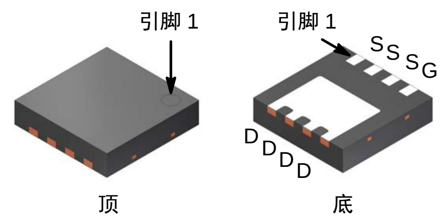
MOSFET – N 沟道屏蔽栅极 POWERTRENCH®

100 V, 43 A, 14 mΩ

FDMC86160ET100

V_{DS}	$r_{DS(on)}$ MAX	I_D MAX
100 V	14 mΩ @ 10 V	43 A
	23 mΩ @ 6 V	



WDFN8 3.3x3.3, 0.65P
(Power 33)
CASE 483 AW

概述

此 N 沟道M MOSFET 采用 **onsemi** 带屏蔽栅极技术的先进 POWERTRENCH 工艺生产。该工艺针对导通电阻进行了优化。此器件非常适合需要在小空间内实现超低 R_{DS} (on) 的应用，例如高性能 VRM、POL 和 Orring 功能。

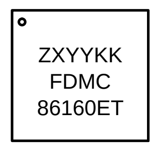
特性

- T_J 额定值扩展：175°C
- 屏蔽栅极 MOSFET 技术
- 最大 $r_{DS(on)}$ = 14 mΩ at V_{GS} = 10 V, I_D = 9 A
- 最大 $r_{DS(on)}$ = 23 mΩ at V_{GS} = 6 V, I_D = 7 A
- 高性能沟道技术可实现极低的 $r_{DS(on)}$
- 终端无引线且符合 RoHS 标准

应用

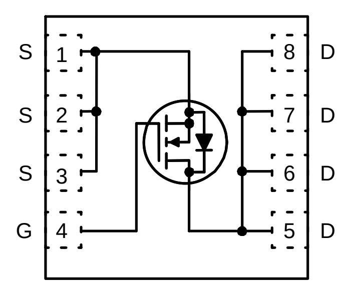
- 桥式拓扑
- 同步整流器

MARKING DIAGRAM



Z = Assembly Plant Code
XYY = 3−Digit Date Code Format
KK = 2−Alphanumeric Lot Run Traceability Code
FDMC86160ET = Device Code

PIN ASSIGNMENT



ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

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}	漏极一源极电压				100	V
V_{GS}	栅极一源极电压				±20	V
I_D	漏极电流	− 连续	T_C = 25°C	(注 5)	43	A
		− 连续	T_C = 100°C	(注 5)	31	
		− 连续	T_A = 25°C	(注 1a)	9	A
		− 脉冲		(注 4)	204	A
E_{AS}	单脉冲雪崩能量			(注 3)	181	mJ
P_D	功耗	T_C = 25°C			65	W
	功耗	T_A = 25°C		(注 1a)	2.8	
T_J, T_{STG}	功耗				−55 至 +175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
(参考译文)
如果电压超过最大额定值表中列出的值范围，器件可能会损坏。如果超过任何这些限值，将无法保证器件功能，可能会导致器件损坏，影响可靠性。

热性能

符号	参数		额定值	单位
$R_{\theta JC}$	热性能	(注 1)	2.3	°C/W
$R_{\theta JA}$	结至环境热阻	(注 1a)	53	

电气特性 (T_J = 25°C 除非另有说明)

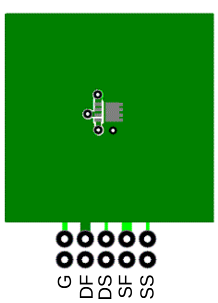
符号	参数	测试条件	最小值	典型值	最大值	单位
关断特性						
BV_{DSS}	漏极一源极击穿电压	I_D = 250 μA, V_{GS} = 0 V	100	−	−	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	I_D = 250 μA, 参考温度为 25°C	−	73	−	mV/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 80 V, V_{GS} = 0 V	−	−	1	μA
I_{GSS}	栅极一源极漏电流	V_{GS} = ±20 V, V_{DS} = 0 V	−	−	±100	nA
导通特性						
$V_{GS(th)}$	栅极一源极阈值电压	V_{GS} = V_{DS}, I_D = 250 μA	2	2.9	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	栅极一源极阈值电压温度系数	I_D = 250 μA, 参考温度为 25°C	−	−9	−	mV/°C
$r_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 9 A	−	11.2	14	mΩ
		V_{GS} = 6 V, I_D = 7 A	−	16	23	
		V_{GS} = 10 V, I_D = 9 A, T_J = 125°C	−	21	26	
g_{FS}	正向跨导	V_{DD} = 10 V, I_D = 9 A	−	43	−	S
动态特性						
C_{iss}	输入电容	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	−	968	1290	pF
C_{oss}	输出电容		−	241	320	pF
C_{rss}	反向传输电容		−	11	20	pF
R_g	栅极阻抗		0.1	0.6	2.5	Ω

电气特性 (T_J = 25°C 除非另有说明) (continued)

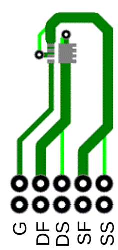
符号	参数	测试条件	最小值	典型值	最大值	单位
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 50 V, I_D = 9 A, V_{GS} = 10 V, R_{GEN} = 6 Ω	–	9.7	19	ns
t_r	上升时间		–	3.6	10	ns
$t_{d(off)}$	关断延迟时间		–	16	30	ns
t_f	下降时间		–	3.4	10	ns
$Q_{g(TOT)}$	总栅极电荷	V_{GS} = 0 V 至 10 V, V_{DD} = 50 V, I_D = 9 A	–	15	22	nC
$Q_{g(TOT)}$	总栅极电荷	V_{GS} = 0 V 至 6 V, V_{DD} = 50 V, I_D = 9 A	–	9.8	15	nC
Q_{gs}	总栅极电荷	V_{DD} = 50 V, I_D = 9 A	–	4.4	–	nC
Q_{gd}	栅极一漏极“米勒”电荷		–	3.5	–	nC
漏极一源极二极管特性						
V_{SD}	源极一漏极二极管正向电压	V_{GS} = 0 V, I_S = 9 A (注 2)	–	0.79	1.3	V
		V_{GS} = 0 V, I_S = 1.9 A (注 2)	–	0.72	1.2	
t_{rr}	反向恢复时间	I_F = 9 A, di/dt = 100 A/μs	–	47	75	ns
Q_{rr}	反向恢复电荷		–	45	73	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
(参考译文)
除非另有说明，“电气特性”表格中列出的是所列测试条件下的产品性能参数。如果在不同条件下运行，产品性能可能与“电气特性”表格中所列性能参数不一致。

1. $R_{\theta JA}$ 取决于安装在一平方英寸衬垫，2 oz 铜焊盘以及 FR−4 材质尺寸 1.5 x 1.5 in. 的衬垫上的器件。$R_{\theta CA}$ 由用户的电路板设计确定。



a. 53 安装在 2 oz 最小 1 in^2 铜焊盘上时的 °C/W



b. 125 安装在 2 oz 最小铜焊盘上时的 °C/W

2. 脉冲测试：脉冲宽度：< 300 μs，占空比：< 2.0%。
3. E_{AS} 为 181 mJ，依据起始 T_J = 25°C、L = 3 mH、I_{AS} = 11 A、V_{DD} = 100 V、V_{GS} = 10 V。在 L = 0.1 mH、I_{AS} = 35 A 时进行 100% 测试。
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°C 除非另有说明)

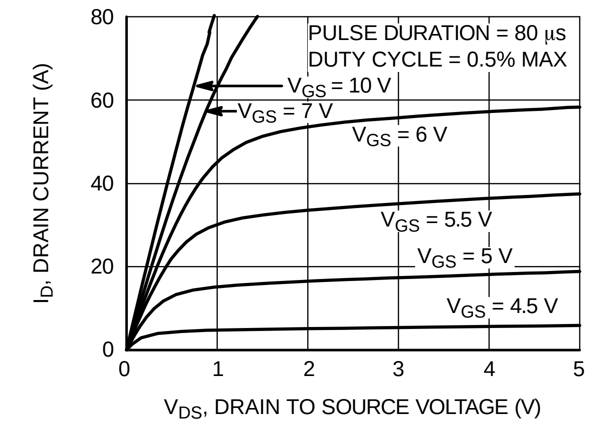


图 1. 通态区域特性

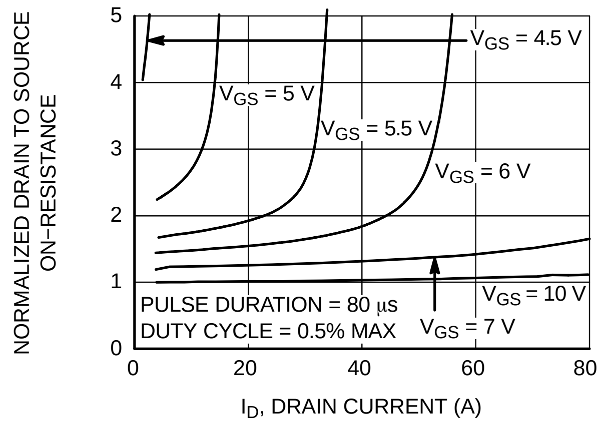


图 2. 标准化导通电阻与漏极电流和栅极电压的关系

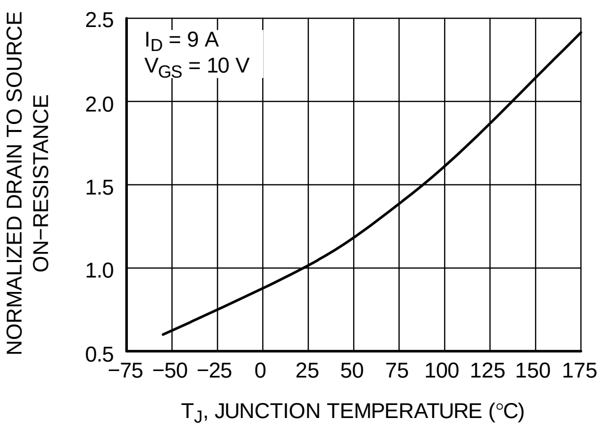


图 3. 标准化导通电阻与结温的关系

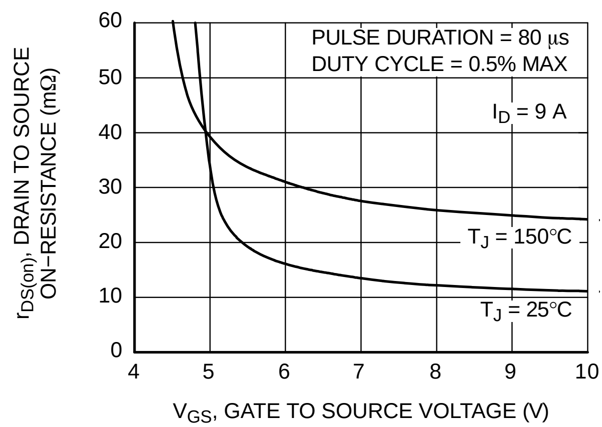


图 4. 导通电阻与栅极−源极电压的关系

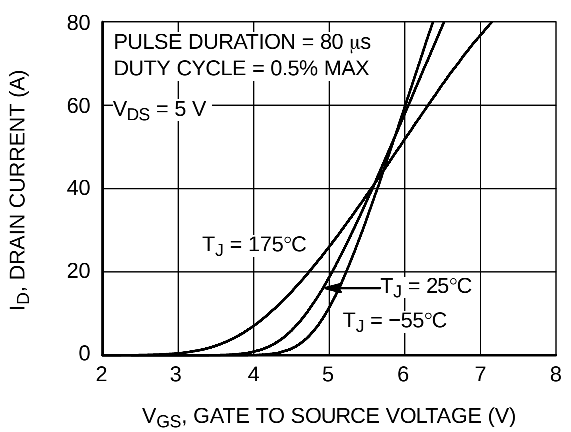


图 5. 转换特性

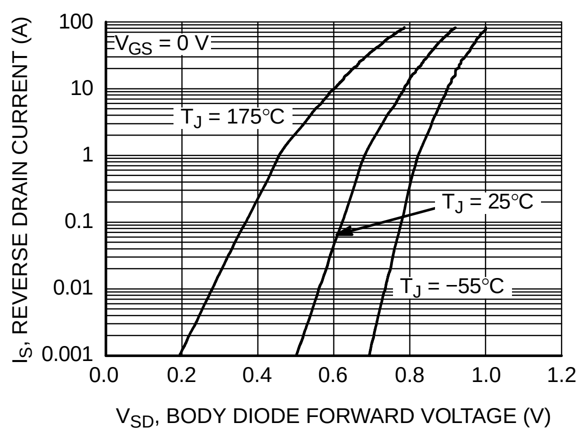


图 6. 源极−漏极二极管正向电压与源电流的关系

典型特性 (T_J = 25°C 除非另有说明)

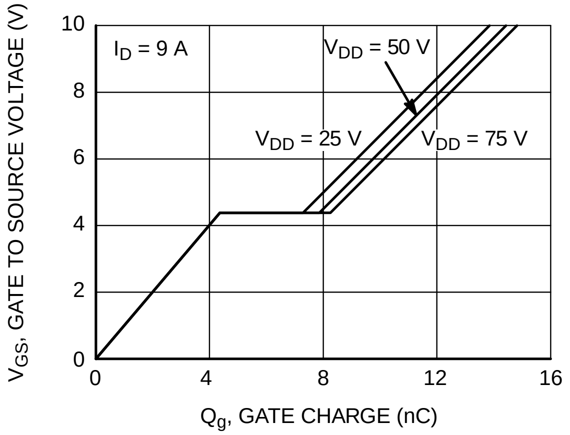


图 7. 栅极电荷特性

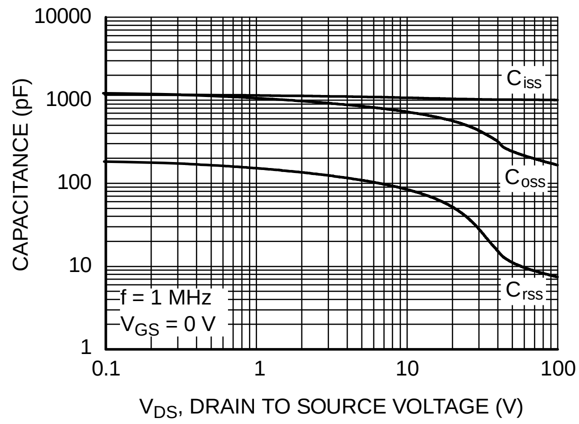


图 8. 电容与漏极-源极电压的关系

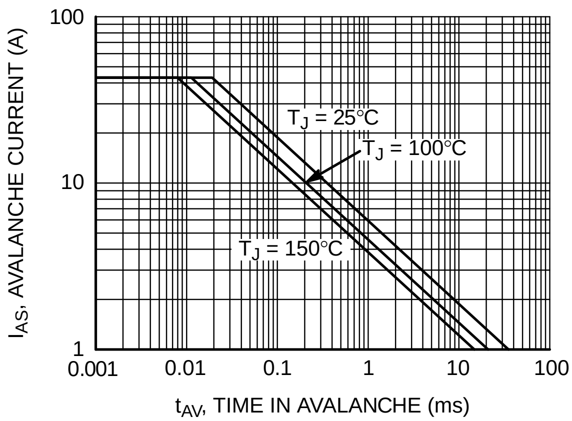


图 9. 非箝位电感开关能力

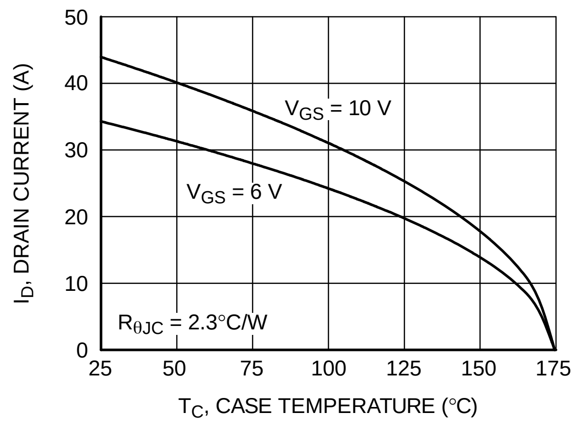


图 10. 最大连续漏极电流与壳温的关系

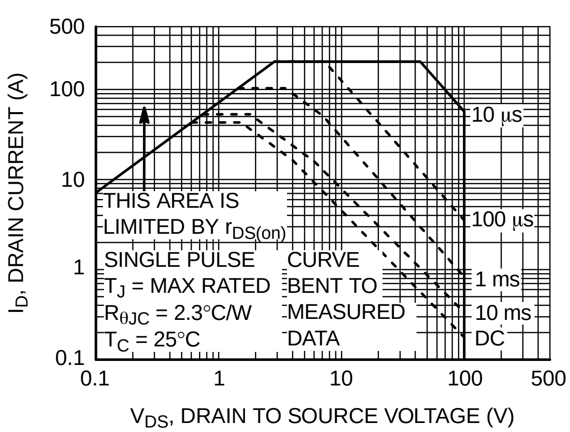


图 11. 正向偏压安全工作区

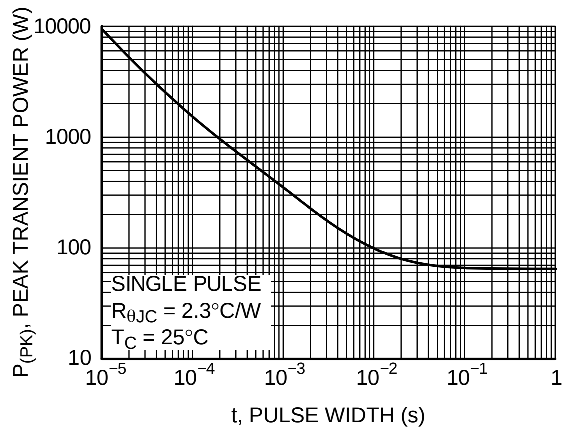


图 12. 单个脉冲最大功耗

典型特性 (T_J = 25°C 除非另有说明)

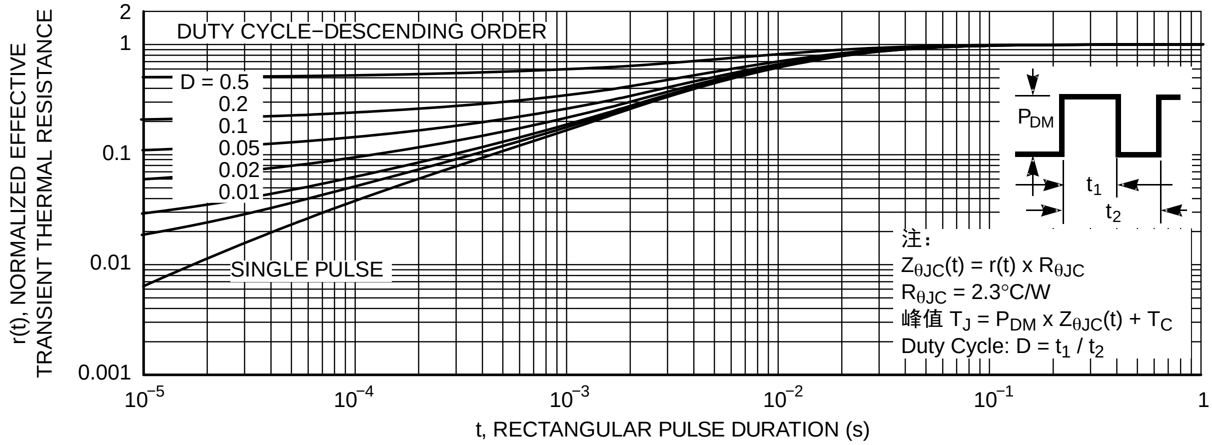
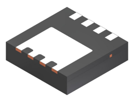


图 13. 结至外壳瞬态热响应曲线

封装标识与定购信息

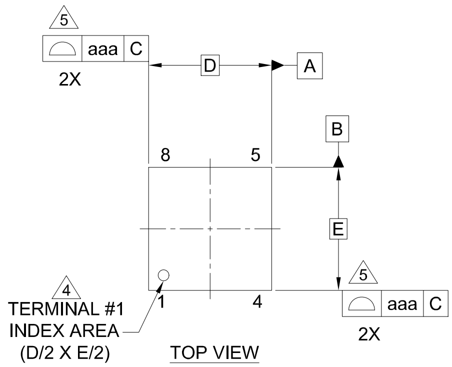
器件	器件标识	封装	卷尺寸	带宽	Shipping†
FDMC86160ET100	FDMC86160ET	WDFN8 3.3x3.3, 0.65P Power 33	13”	12 mm	3000 / Tape & Reel

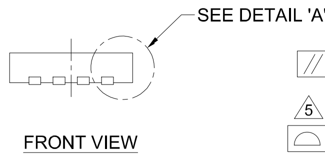
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

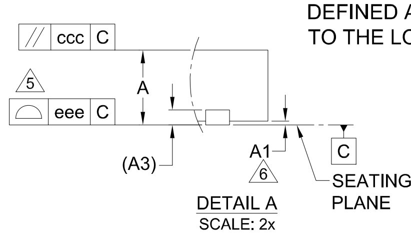


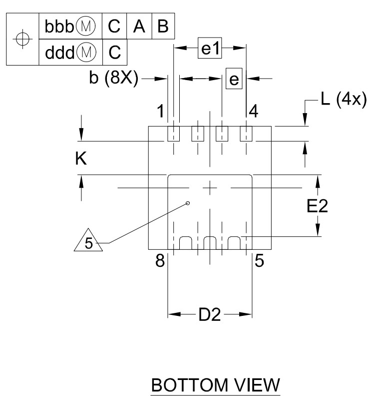
WDFN8 3.30x3.30x0.75, 0.65P
CASE 483AW
ISSUE B

DATE 22 MAR 2024







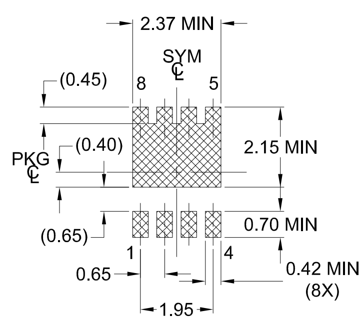


NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
4. THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JEP95 SEC. 3 SPP-12. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD, EMBEDDED METAL OR MARKED FEATURE.
5. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
6. SEATING PLANE IS DEFINED BY THE TERMINALS. 'A1' IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

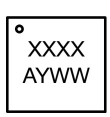
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	--	--	0.05
A3	0.20 REF		
b	0.27	0.32	0.37
D	3.30 BSC		
D2	2.17	2.27	2.37
E	3.30 BSC		
E2	1.56	1.66	1.76
e	0.65 BSC		
e1	1.95 BSC		
K	0.90	--	--
L	0.30	0.40	0.50
aaa	0.10		
bbb	0.10		
ccc	0.10		
ddd	0.05		
eee	0.05		

LAND PATTERN
RECOMMENDATION



*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

GENERIC
MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	98AON13672G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	WDFN8 3.30x3.30x0.75, 0.65P	PAGE 1 OF 1

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales

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