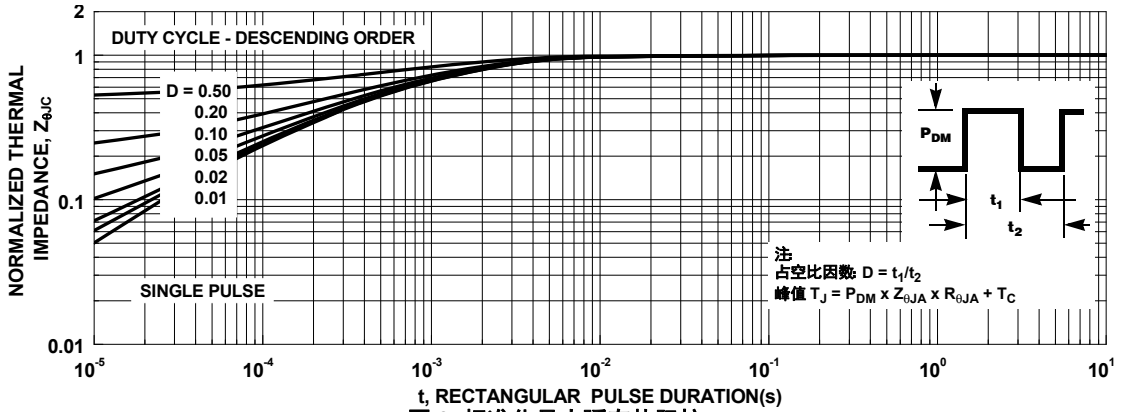


图 3. 标准化最大瞬态热阻抗

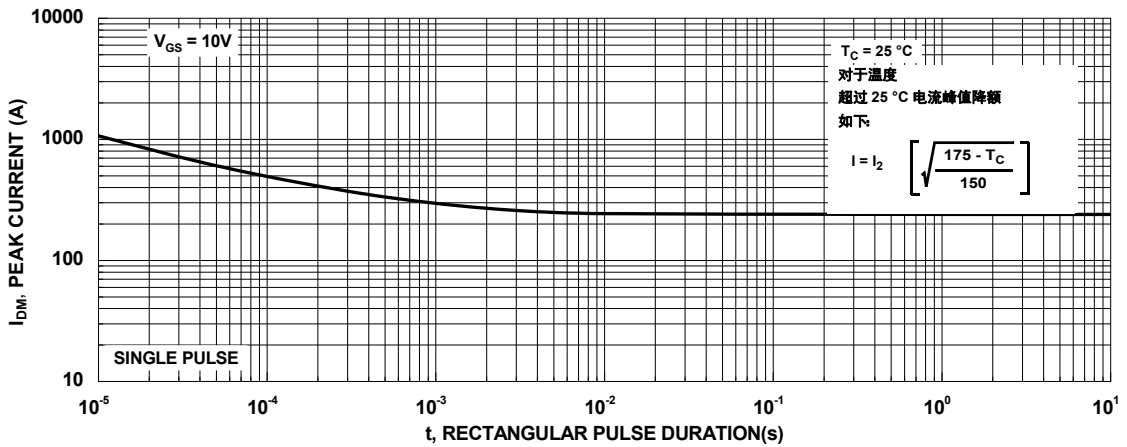


图 4. 峰值电流能力

典型特性

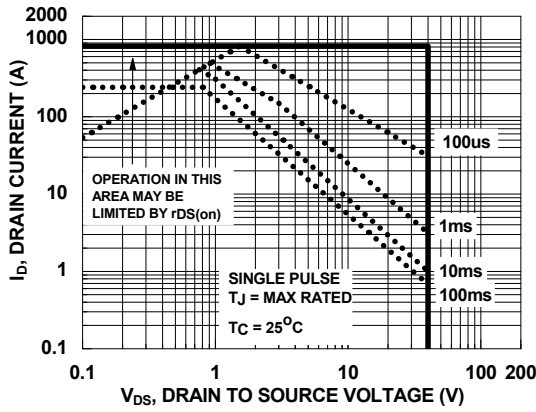
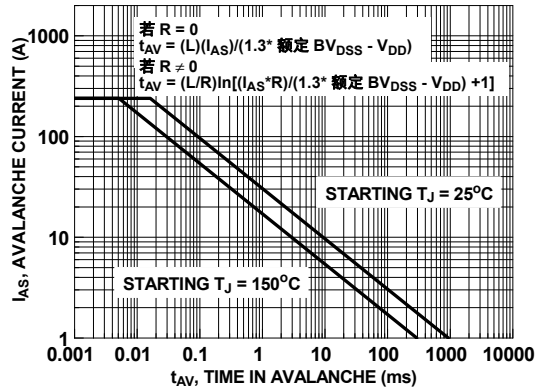


图 5. 正向偏压安全工作区



注: 请参考 Fairchild 应用指南 AN7514 和 AN7515

图 6. 非感性感性开关性能

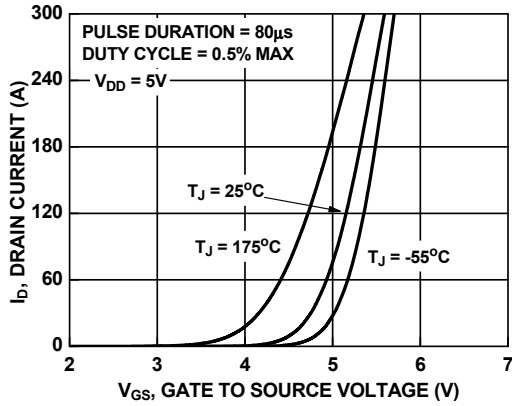


图 7. 传递特性

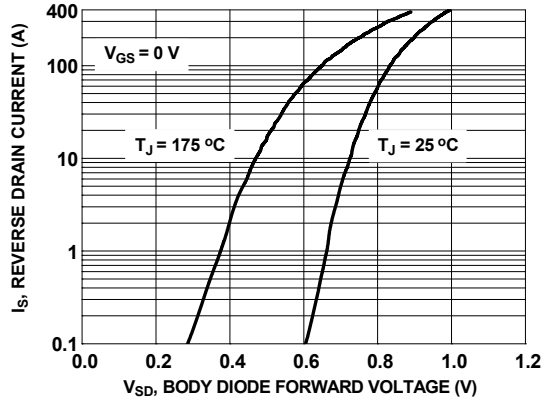


图 8. 正向二极管特性

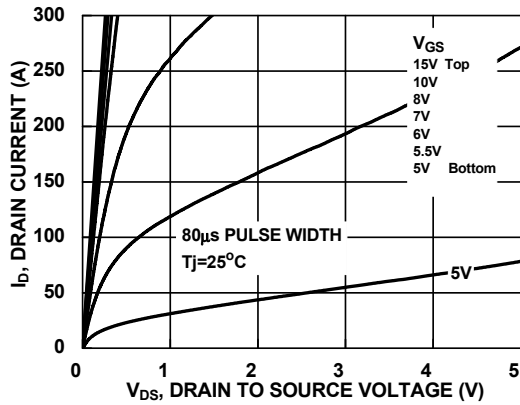


图 9. 饱和特性

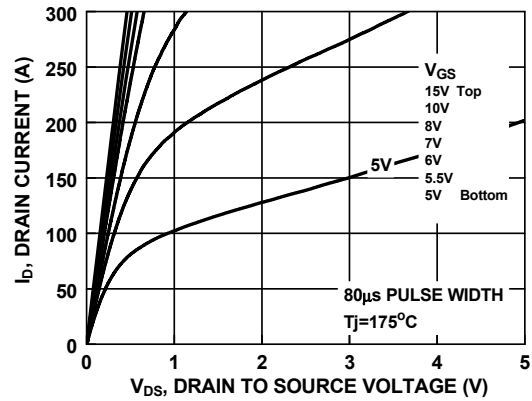


图 10. 饱和特性

典型特性

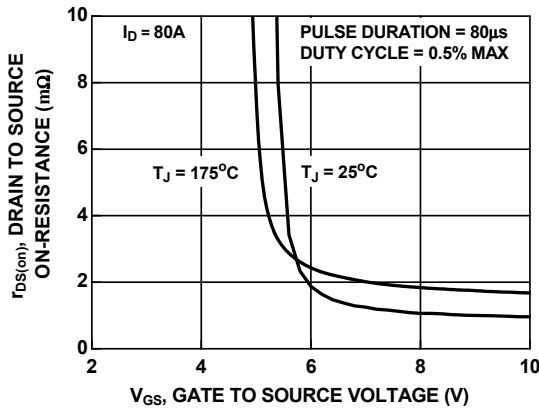


图 11.  $R_{DS(on)}$  与栅极电压的关系

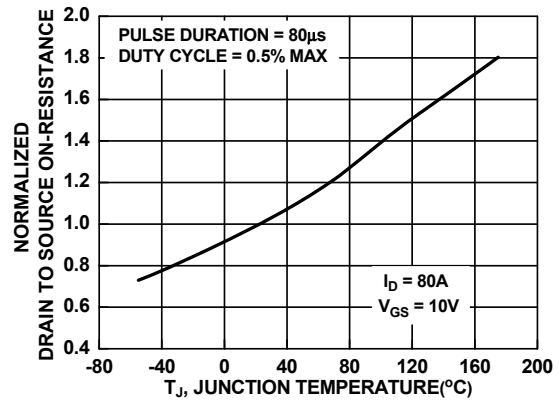


图 12. 标准化  $R_{DS(on)}$  与结温的关系

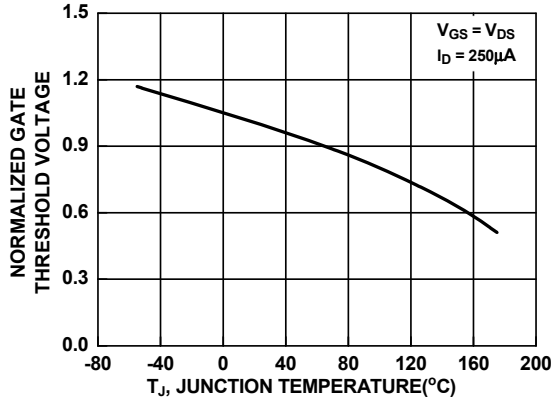


图 13. 标准化栅极阈值电压与温度的关系

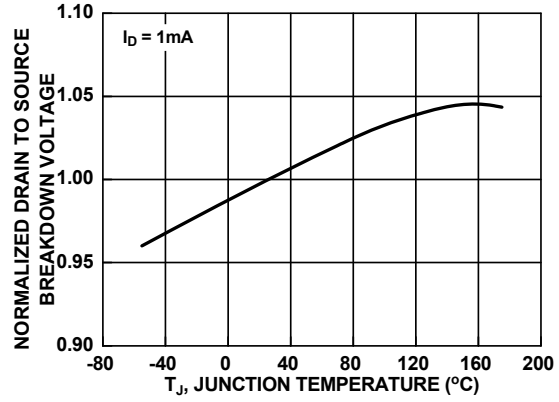


图 14. 标准化漏极至源极击穿电压与结温的关系

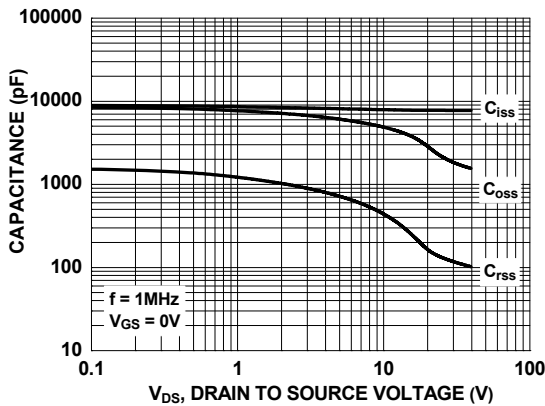


图 15. 电容与漏极-源极电压的关系

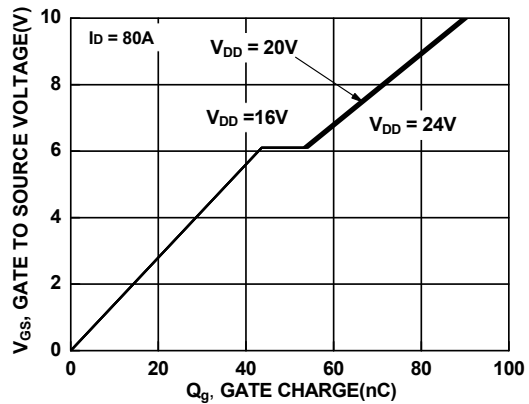
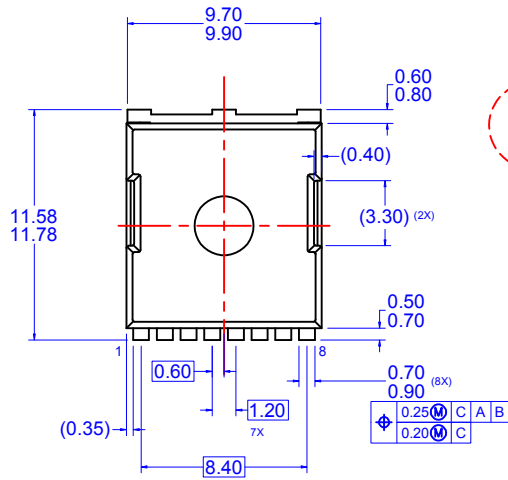
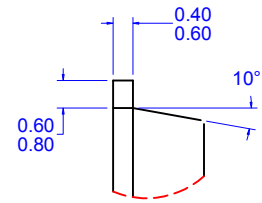
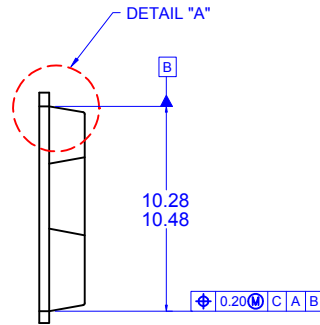


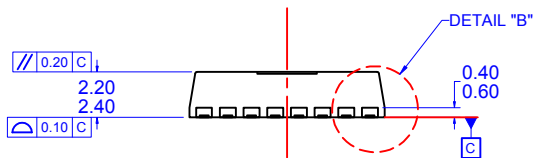
图 16. 栅极电荷与栅极-源极电压的关系



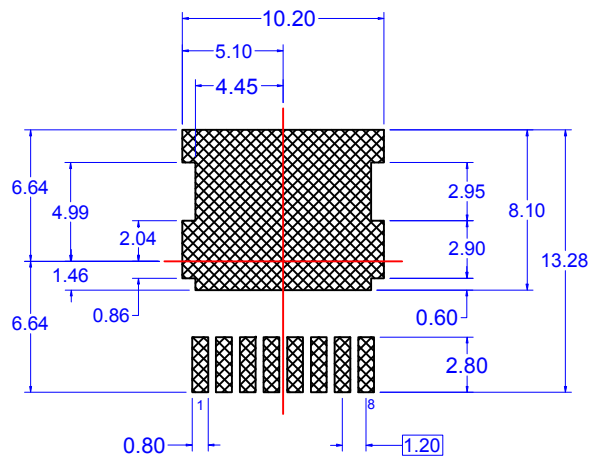
TOP VIEW



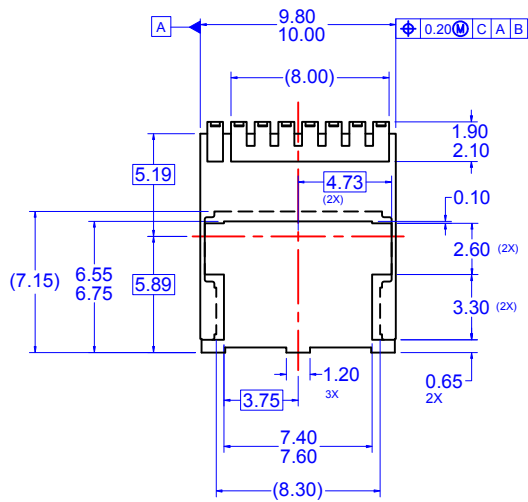
DETAIL "A"



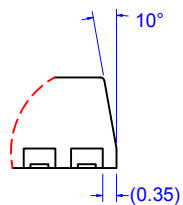
SIDE VIEW



LAND PATTERN RECOMMENDATION



BOTTOM VIEW



DETAIL "B"

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- A) PACKAGE STANDARD REFERENCE: JEDEC MO-299, ISSUE A, DATED NOVEMBER 2009.
  - 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-1994.
  - E) DRAWING FILE NAME: MKT-PSOF08AREV3

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