Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

2015 年 3 月

FDMS86202ET120

N 沟道屏蔽栅极 PowerTrench® MOSFET
120 V, 102 A, 7.2 mΩ

特性

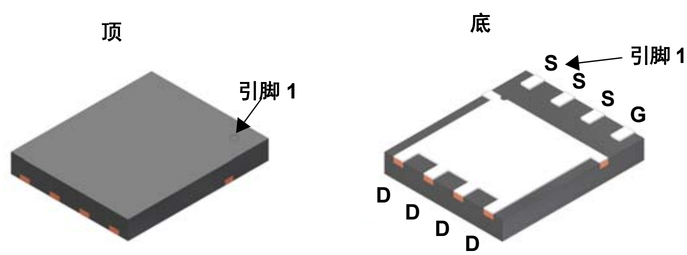
- 扩展额定 T_J 至 175°C
- 屏蔽栅极 MOSFET 技术
- 最大 $r_{DS(on)}$ = 7.2 mΩ (V_{GS} = 10 V, I_D = 13.5 A)
- 最大 $r_{DS(on)}$ = 10.3 mΩ (V_{GS} = 6 V, I_D = 11.5 A)
- 低 $r_{DS(on)}$ 和高效的先进硅封装
- MSL1 耐用封装设计
- 100% 经过 UIL 测试
- 符合 RoHS 标准

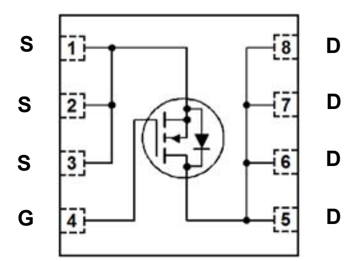
概述

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

- DC-DC 转换





Power 56

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			120	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）	102	A
	- 连续	T_C = 100°C	（注 5）	72	
	- 连续	T_A = 25°C	（注 1a）	13.5	
	- 脉冲		（注 4）	538	
E_{AS}	单脉冲雪崩能量		（注 3）	600	mJ
P_D	功耗	T_C = 25 °C		187	W
	功耗	T_A = 25 °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		0.8	°C/W
$R_{\theta JA}$	结至环境热阻最大值	（注 1a）	45	

封装标识与定购信息

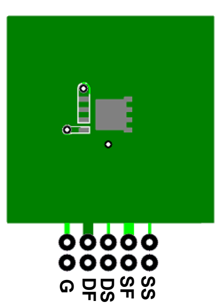
器件标识	器件	封装	卷尺寸	带宽	数量
FDMS86202ET	FDMS86202ET120	Power 56	13 ”	12 mm	3000 units

电气特性 T_J = 25°C，除非另有说明

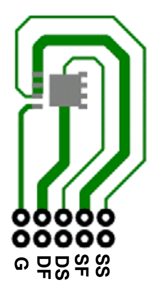
符号	参数	测试条件	最小值	典型值	最大值	单位
关断特性						
BV_{DSS}	漏极—源极击穿电压	I_D = 250 µA, V_{GS} = 0 V	120			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	I_D = 250 µA （相对 25 °C）		103		mV/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 96 V, V_{GS} = 0 V			1	µA
I_{GSS}	栅极—源极漏电流	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
导通特性						
$V_{GS(th)}$	栅极—源极阈值电压	V_{GS} = V_{DS}, I_D = 250 µA	2.0	3.1	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 µA （相对 25 °C）		-10		mV/°C
$r_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 13.5 A		6.0	7.2	mΩ
		V_{GS} = 6 V, I_D = 11.5 A		8.1	10.3	
		V_{GS} = 10 V, I_D = 13.5 A, T_J = 125 °C		10.9	13.2	
g_{FS}	正向跨导	V_{DS} = 5 V, I_D = 13.5 A		44		S
动态特性						
C_{iss}	输入电容	V_{DS} = 60 V, V_{GS} = 0 V, f = 1 MHz		3275	4585	pF
C_{oss}	输出电容			460	644	pF
C_{rss}	反向传输电容			17	30	pF
R_g	栅极阻抗		0.1	0.9	2.7	Ω
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 60 V, I_D = 13.5 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		21	33	ns
t_r	上升时间			8.75	17.5	ns
$t_{d(off)}$	关断延迟时间			27.2	44	ns
t_f	下降时间			6.1	12.2	ns
Q_g	总栅极电荷	V_{GS} = 0 V 到 10 V; V_{DD} = 60 V, I_D = 13.5 A		45	64	nC
Q_g	总栅极电荷	V_{GS} = 0 V 到 6 V; V_{DD} = 60 V, I_D = 13.5 A		29	41	nC
Q_{gs}	栅极—源极电荷	V_{DD} = 60 V, I_D = 13.5 A		14.3		nC
Q_{gd}	栅极—漏极“米勒”电荷	V_{DD} = 60 V, I_D = 13.5 A		9.5		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 V, I_S = 2.1 A （注 2）		0.69	1.2	V
		V_{GS} = 0 V, I_S = 13.5 A （注 2）		0.76	1.3	
t_{rr}	反向恢复时间	I_F = 13.5 A, di/dt = 100 A/µs		79	127	ns
Q_{rr}	反向恢复电荷			140	224	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^2 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 °C/W（安装于 1 英寸^2 的 2 盎司铜焊盘）



b) 115 °C/W （安装于最小 2 盎司铜焊盘上）

2. 脉冲测试：脉宽 < 300 µ，占空比 < 2.0%。
3. 600 mJ 的 E_{AS} 取决于起始 T_J = 25 °C、 L = 3 mH、 I_{AS} = 20 A、 V_{DD} = 120 V、 V_{GS} = 10 V。测试百分比 100%：L = 0.1 mH、 I_{AS} = 65 A。
4. 脉冲 Id 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 °C 除非另有说明

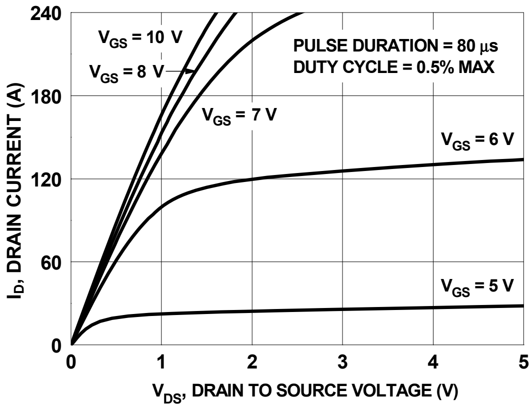


图 1. 导通区域特性

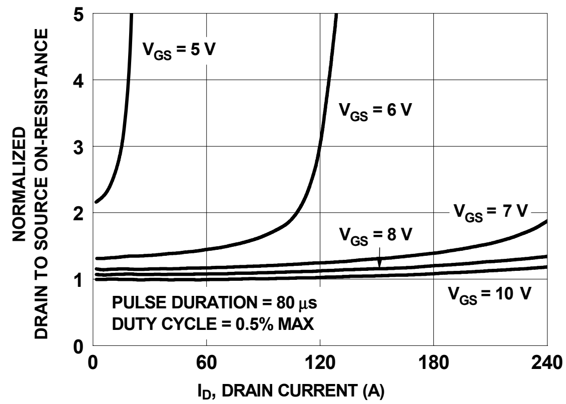


图 2. 标准化导通电阻 vs 漏极电流和栅极电压

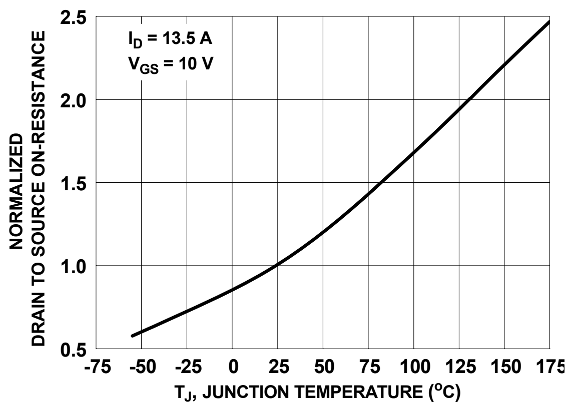


图 3. 标准化导通电阻 vs 结温

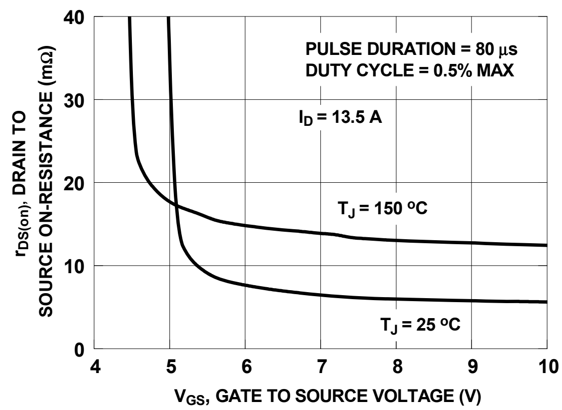


图 4. 导通电阻 vs 栅极一源极电压

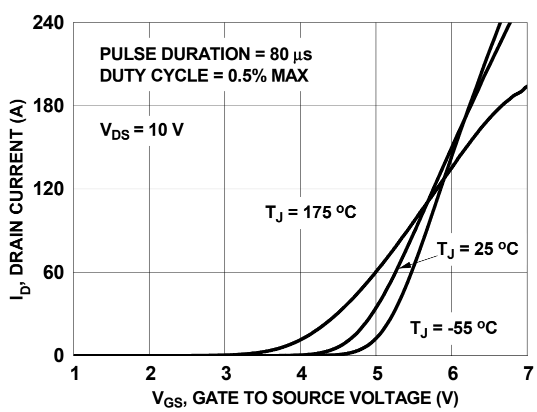


图 5. 转换特性

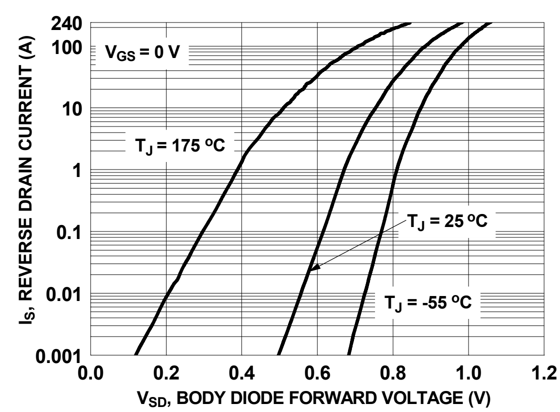


图 6. 源极一漏极二极管正向电压 vs 源极电流

典型特性 T_J = 25 °C 除非另有说明

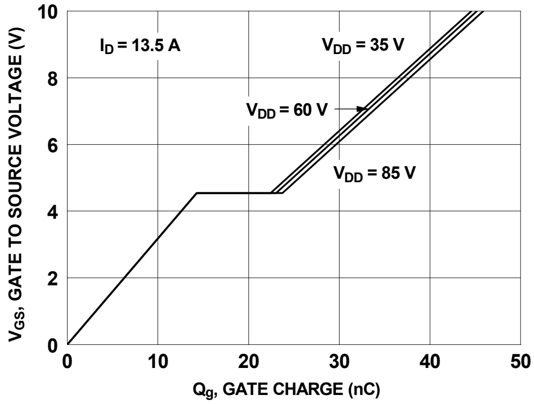


图 7. 栅极电荷特性

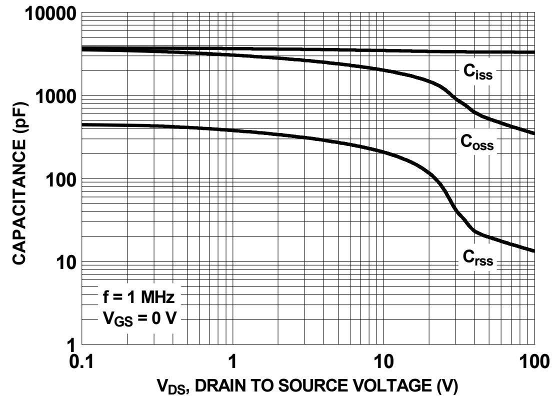


图 8. 电容 vs 漏极一源极电压

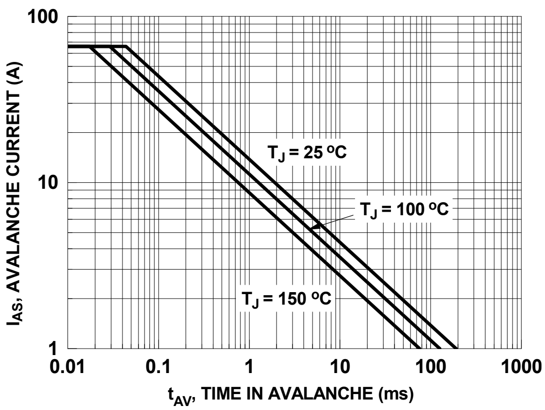


图 9. 非钳位感应开关能力

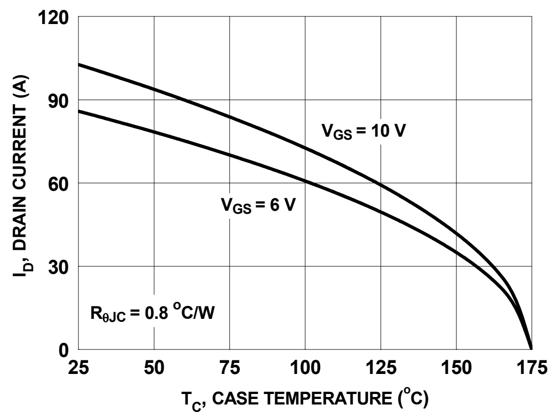


图 10. 最大连续漏极电流 vs 壳体温度

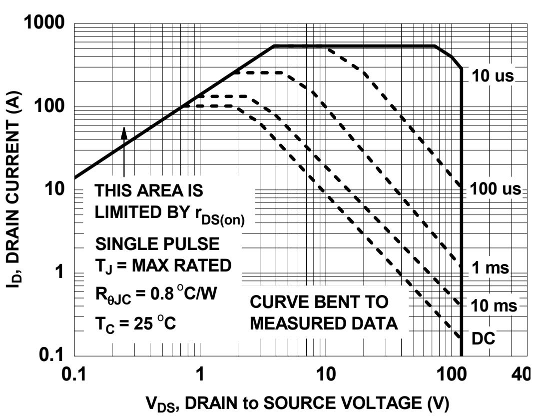


图 11. 正向偏置安全工作区

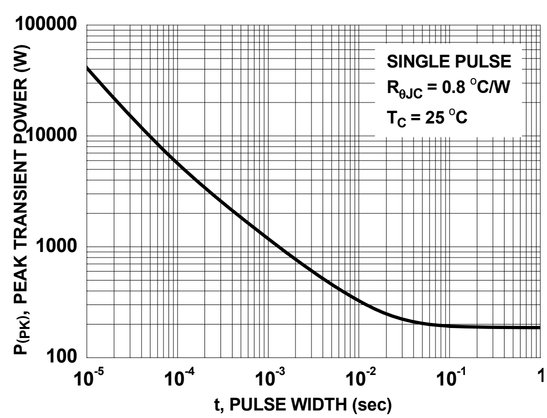


图 12. 单脉冲最大功耗

©2015 飞兆半导体公司

典型特性 T_J = 25 °C 除非另有说明

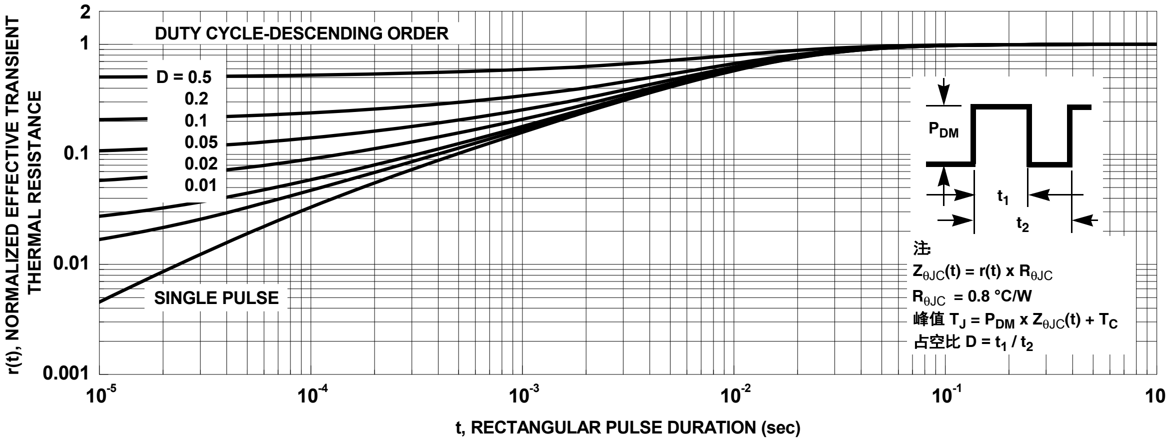
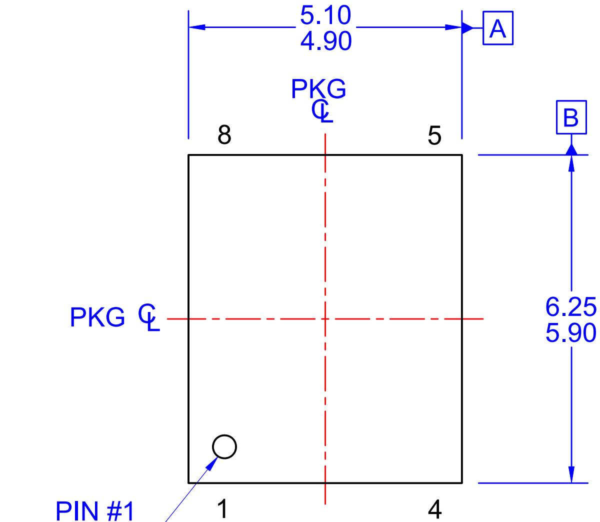
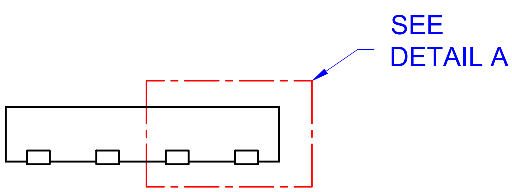


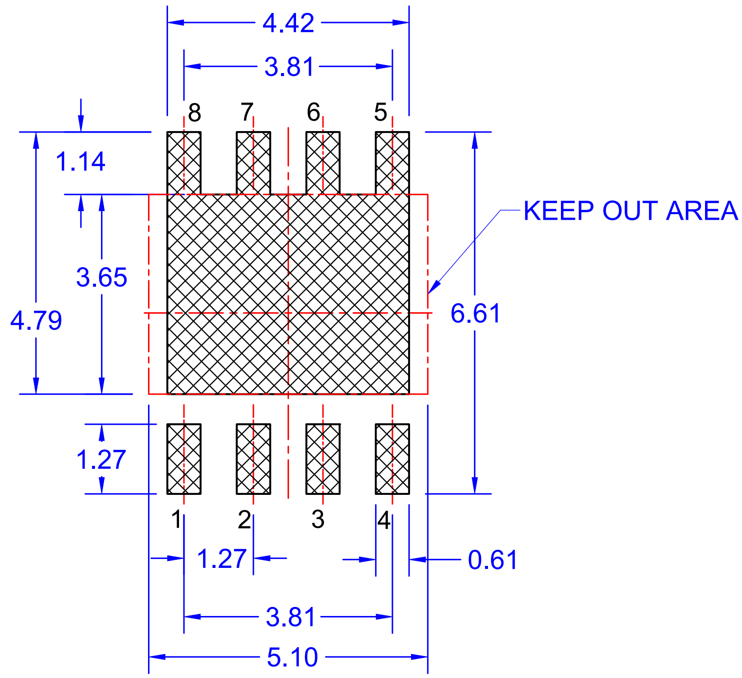
图 13. 结 - 环境之间瞬态热响应曲线



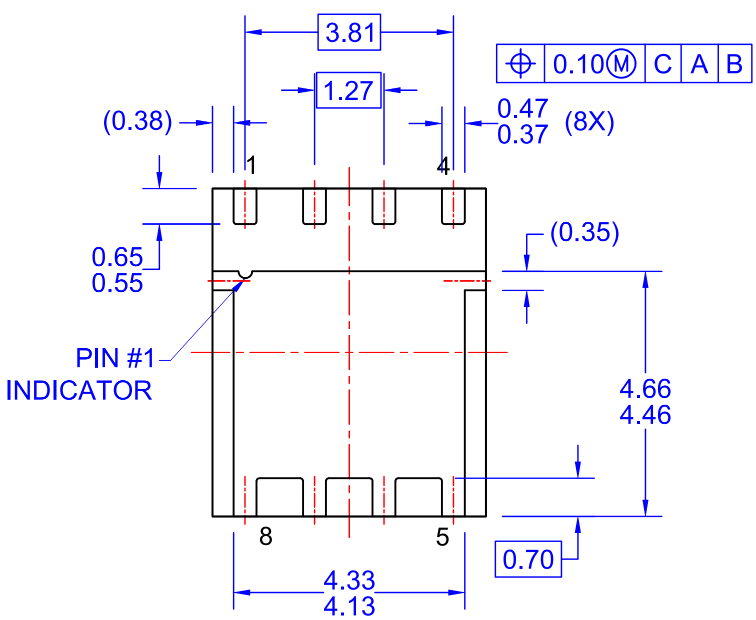
TOP VIEW



SIDE VIEW

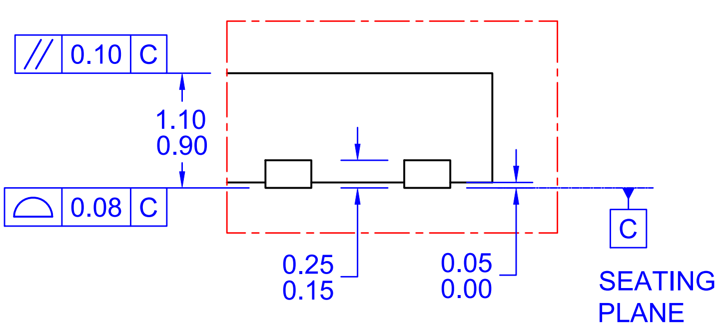


LAND PATTERN
RECOMMENDATION



BOTTOM VIEW

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.



DETAIL A
SCALE: 2:1

FAIRCHILD

ON Semiconductor and ON are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative