



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.

FDB031N08

N 沟道 PowerTrench® MOSFET

75 V, 235 A, 3.1 mΩ

特性

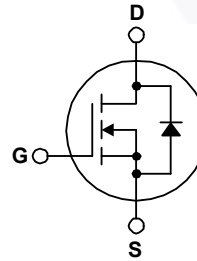
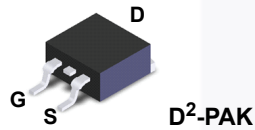
- $R_{DS(on)} = 2.4 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 10 \text{ V}$, $I_D = 75 \text{ A}$
- 快速开关速度
- 低栅极电荷
- 高性能沟道技术可实现极低的 $R_{DS(on)}$
- 高功率和高电流处理能力
- 符合 RoHS 标准

说明

此 N 沟道 MOSFET 采用飞兆半导体先进的 PowerTrench® 工艺生产，这一先进工艺是专为最大限度地降低导电电阻并保持卓越开关性能而定制的。

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



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

符号	参数	FDB031N08	单位
V_{DSS}	漏极-源极电压	75	V
V_{GSS}	栅极-源极电压	± 20	V
I_D	漏极电流	- 连续 ($T_C=25^\circ\text{C}$, 硅片受限)	235
		- 连续 ($T_C=100^\circ\text{C}$, 硅片受限)	165
		- 连续 ($T_C=25^\circ\text{C}$, 封装受限)	120
I_{DM}	漏极电流 - 脉冲 (说明 1)	940	A
E_{AS}	单脉冲雪崩能量 (说明 2)	1995	mJ
dv/dt	二极管恢复 dv/dt 峰值 (说明 3)	5.5	V/ns
P_D	功耗 ($T_C = 25^\circ\text{C}$)		375
		- 降低至 25°C 以上	2.5
T_J, T_{STG}	工作和存储温度范围	-55 至 +175	$^\circ\text{C}$
T_L	用于焊接的最大引线温度, 距离外壳 1/8", 持续 5 秒	300	$^\circ\text{C}$

热性能

符号	参数	FDB031N08	单位
$R_{\theta JC}$	结至外壳热阻最大值。	0.4	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻最大值。	62.5	

封装标识与订购信息

器件编号	顶标	封装	包装方法	卷尺寸	带宽	数量
FDB031N08	FDB031N08	D ² -PAK	卷带	330 mm	24 mm	800 个

电气特性 TC = 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	$I_D = 250 \mu A, V_{GS} = 0 V, T_C = 25^\circ C$	75	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	$I_D = 250 \mu A$, 温度参考 25°C	-	0.05	-	V/°C
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 75 V, V_{GS} = 0 V$	-	-	1	μA
		$V_{DS} = 75 V, T_C = 150^\circ C$	-	-	500	
I_{GSS}	栅极-体漏电流	$V_{GS} = \pm 20 V, V_{DS} = 0 V$	-	-	± 100	nA

导通特性

$V_{GS(th)}$	栅极阈值电压	$V_{GS} = V_{DS}, I_D = 250 \mu A$	2.5	3.5	4.5	V
$R_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10 V, I_D = 75 A$	-	2.4	3.1	m Ω
g_{FS}	正向跨导	$V_{DS} = 10 V, I_D = 75 A$	-	180	-	S

动态特性

C_{iss}	输入电容	$V_{DS} = 25 V, V_{GS} = 0 V,$ $f = 1 MHz$	-	11400	15160	pF
C_{oss}	输出电容		-	1360	1810	pF
C_{riss}	反向传输电容		-	595	800	pF
$Q_{g(tot)}$	10 V 的栅极电荷总量	$V_{DS} = 60 V, I_D = 75 A,$ $V_{GS} = 10 V$ (说明 4)	-	169	220	nC
Q_{gs}	栅极-源极栅极电荷		-	60	-	nC
Q_{gd}	栅极-漏极“米勒”电荷		-	47	-	nC

开关特性

$t_{d(on)}$	导通延迟时间	$V_{DD} = 37.5 V, I_D = 75 A,$ $R_G = 25 \Omega, V_{GS} = 10 V$ (说明 4)	-	230	470	ns
t_r	开通上升时间		-	191	392	ns
$t_{d(off)}$	关断延迟时间		-	335	680	ns
t_f	关断下降时间		-	121	252	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	-	-	235	A	
I_{SM}	漏极-源极二极管最大正向脉冲电流	-	-	940	A	
V_{SD}	漏极-源极二极管正向电压	$V_{GS} = 0 V, I_{SD} = 75 A$	-	-	1.3	V
t_{rr}	反向恢复时间	$V_{GS} = 0 V, I_{SD} = 75 A,$ $di_F/dt = 100 A/\mu s$	-	53	-	ns
Q_{rr}	反向恢复电荷		-	77	-	nC

注意:

- 重复额定值: 脉冲宽度受限于最大结温。
- $L = 0.71 mH, I_{AS} = 75 A, V_{DD} = 50 V, R_G = 25 \Omega$, 启动 $T_J = 25^\circ C$ 。
- $I_{SD} \leq 75 A, di/dt \leq 200 A/\mu s, V_{DD} \leq BV_{DSS}$, 开始 $T_J = 25^\circ C$ 。
- 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

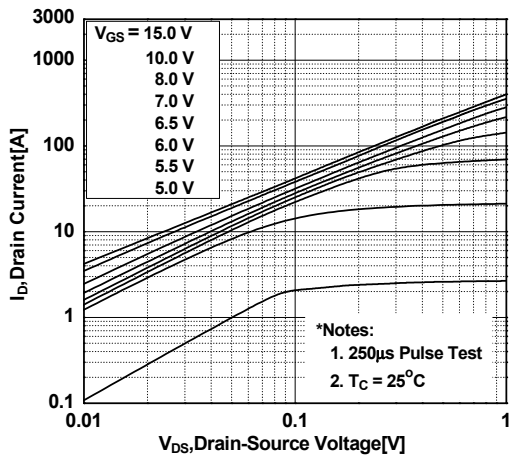


图 2. 传输特性

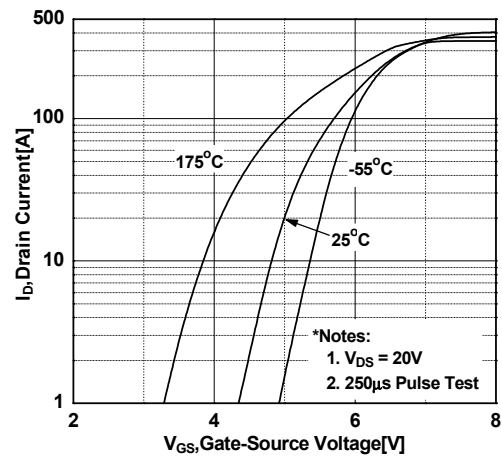


图 3. 导通电阻变化 vs. 漏极电流和栅极电压

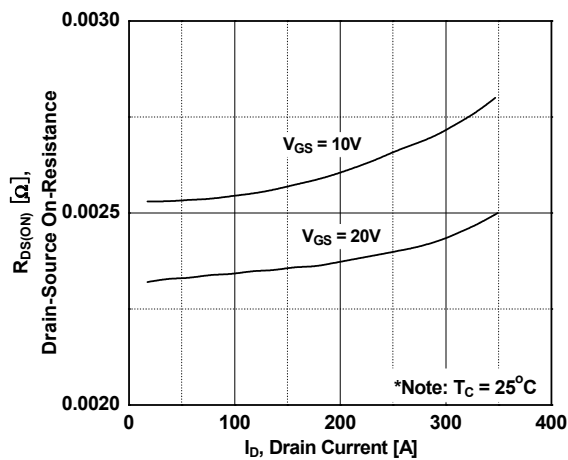


图 4. 体二极管正向电压变化 vs. 源极电流和温度

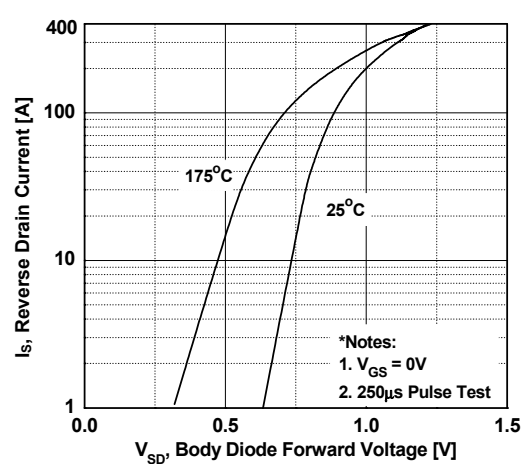


图 5. 电容特性

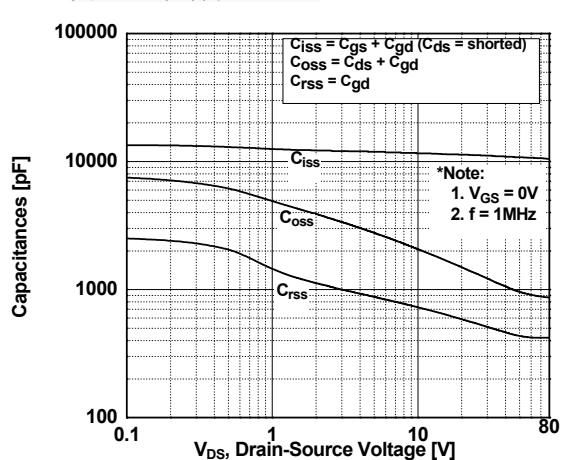
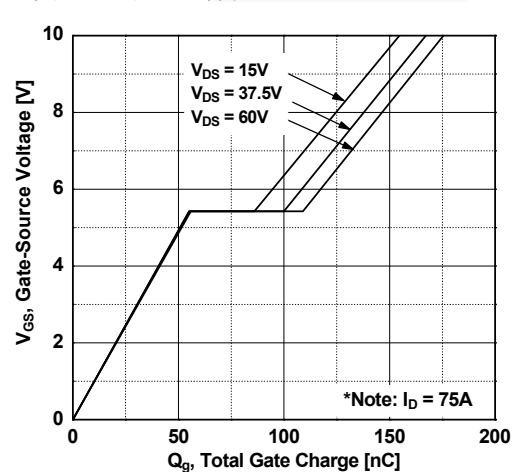


图 6. 栅极电荷特性



典型性能特征 (接上页)

图 7. 击穿电压变化与温度的关系

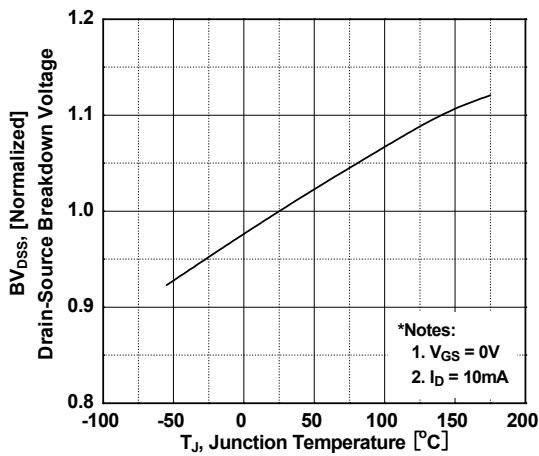


图 8. 导通电阻变化与温度的关系

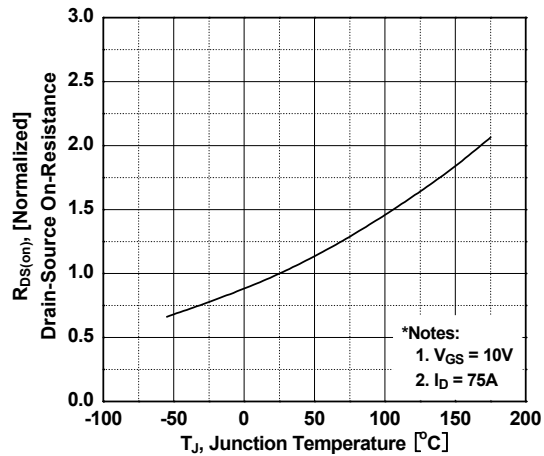


图 9. 最大安全工作区

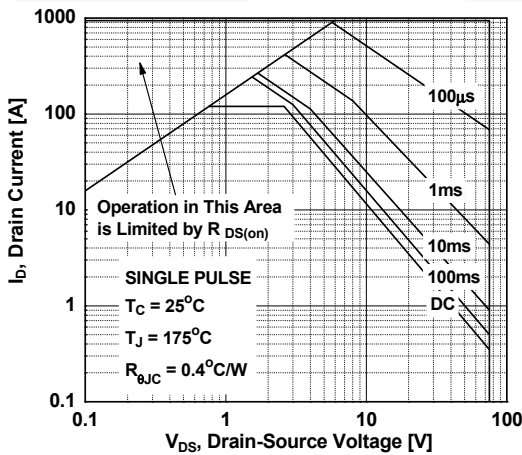


图 10. 最大漏极电流 vs. 外壳温度

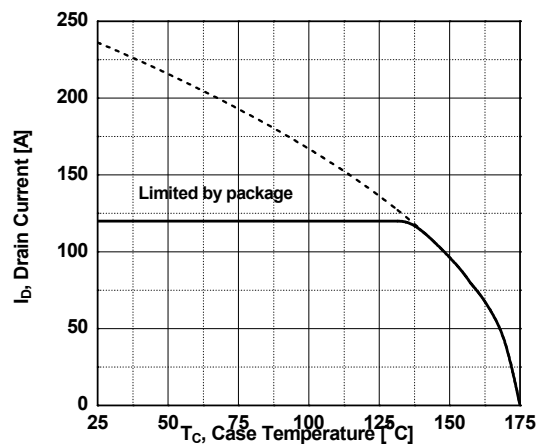
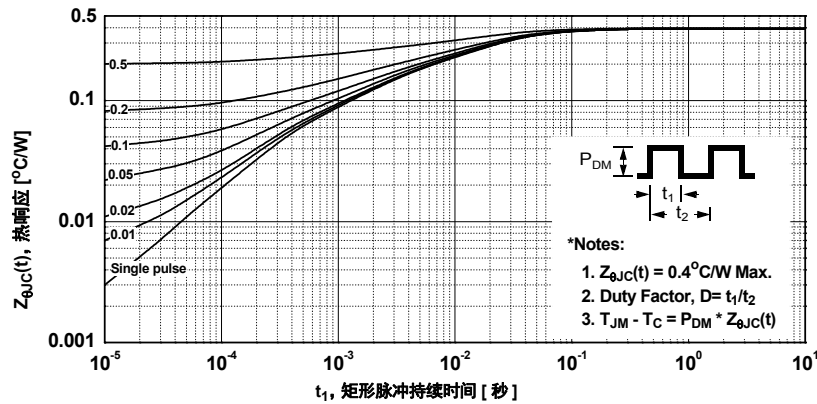


图 11. 瞬态热响应曲线



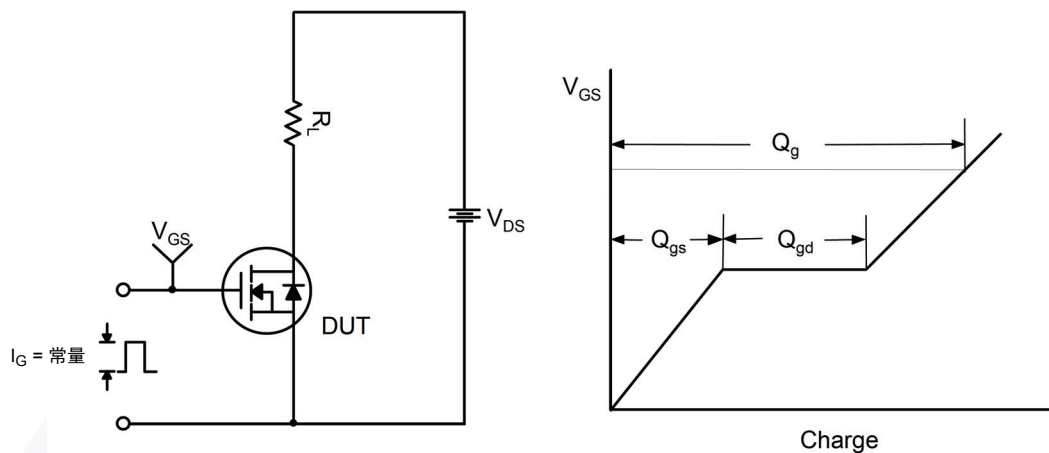


图 12. 栅极电荷测试电路与波形

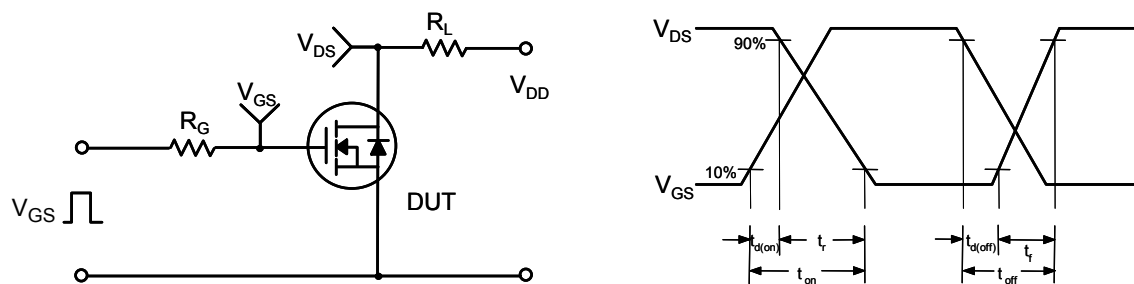


图 13. 阻性开关测试电路与波形

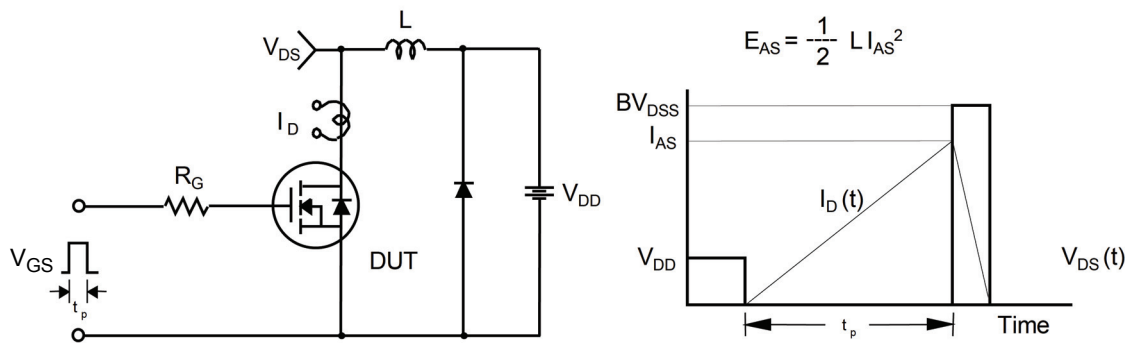


图 14. 非箝位感性开关测试电路与波形

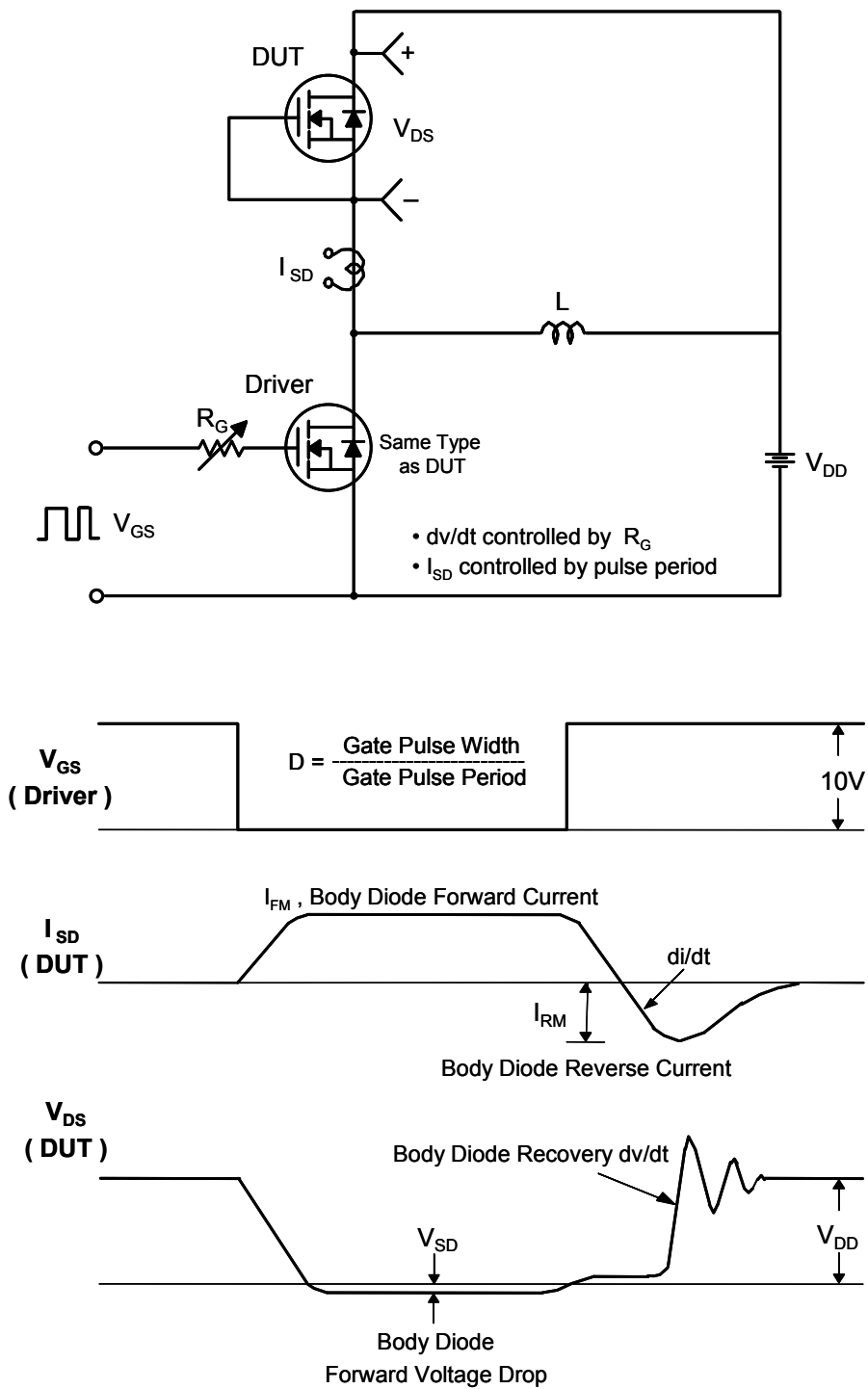


图 15. 峰值二极管恢复 dv/dt 测试电路与波形

机械尺寸

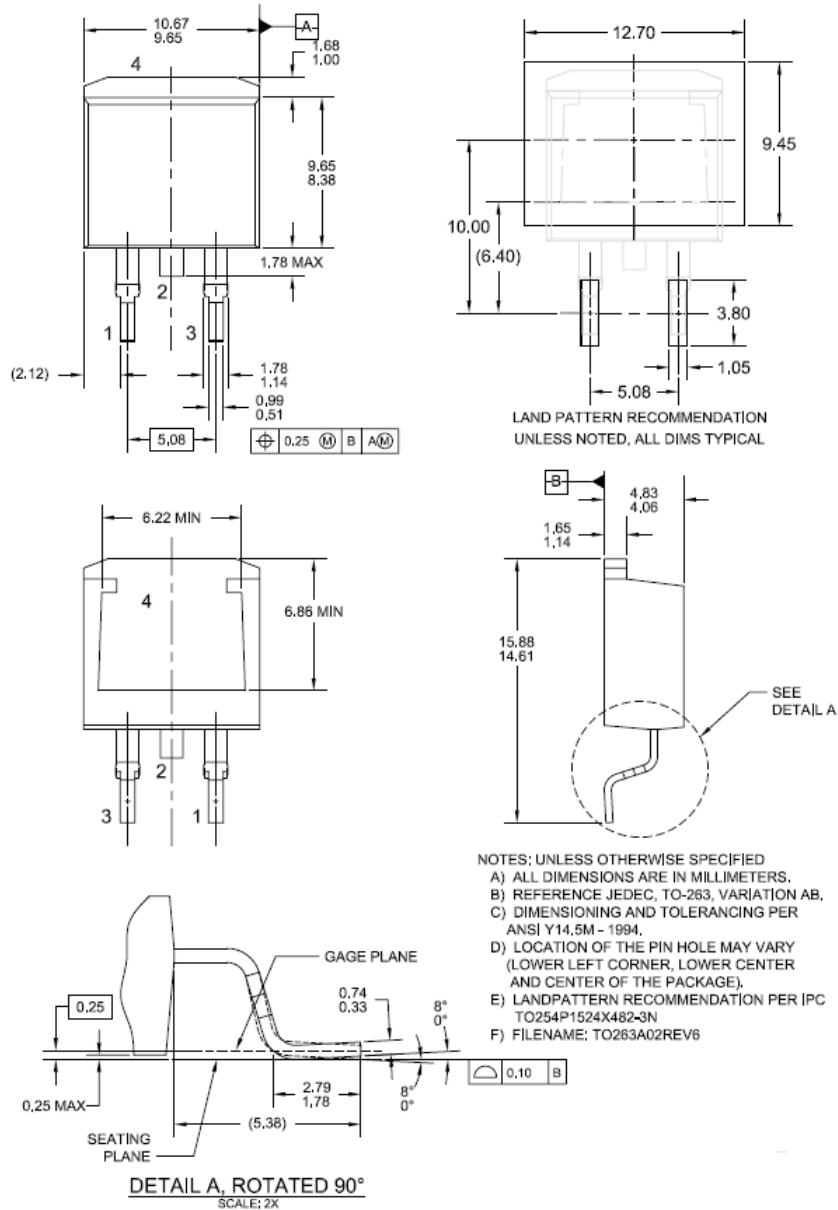


图 16. TO263 (D²PAK), 模塑, 2 引脚, 表面贴装

封装图纸作为一项服务, 提供给考虑飞兆半导体元件的客户。具体参数可能会有变化, 且不会做出相应通知。请注意图纸上的版本和 / 或日期, 并联系飞兆半导体代表核实或获得最新版本。封装规格并不扩大飞兆公司全球范围内的条款与条件, 尤其是其中涉及飞兆公司产品保修的部分。

随时访问飞兆半导体在线封装网页, 可以获取最新的封装图纸:

http://www.fairchildsemi.com/package/packageDetails.html?id=PN_TT263-0R2



TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

- | | | |
|--------------------------|---|--------------------------|
| AccuPower™ | F-PFS™ | Sync-Lock™ |
| AX-CAP®* | FRFET® | SYSTEM GENERAL ®* |
| BitSiC™ | Global Power Resource SM | TinyBoost® |
| Build it Now™ | GreenBridge™ | TinyBuck® |
| CorePLUS™ | Green FPS™ | TinyCalc™ |
| CorePOWER™ | Green FPS™ e-Series™ | TinyLogic® |
| CROSSVOLT™ | Gmax™ | TINYOPTO™ |
| CTL™ | GTO™ | TinyPower™ |
| Current Transfer Logic™ | IntelliMAX™ | TinyPWM™ |
| DEUXPEED® | ISOPLANAR™ | TinyWire™ |
| Dual Cool™ | Marking Small Speakers Sound Louder and Better™ | TranSiC™ |
| EcoSPARK® | MegaBuck™ | TriFault Detect™ |
| EfficientMax™ | MICROCOUPLER™ | TRUECURRENT®* |
| ESBC™ | MicroFET™ | µSerDes™ |
| F ® | MicroPak™ | µSerDes ™ |
| Fairchild® | MicroPak2™ | UHC® |
| Fairchild Semiconductor® | MillerDrive™ | Ultra FRFET™ |
| FACT Quiet Series™ | MotionMax™ | UniFET™ |
| FACT® | mWSaver® | VCX™ |
| FAST® | OptoHiT™ | VisualMax™ |
| FastvCore™ | OPTOLOGIC® | VoltagePlus™ |
| FETBench™ | OPTOPLANAR® | XS™ |
| FPS™ | | |
| | PowerTrench® | |
| | PowerXS™ | |
| | Programmable Active Droop™ | |
| | QFET® | |
| | QS™ | |
| | Quiet Series™ | |
| | RapidConfigure™ | |
| | Saving our world, 1mW/W/kW at a time™ | |
| | SignalWise™ | |
| | SmartMax™ | |
| | SMART START™ | |
| | Solutions for Your Success™ | |
| | SPM® | |
| | STEALTH™ | |
| | SuperFET® | |
| | SuperSOT™-3 | |
| | SuperSOT™-6 | |
| | SuperSOT™-8 | |
| | SupreMOS® | |
| | SyncFET™ | |

*Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used here in:

- Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
- A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.Fairchildsemi.com, under Sales Support. Counterfeiting of semiconductor parts is a growing problem in the industry. All manufactures of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed application, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address and warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I66

ON Semiconductor and  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