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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.

FDB024N08BL7

N 沟道 PowerTrench® MOSFET
80 V, 229 A, 2.4 mΩ

特性

- $R_{DS(on)}$ = 1.7 mΩ（典型值）@ V_{GS} = 10 V, I_D = 100 A
- 低 FOM $R_{DS(on)}$ ∗Q_G
- 低反向恢复电荷，Q_{rr} = 112 nC
- 软反向恢复体二极管
- 可实现高效同步整流
- 快速开关速度
- 符合 RoHS 标准
- 通过 JEDEC JESD22-A113F 和 IPC/JEDEC J-STD-020D.1 认证

描述

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通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

1. 栅极
2. 源极
3. 源极
4. 漏极
5. 源极
6. 源极
7. 源极

D2-PAK (TO-263)

D(Pin4, tab)

G (Pin1)

S(Pin2,3,5,6,7)
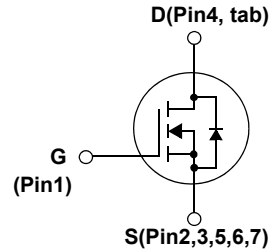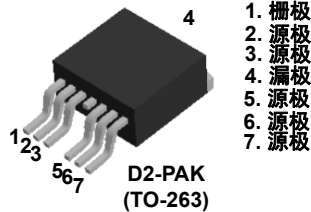
MOSFET 最大额定值 T_C = 25°C 除非另有说明

符号	参数			FDB024N08BL7	单位
V_{DSS}	漏极－源极电压			80	V
V_{GSS}	栅极－源极电压			±20	V
I_D	漏极电流	- 连续 （T_C = 25°C，硅限制）		229*	A
		- 连续 （T_C=100°C，硅限制）		162*	
		- 连续 （T_C = 25°C, 封装限制）		120	
I_{DM}	漏极电流	- 脉冲	（注 1）	916	A
E_{AS}	单脉冲雪崩能量		（注 2）	917	mJ
dv/dt	二极管恢复 dv/dt 峰值		（注 3）	6.0	V/ns
P_D	功耗	(T_C = 25°C)		246	W
		- 高于 25°C 的功耗系数		1.64	W/°C
T_J, T_{STG}	工作和存储温度范围			-55 至 +175	°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	°C

* 连续电流是基于最高可允许的结温计算所得。封装限制电流为 120 A。

热性能

符号	参数	FDB024N08BL7	单位
$R_{θJC}$	结至外壳热阻最大值	0.61	°C/W
$R_{θJA}$	结至环境热阻最大值	62.5	

封装标识与定购信息

器件编号	顶标	封装	包装方法	卷尺寸	带宽	数量
FDB024N08BL7	FDB024N08B	D2PAK-7L	卷带	330 mm	24 mm	800 个

电气特性 T_C = 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	80	-	-	V
$\dfrac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	I_D = 250 μA，参考 25°C 数值	-	0.05	-	V/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 64 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 64 V, T_C = 150°C	-	-	500	
I_{GSS}	栅极－体漏电流	V_{GS} = ±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 μA	2.5	-	4.5	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 100 A	-	1.7	2.4	mΩ
g_{FS}	正向跨导	V_{DS} = 10 V, I_D = 100 A	-	227	-	S
动态特性						
C_{iss}	输入电容	V_{DS} = 40 V, V_{GS} = 0 V, f = 1 MHz	-	10170	13530	pF
C_{oss}	输出电容		-	1670	2220	pF
C_{rss}	反向传输电容		-	35	-	pF
C_{oss}(er)	能量相关输出电容	V_{DS} = 40 V, V_{GS} = 0 V	-	3025	-	pF
$Q_{g(tot)}$	10 V 的栅极电荷总量	V_{DS} = 40 V, V_{GS} = 10 V, I_D = 100 A	-	137	178	nC
Q_{gs}	栅极－源极栅极电荷		-	56	-	nC
Q_{gs2}	阈值电压－"米勒"平台电荷		-	25	-	nC
Q_{gd}	栅极 - 漏极"米勒"电荷	（注 4）	-	28	-	nC
ESR	等效串联电阻 (G-S)	f = 1 MHz	-	2.4	-	Ω
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 40 V, I_D = 100 A, V_{GS} = 10 V, R_G = 4.7 Ω	-	47	104	ns
t_r	导通上升时间		-	66	142	ns
$t_{d(off)}$	关断延迟时间		-	87	184	ns
t_f	关断下降时间	（注 4）	-	41	92	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		-	-	229*	A
I_{SM}	漏极－源极二极管最大正向脉冲电流		-	-	916	A
V_{SD}	漏极－源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 100 A	-	-	1.3	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, V_{DD} = 40 V, I_{SD} = 100 A, dI_F/dt = 100 A/μs	-	80	-	ns
Q_{rr}	反向恢复电荷		-	112	-	nC

注：
1. 重复额定值：脉冲宽度受限于最大结温。
2. L = 3 mH，I_{AS} = 24.72 A，R_G = 25 Ω，开始于 T_J = 25°C。
3. $I_{SD} \le$ 100 A，di/dt $\le$ 200 A/μs，$V_{DD} \le BV_{DSS}$，开始于 T_J=25°C。
4. 典型特性本质上独立于工作温度。

典型性能特征

图 1. 导通区域特性

V_{GS} = 15.0V
10.0V
8.0V
6.5V
6.0V
5.5V
5.0V

*Notes:
1. 250µs Pulse Test
2. T_C = 25°C

I_D, Drain Current[A]
V_{DS}, Drain-Source Voltage[V]

图 2. 传输特性

*Notes:
1. V_{DS} = 10V
2. 250µs Pulse Test

175°C
25°C
-55°C

I_D, Drain Current[A]
V_{GS}, Gate-Source Voltage[V]
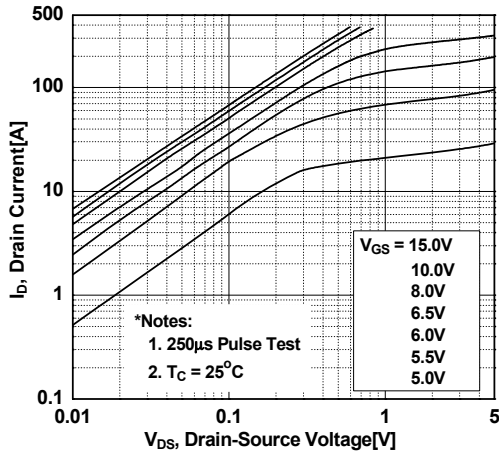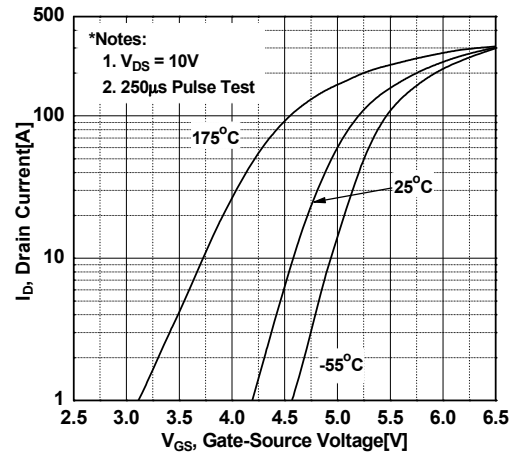
图 3. 导通电阻变化与漏极电流和栅极电压的关系

V_{GS} = 10V
V_{GS} = 20V

*Note: T_C = 25°C

$R_{DS(ON)}$ [mΩ], Drain-Source On-Resistance
I_D, Drain Current [A]
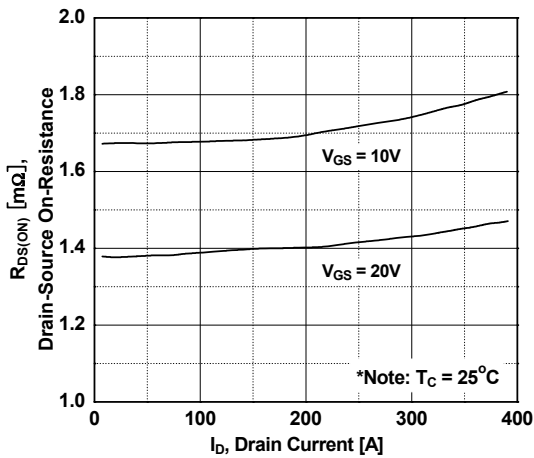
图 4. 体二极管正向电压变化与源极电流和温度的关系

175°C
25°C

*Notes:
1. V_{GS} = 0V
2. 250µs Pulse Test

I_S, Reverse Drain Current [A]
V_{SD}, Body Diode Forward Voltage [V]

图 5. 电容特性

C_{iss}
C_{oss}
C_{rss}

*Note:
1. V_{GS} = 0V
2. f = 1MHz

$C_{iss} = C_{gs} + C_{gd}$ (C_{ds} = shorted)
$C_{oss} = C_{ds} + C_{gd}$
$C_{rss} = C_{gd}$

Capacitances [pF]
V_{DS}, Drain-Source Voltage [V]

图 6. 栅极电荷特性

V_{DS} = 16V
V_{DS} = 40V
V_{DS} = 64V

*Note: I_D = 100A

V_{GS}, Gate-Source Voltage [V]
Q_g, Total Gate Charge [nC]
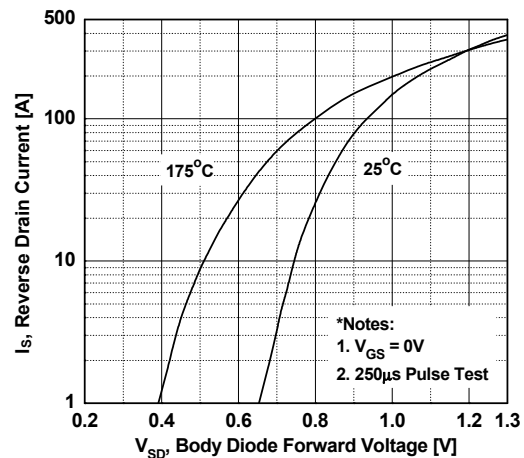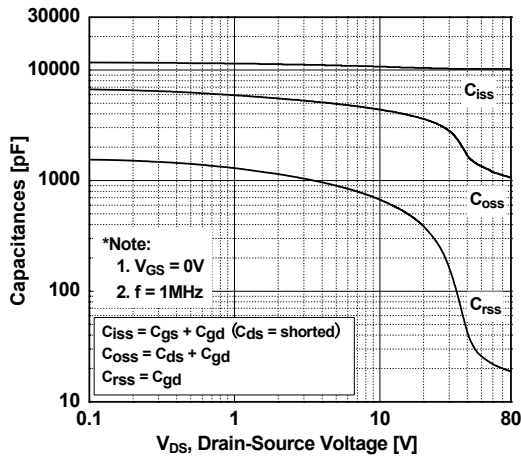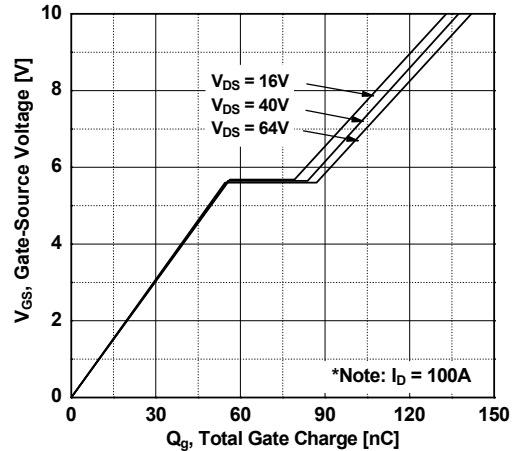
典型性能特性 （接上页）

图 7. 击穿电压变化与温度的关系

*Notes:
1. V_{GS} = 0V
2. I_D = 250μA

图 8. 导通电阻变化与温度的关系

*Notes:
1. V_{GS} = 10V
2. I_D = 100A

图 9. 最大安全工作区

Operation in This Area
is Limited by $R_{DS(on)}$

*Notes:
1. T_C = 25°C
2. T_J = 175°C
3. Single Pulse

图 10. 最大漏极电流与壳温的关系

V_{GS} = 10V

$R_{θJC}$ = 0.61°C/W
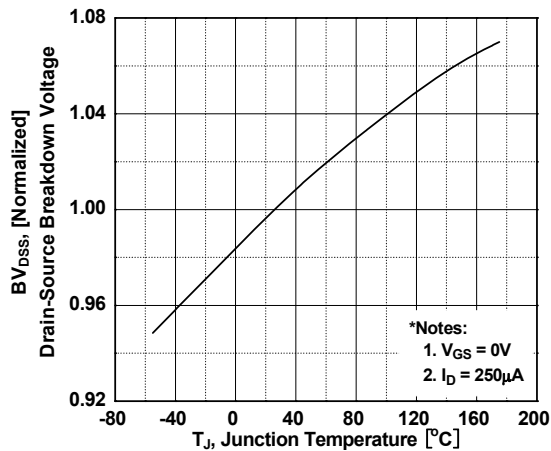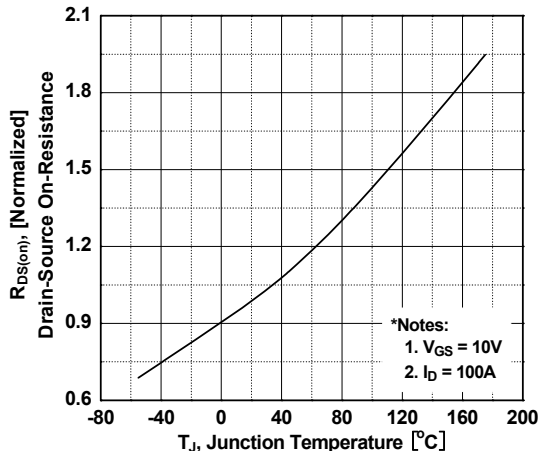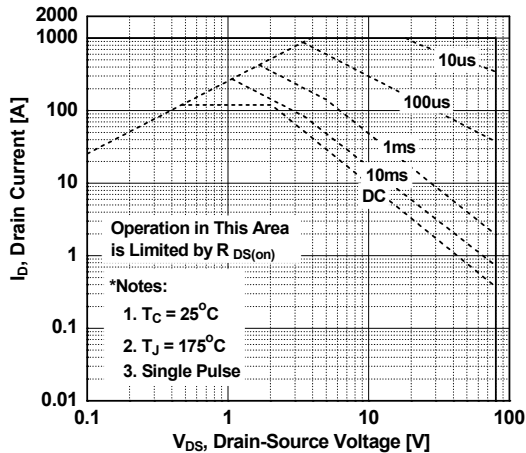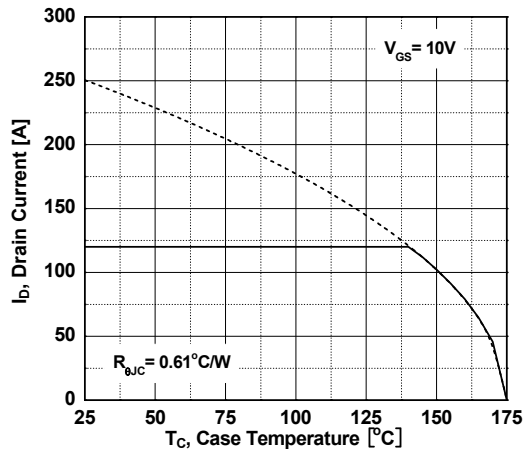
图 11. Eoss 与漏源极电压的关系

图 12. 非箝位感性开关能力

If R = 0
t_{AV} = (L) (I_{AS})/ (1.3*RATED BV_{DSS}-V_{DD})
If R = 0
t_{AV} = (L/R)ln [(I_{AS}*R)/ (1.3*RATED BV_{DSS}-V_{DD})+1]

STARTING T_J = 25°C

STARTING T_J = 150°C

典型性能特性（接上页）

图 12. 瞬态热响应曲线

Thermal Response [$Z_{\theta JC}$]

0.5
0.2
0.1
0.05
0.02
0.01
Single pulse

Rectangular Pulse Duration [sec]

P_{DM}

t_1
t_2

*Notes:

1. $Z_{\theta JC}(t) = 0.61 °C/W$ Max.
2. Duty Factor, $D = t_1/t_2$
3. $T_{JM} - T_C = P_{DM} * Z_{\theta JC}(t)$

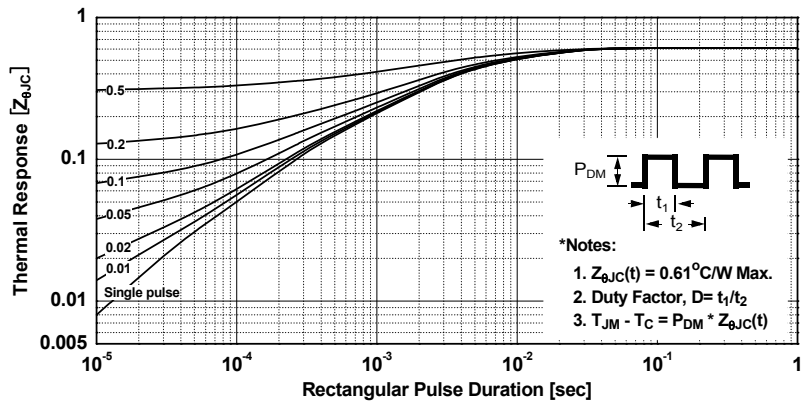www.fairchildsemi.com
FDB024N08BL7 Rev.C4
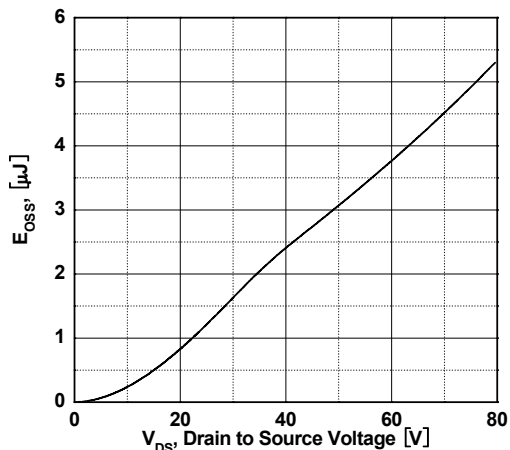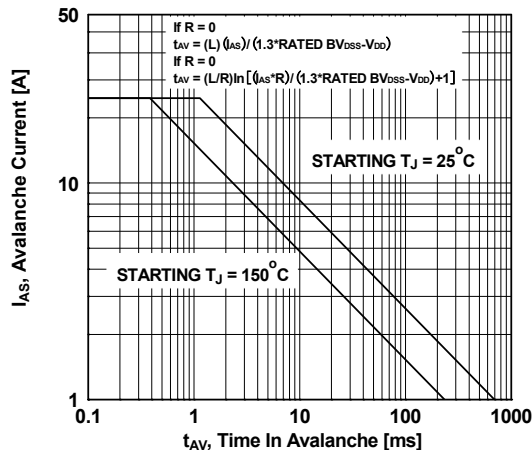
图 13. 栅极电荷测试电路与波形
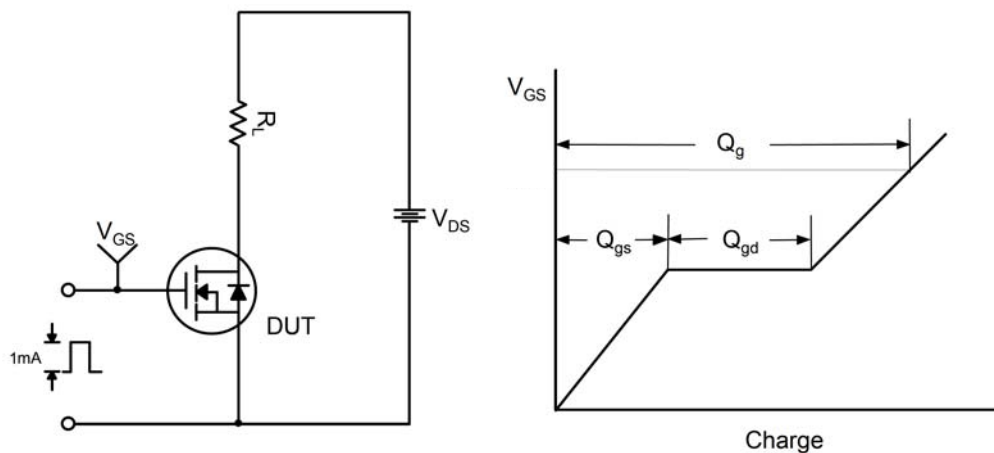
图 14. 阻性开关测试电路与波形
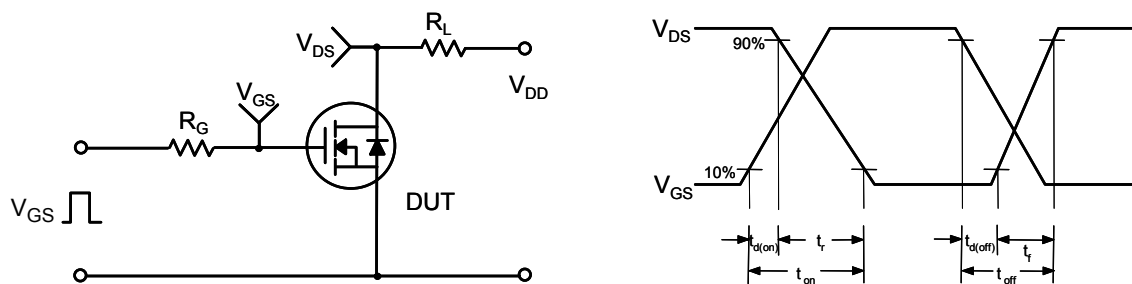
图 15. 非箝位电感开关测试电路与波形

$$E_{AS} = \frac{1}{2} L I_{AS}^2$$
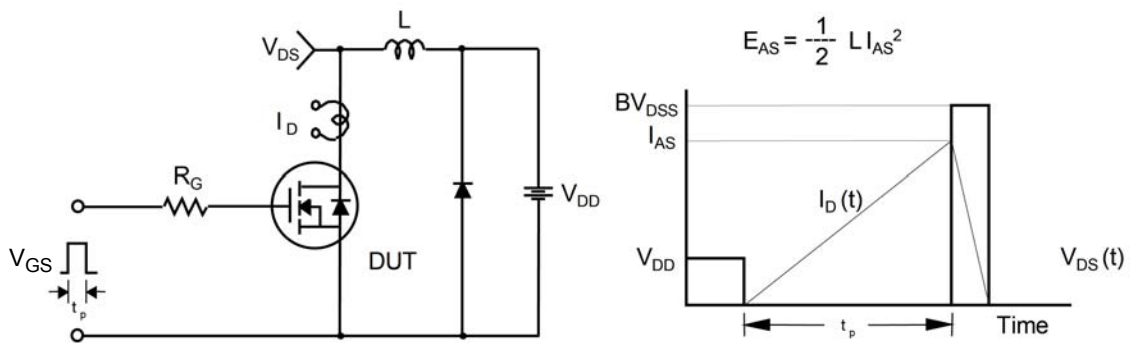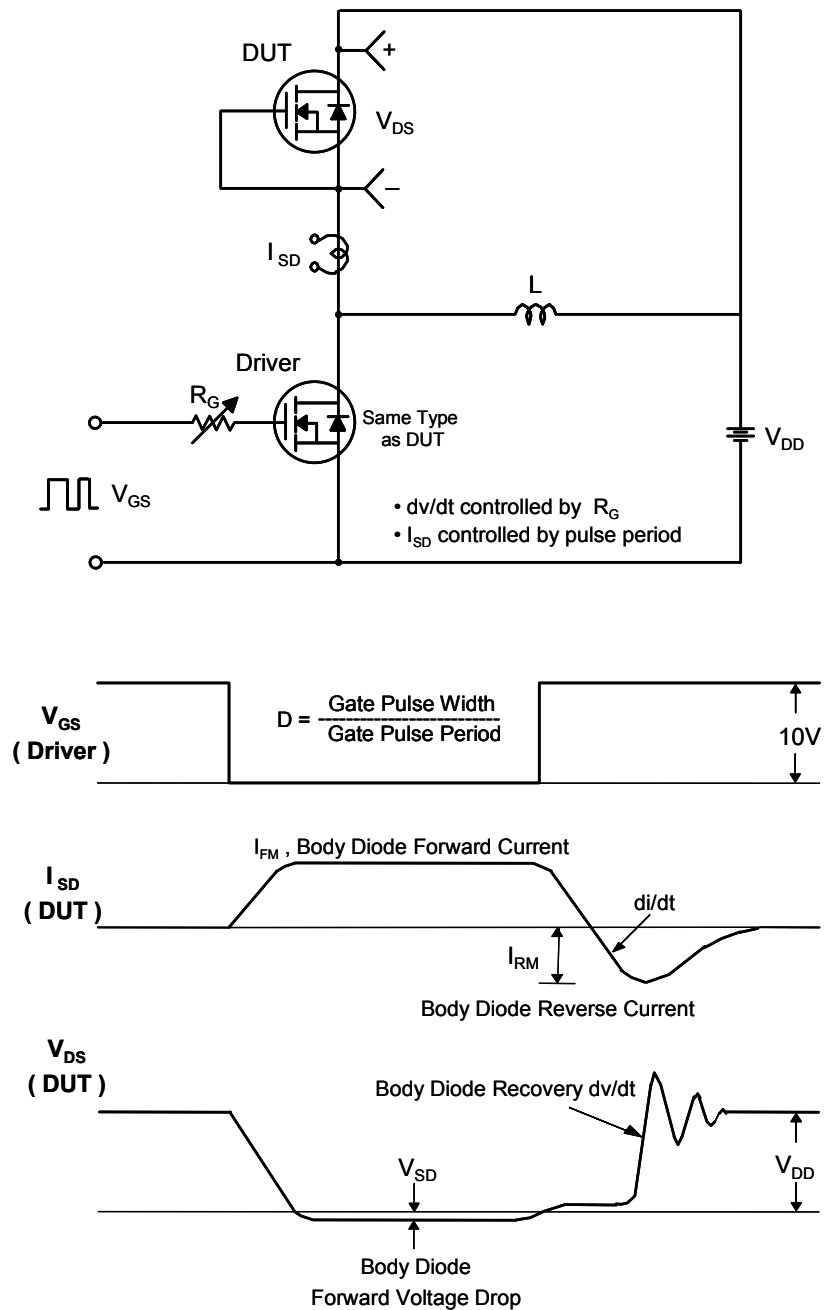
图 16. 二极管恢复 dv/dt 峰值测试电路与波形

机械尺寸

10.20
9.70

1.40
1.00

(10.50)

9.40
9.00

(8.40)

(10.20)

1.40 MAX

(0.73)

(3.45)

1   7

0.90
0.70

(0.95)

(1.27) 6X

1.27 6X

(7.62)

0.70
0.50

LAND PATTERN RECOMMENDATION

7.62

⊕ 0.25 A Ⓜ

B

4.70
4.30

1.40
1.20

8.78
8.38

7.70 MIN

8

15.70
15.10

7   1

A

0.60
0.40

0.254

0.20 MAX

NOTES:

A. PACKAGE CONFORMS TO JEDEC TO-263
   VARIATION CB EXCEPT WHERE NOTED.
B. ALL DIMENSIONS ARE IN MILLIMETERS.

C OUT OF JEDEC STANDARD VALUE.
D. DIMENSION AND TOLERANCE AS PER ASME
   Y14.5-1994.
E. DIMENSIONS ARE EXCLUSIVE OF BURRS,
   MOLD FLASH AND TIE BAR PROTRUSIONS.
F. LAND PATTERN RECOMMENDATION PER IPC.
   TO127P1524X465-8N.
G. DRAWING FILE NAME: TO263A07REV5.

GAGE PLANE

SEATING PLANE

5.20
4.80

R0.50

2.84
2.44

0.20 B

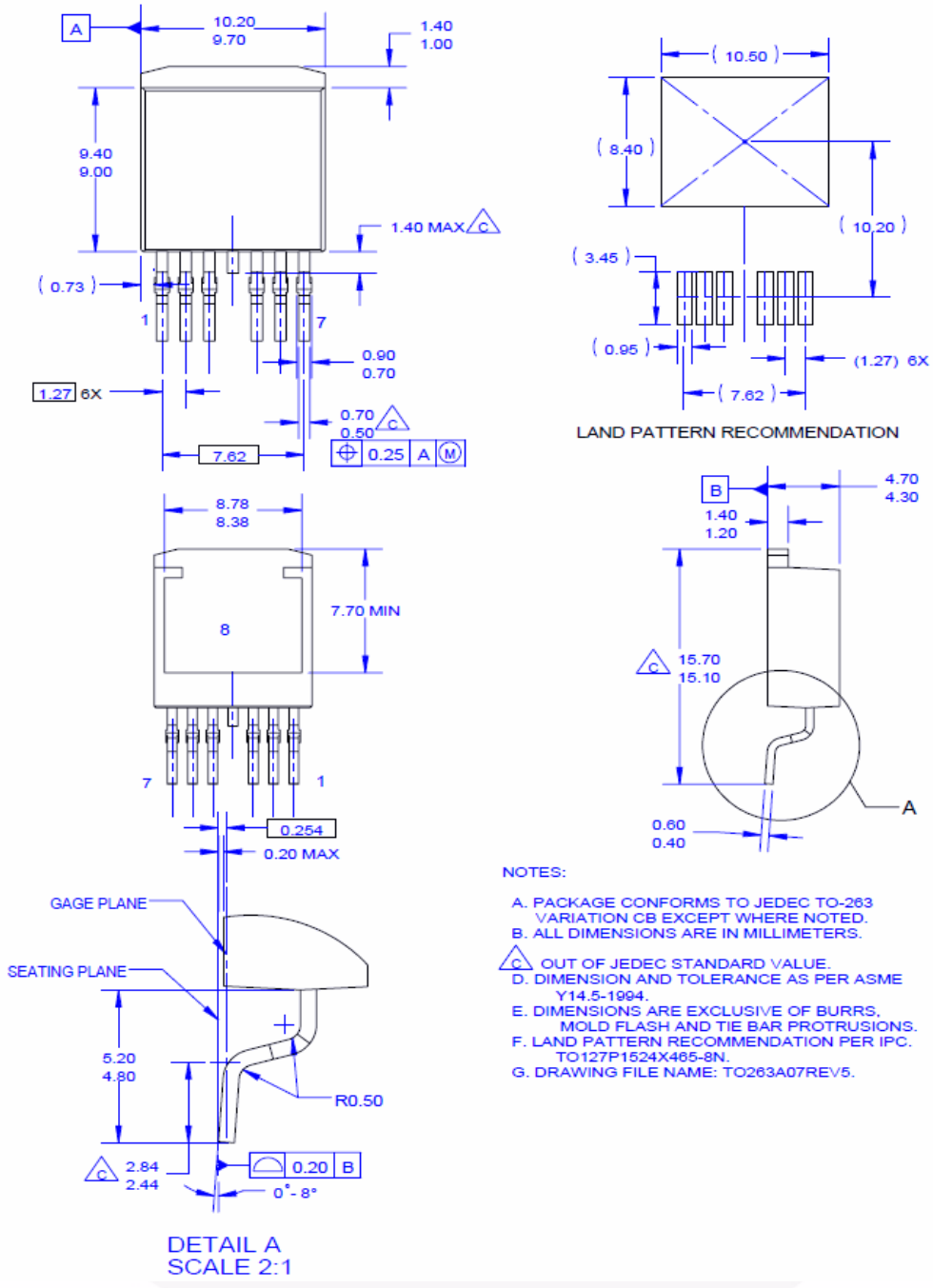0°- 8°

DETAIL A
SCALE 2:1

图 17. TO263 (D^{2}PAK)，模塑，7 引脚，表面贴装

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http://www.fairchildsemi.com/package/packageDetails.html?id=PN_TO263-0R7

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2. 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.

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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. I68

PUBLICATION ORDERING INFORMATION