

MOSFET – N 沟道, POWER TRENCH®

150 V, 167 A, 5.9 mΩ

FDH055N15A

说明

此N沟道 MOSFET 采用安森美先进的 POWER TRENCH 工艺生产，这一先进工艺是专为最大限度地降低导通电阻并保持卓越开关性能而定制的。

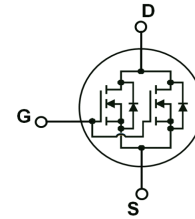
特性

- $R_{DS(on)} = 4.8 \text{ m}\Omega$ (典型值) @ $V_{GS} = 10 \text{ V}$, $I_D = 120 \text{ A}$
- 开关速度快
- 低栅极电荷
- 高性能沟道技术可实现极低的 $R_{DS(on)}$
- 高功率和高电流处理能力
- 符合 RoHS 标准
- 该器件为无铅产品

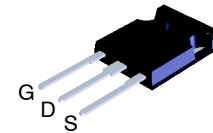
应用

- 用于 ATX / 服务器/ 电信 PSU 的同步整流
- 电池保护电路
- 电机驱动和不间断电源
- 微型太阳能逆变器

V_{DS}	$R_{DS(on)} \text{ MAX}$	$I_D \text{ MAX}$
150 V	5.9 mΩ @ 10 V	167 A

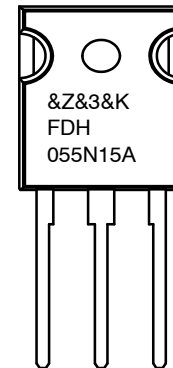


N-CHANNEL MOSFET



TO-247-3LD
CASE 340CK

MARKING DIAGRAM



&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
FDH055N15A	= Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

FDH055N15A

最大绝对额定值 ($T_C = 25^\circ\text{C}$ 除非另有说明)

符号	参数	FDH055N15A	单位
V_{DSS}	漏极-源极电压	150	V
V_{GSS}	栅极-源极电压	- DC	± 20
		- AC ($f > 1\text{ Hz}$)	± 30
I_D	漏极电流	- 连续 ($T_C = 25^\circ\text{C}$, 硅限制)	167 (说明 1)
		- 连续 ($T_C = 100^\circ\text{C}$, 硅限制)	118
		- 连续 ($T_C = 100^\circ\text{C}$, 封装限制)	156
I_{DM}	漏极电流	- 脉冲 (说明 2)	668
E_{AS}	单脉冲雪崩能量 (说明 3)	835	mJ
dv/dt	二极管恢复 dv/dt 峰值 (说明 4)	6.0	V/ns
P_D	功耗	($T_C = 25^\circ\text{C}$)	429
		- 降低至 25°C 以上	2.86
T_J, T_{STG}	工作和存储温度范围	-55 至 +175	$^\circ\text{C}$
T_L	用于焊接的最高引脚温度, 距离外壳 1/8", 持续 5 秒	300	$^\circ\text{C}$

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。

1. 计算连续电流 (基于最高允许结温), 封装限制电流为 156 安。
2. 重复额定值: 脉冲宽度受限于最大结温。
3. $I_{AS} = 23.6\text{ A}$, $L = 3\text{ mH}$, 开始 $T_J = 25^\circ\text{C}$ 。
4. $I_{SD} \leq 120\text{ A}$, $di/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, 开始 $T_J = 25^\circ\text{C}$ 。

热性能

符号	参数	FDH055N15A	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.35	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻最大值	40	

封装标识与订购信息

器件名称	产品标识	封装形式	包装方法	卷尺寸	带宽	数量
FDH055N15A	FDH055N15A	TO-247-3LD	塑料管	N/A	N/A	30 颗

FDH055N15A

电气特性 ($T_C = 25^\circ\text{C}$ 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
----	----	------	-----	-----	-----	----

关断特性

BV_{DSS}	漏极-源极击穿电压	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	150	–	–	V
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	$I_D = 250\text{ }\mu\text{A}$, 温度参考 25°C	–	0.1	–	V/ $^\circ\text{C}$
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 120\text{ V}, V_{GS} = 0\text{ V}$	–	–	1	μA
		$V_{DS} = 120\text{ V}, T_C = 150\text{ }^\circ\text{C}$	–	–	500	
I_{GSS}	栅极-体漏电流	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	–	–	± 100	nA

导通特性

$V_{GS(th)}$	栅极阈值电压	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	2.0	–	4.0	V
$R_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\text{ V}, I_D = 120\text{ A}$	–	4.8	5.9	m Ω
g_{FS}	正向跨导	$V_{DS} = 40\text{ V}, I_D = 120\text{ A}$	–	219	–	S

动态特性

C_{iss}	输入电容	$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	–	7100	9445	pF
C_{oss}	输出电容		–	664	885	pF
C_{rss}	反向传输电容		–	23	35	pF
$C_{oss(er.)}$	能量相关输出电容	$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}$	–	1159	–	pF
$Q_{g(tot)}$	10 V 时的栅极电荷总量	$V_{DS} = 75\text{ V}, I_D = 120\text{ A}, V_{GS} = 10\text{ V}$ (说明 5)	–	92	–	nC
Q_{gs}	栅极-源极栅极电荷		–	31	–	nC
Q_{gs2}	栅极-源极栅极电荷		–	15	–	nC
Q_{gd}	栅极-漏极“米勒”电荷		–	16	–	nC
ESR	等效串联电阻 (G-S)	$f = 1\text{ MHz}$	–	1.2	–	Ω

开关特性

$t_{d(on)}$	导通延迟时间	$V_{DD} = 75\text{ V}, I_D = 120\text{ A},$ $V_{GS} = 10\text{ V}, R_G = 4.7\text{ }\Omega$ (说明 5)	–	35	80	ns
t_r	开通上升时间		–	67	144	ns
$t_{d(off)}$	关断延迟时间		–	71	152	ns
t_f	关断下降时间		–	21	52	ns

漏极-源极二极管特性

I_S	漏极-源极二极管最大正向连续电流		–	–	167 (说明 1)	A
I_{SM}	漏极-源极二极管最大正向脉冲电流		–	–	668	A
V_{SD}	漏极-源极二极管正向电压	$V_{GS} = 0\text{ V}, I_{SD} = 120\text{ A}$	–	–	1.25	V
t_{rr}	反向恢复时间	$V_{GS} = 0\text{ V}, I_{SD} = 120\text{ A}, V_{DS} = 75\text{ V},$ $di_F/dt = 100\text{ A}/\mu\text{s}$	–	105	–	ns
Q_{rr}	反向恢复电荷		–	342	–	nC
Q_{rr}	反向恢复电荷	$V_{GS} = 0\text{ V}, I_{SD} = 30\text{ A}, V_{DS} = 75\text{ V},$ $di_F/dt = 100\text{ A}/\mu\text{s}$	–	348	–	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。

5. 本质上独立于工作温度的典型特性。

典型性能特征

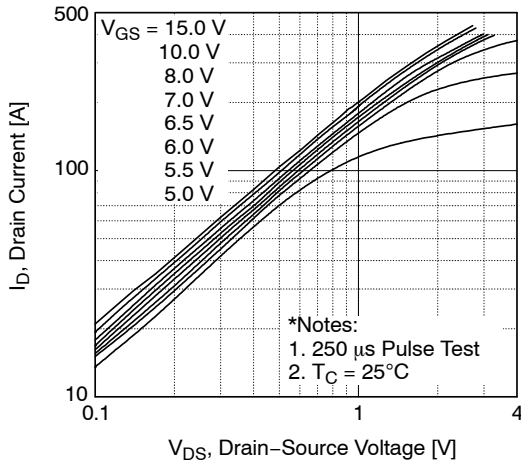


图 1. 导通区域特性

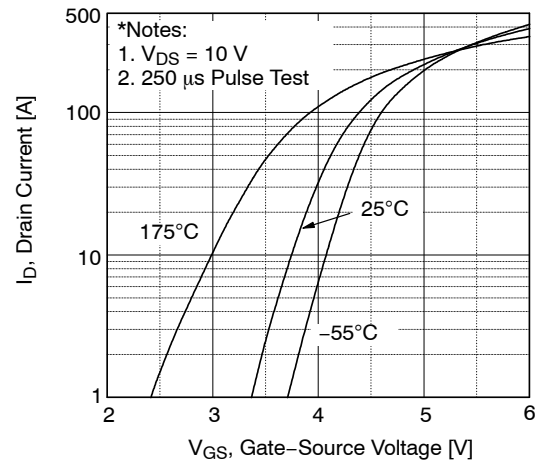


图 2. 传输特性

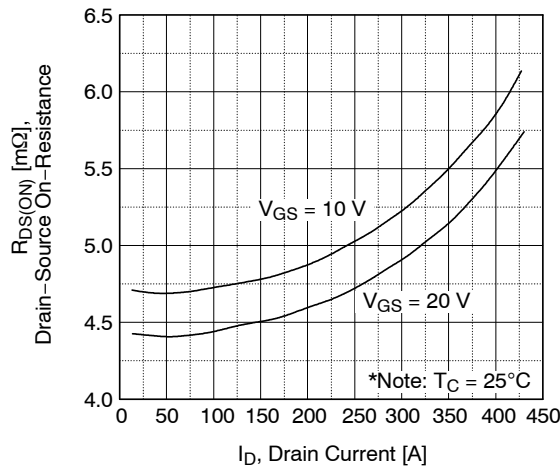


图 3. 导通电阻变化与漏极电流和栅极电压

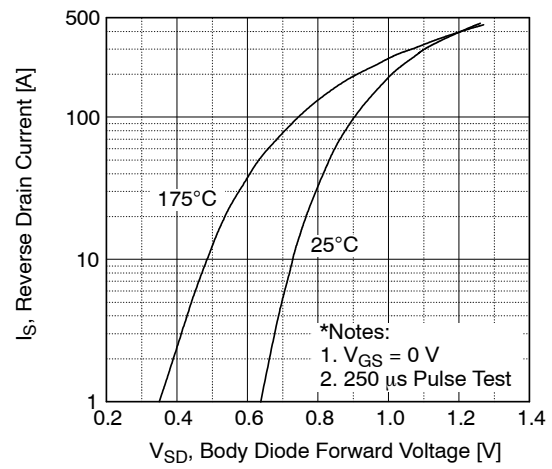


图 4. 体二极管正向电压变化与源极电流和温度

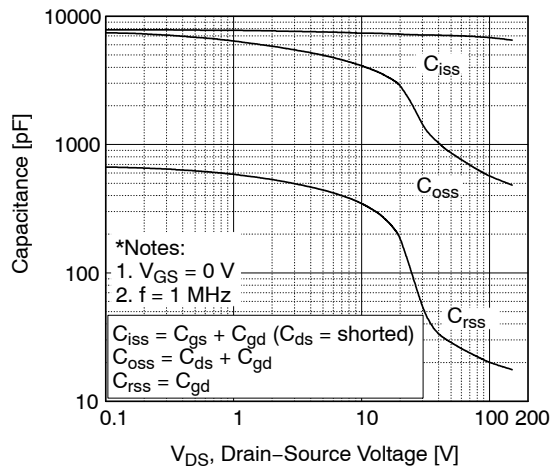


图 5. 电容特性

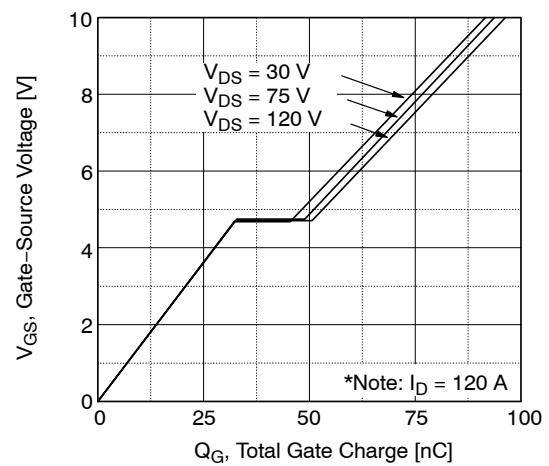


图 6. 栅极电荷

典型性能特征 (接上页)

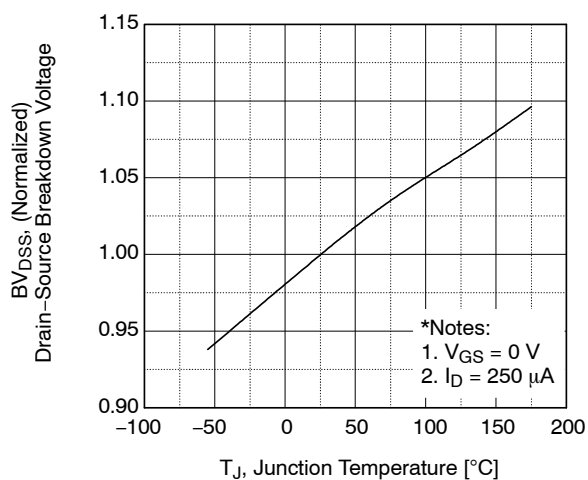


图 7. 击穿电压变化与温度

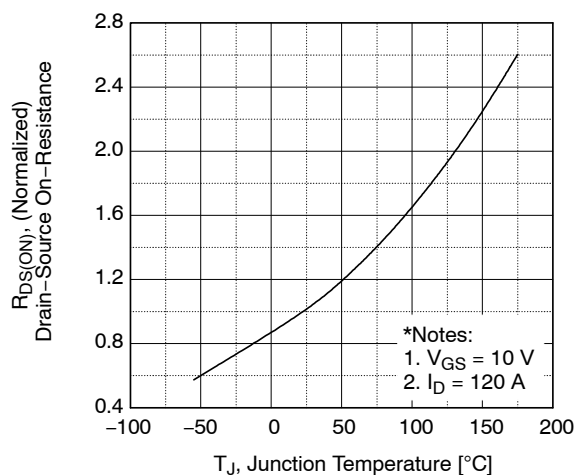


图 8. 导通电阻变化与温度

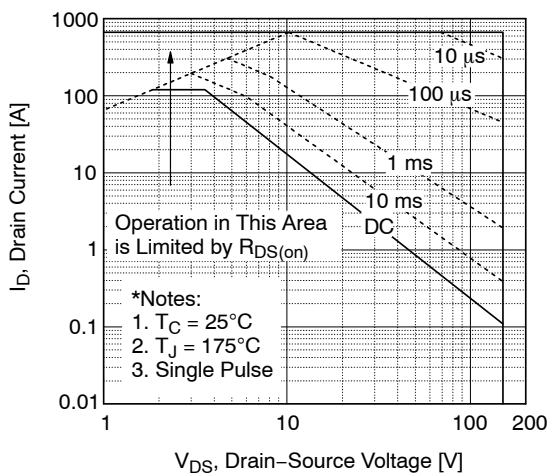


图 9. 最大安全工作区

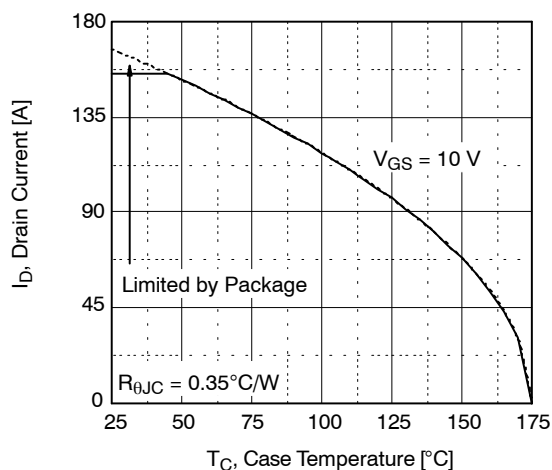


图 10. 最大漏极电流与外壳温度

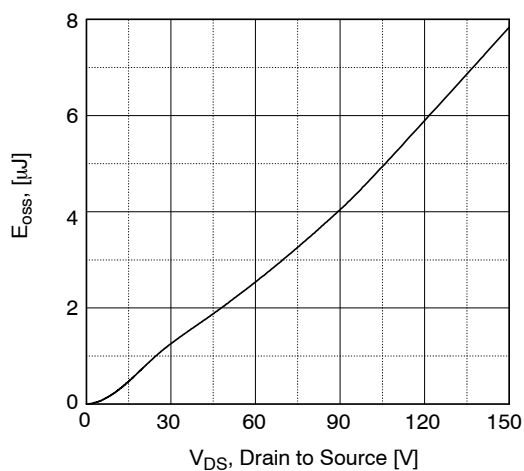


图 11. 输出电容 (Eoss) 与漏极 - 源极电压

FDH055N15A

典型性能特征（接上页）

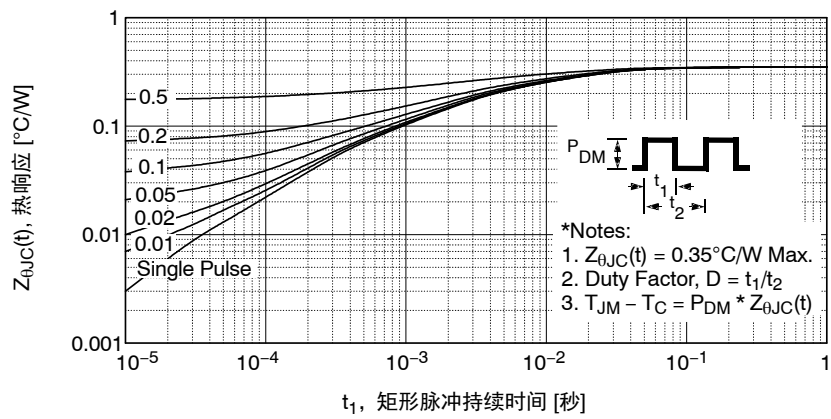


图 12. 瞬态热响应曲线

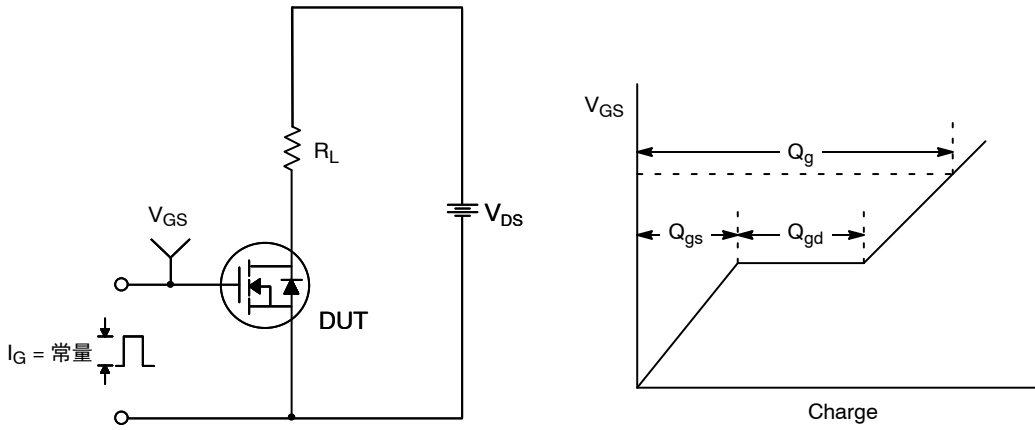


图 13. 栅极电荷测试电路与波形

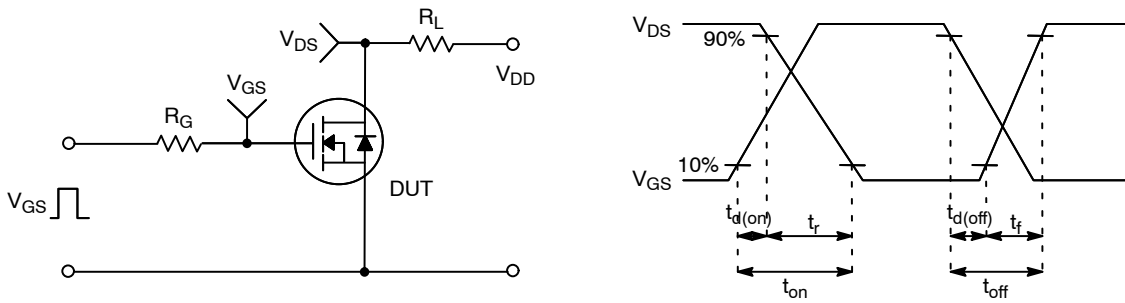


图 14. 阻性开关测试电路与波形

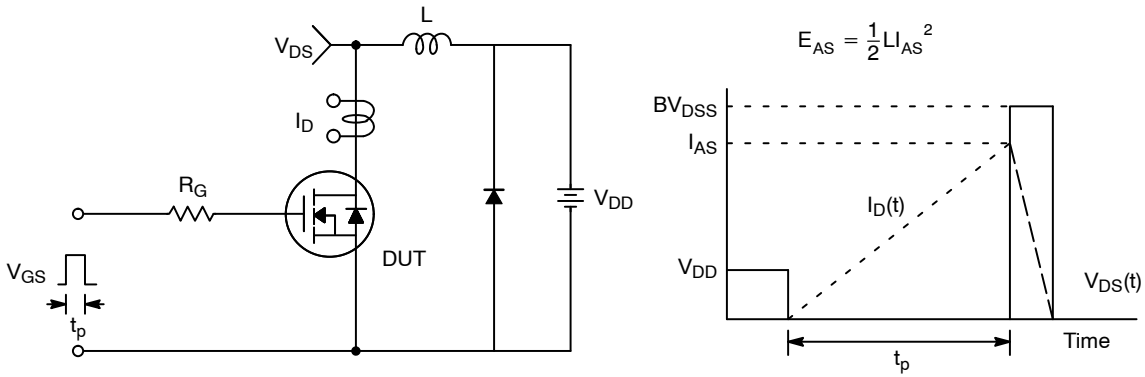


图 15. 非箝位电感开关测试电路与波形

FDH055N15A

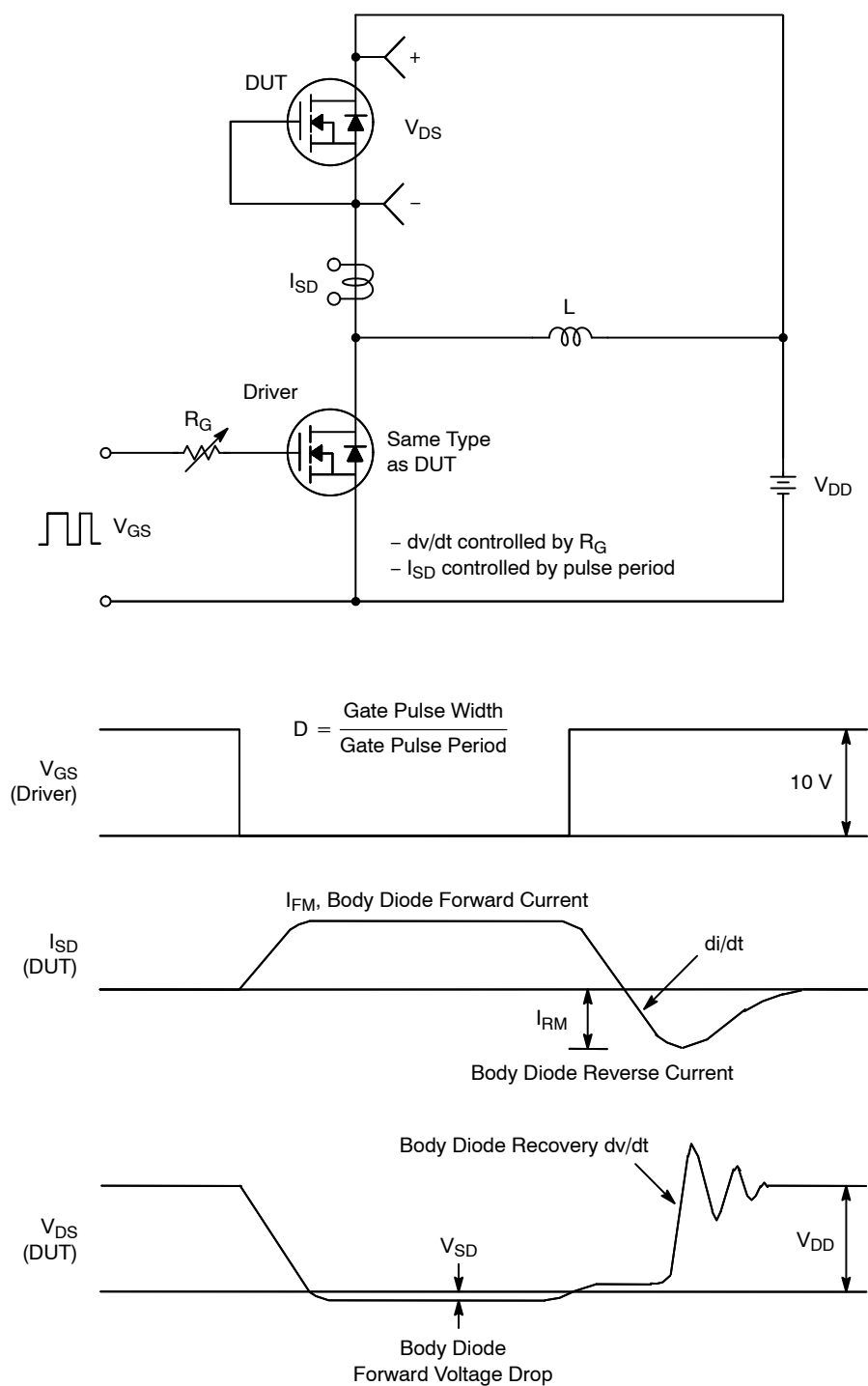
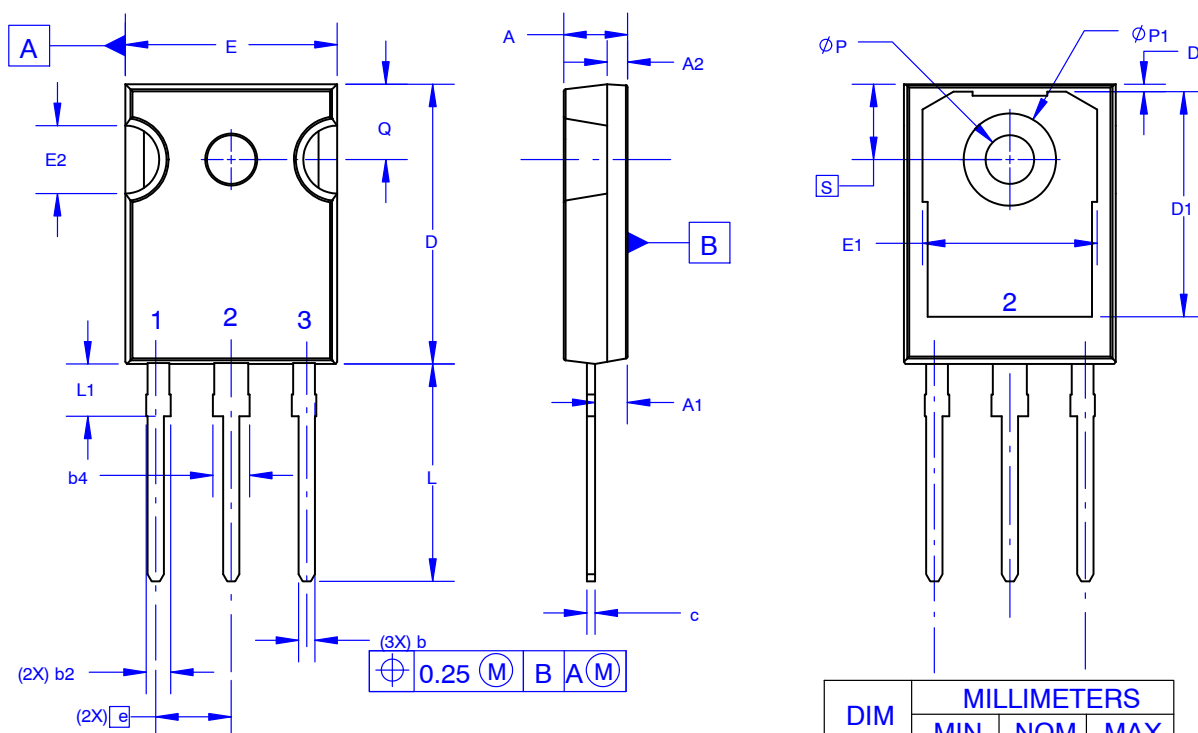


图 16. 二极管恢复 dv/dt 峰值测试电路与波形

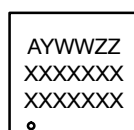
TO-247-3LD SHORT LEAD
CASE 340CK
ISSUE A

DATE 31 JAN 2019



NOTES: UNLESS OTHERWISE SPECIFIED.

- A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

GENERIC
MARKING DIAGRAM*


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

*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.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
b4	2.42	2.54	2.66
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	5.56	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
ϕP	3.51	3.58	3.65
$\phi P1$	6.60	6.80	7.00
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

DOCUMENT NUMBER:	98AON13851G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	TO-247-3LD SHORT LEAD	PAGE 1 OF 1

onsemi and Onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

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