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## **ON Semiconductor**®

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## FDI150N10 N 沟道 PowerTrench<sup>®</sup> MOSFET 100 V, 57 A, 16 mΩ

### 特性

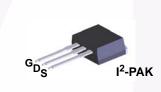
- $R_{DS(on)} = 12 \text{ m}\Omega \text{ (Typ.)} @V_{GS} = 10 \text{ V}, I_D = 49 \text{ A}$
- 快速开关速度
- 低栅极电荷
- 高性能沟道技术可实现极低的 R<sub>DS(on)</sub>
- 高功率和高电流处理能力
- 符合 RoHS 标准

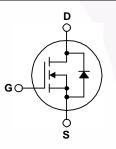
### 说明

此 N 沟道 MOSFET 采用飞兆半导体先进的 PowerTrench<sup>®</sup> 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
- 微型光伏逆变器





## MOSFET 最大额定值 T<sub>C</sub> = 25℃ 除非另有说明。

符号		参数		FDI150N10	单位
V <sub>DSS</sub>	漏极一源极电压			100	V
V <sub>GSS</sub>	栅极一源极电压		±20	V	
I <sub>D</sub>	旧机中达	- 连续 (T <sub>C</sub> = 25°C)		57	Α
	漏极电流	- 连续 (T <sub>C</sub> = 100°C)		40	A
I <sub>DM</sub>	漏极电流	- 脉冲	(说明1)	228	A
E <sub>AS</sub>	单脉冲雪崩能量	<b>单脉冲雪崩能量</b> (说明 2)		132	mJ
dv/dt	二极管恢复 dv/dt 峰值		(说明3)	7.5	V/ns
P <sub>D</sub>	-++ ±r	(T <sub>C</sub> = 25°C)		110	W
	功耗	- 降低至 25°C 以上		0.88	W/°C
T <sub>J</sub> , T <sub>STG</sub>	工作和存储温度范围			-55 至 +150	°C
TL	用于焊接的最大引线温度	,距离外壳 1/8",持续 5 秒		300	°C

### 热性能

符号	参数	FDI150N10	单位
$R_{ ext{ heta}JC}$	结至外壳热阻最大值	1.13	°C/W
$R_{ ext{ heta}JA}$	结至环境热阻最大值	62.5	0/10

2014年1月

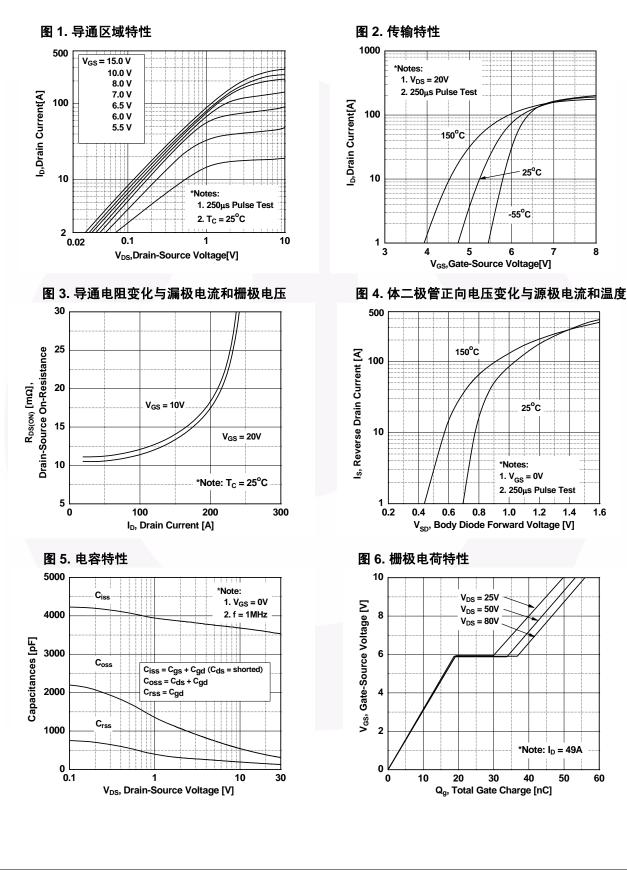
器件编号     顶标		封装	装 包装方法 卷尺寸	带宽		数量			
FDI150			I <sup>2</sup> -PAK			不适用		50 个	
	N			I	L				
电气特性	E T <sub>C</sub> = 25°C 除	非另有说明。							
符号	; 参数			测试条件		最小值	典型值	最大值	单位
关断特性									
BV <sub>DSS</sub>	漏极一源极击穿电压			I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V, T <sub>C</sub> = 25°C		100	-	-	V
ABV <sub>DSS</sub>	击穿电压温度系数			I <sub>D</sub> = 250 μA,参考温度为 25°C		-	0.1	-	V/°C
/ ∆T <sub>J</sub>	山牙屯压温度示奴						0.1		0,0
DSS	零栅极电压漏极电流			$V_{DS} = 100 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$		-	-	1	μA
			_	$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, T_{C} = 150^{\circ}\text{C}$		-	-	500 ±100	nA
GSS	栅极 - 体漏	电流	-	$V_{GS} = \pm 20 V, V_{DS} = 0$	J V	-	-	±100	ΠA
导通特性									
V <sub>GS(th)</sub>	栅极阈值电压			$V_{GS} = V_{DS}, I_{D} = 250 \ \mu A$		2.5	-	4.5	V
R <sub>DS(on)</sub>	漏极至源极静态导通电阻			V <sub>GS</sub> = 10 V, I <sub>D</sub> = 49 A		-	12	16	mΩ
9 <sub>FS</sub>	正向跨导			V <sub>DS</sub> = 20 V, I <sub>D</sub> = 49 A		-	156	-	S
动态特性									
	榆入由交		_			-	3580	4760	рF
C <sub>iss</sub>	输入电容		_	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0	V,	-	3580 340	4760	pF pF
C <sub>iss</sub> C <sub>oss</sub>	输出电容	28	_	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 f = 1 MHz	V,	-		4760 450 210	pF pF pF
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	=	容			V,	-	340	450	, pF
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	输出电容	1容			V,	-	340	450	, pF
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> 开关特性	输出电容			f = 1 MHz		-	340 140 47	450 210 104	, pF
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> 开关特性	输出电容   反向传输电   导通延迟时   开通上升时	问		f = 1 MHz V <sub>DD</sub> = 50 V, I <sub>D</sub> = 49 /	<b>4</b> ,	-	340 140 47 164	450 210 104 338	pF pF ns ns
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> 开关特性	输出电容   反向传输电   导通延迟时   开通上升时   关断延迟时	问  问  问		f = 1 MHz	Α, Ω	-	340 140 47 164 86	450 210 104 338 182	pF pF ns
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> <b>开关特性</b> t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub>	输出电容   反向传输电   导通延迟时   开通上升时   关断延迟时   关断下降时	问   问   问		f = 1 MHz V <sub>DD</sub> = 50 V, I <sub>D</sub> = 49 /	<b>4</b> ,	-	340 140 47 164 86 83	450 210 104 338 182 176	pF pF ns ns ns ns
Criss Coss Crss d(on) r d(off) f Q <sub>g(tot)</sub>	输出电容   输出电容   反向传输电   导通延迟时   开通上升时   关断延迟时   关断下降时   10 V 的栅机	间  间  间 吸电荷总量		f = 1 MHz $V_{DD} = 50 V, I_D = 49 V$ $V_{GS} = 10 V, R_G = 25$ $V_{DS} = 80 V, I_D = 49 V$	À, Ω (说明 4)	-	340 140 47 164 86 83 53	450 210 104 338 182 176 69	pF pF ns ns ns ns nC
Criss Coss Crss d(on) r d(off) f Q <sub>g(tot)</sub>	输出电容   反向传输电   导通延迟时   开通上升时   关断下降时   10 V 的栅机   栅极 - 源极	间  间  间 吸电荷总量  栅极电荷		f = 1 MHz V <sub>DD</sub> = 50 V, I <sub>D</sub> = 49 / V <sub>GS</sub> = 10 V, R <sub>G</sub> = 25	A, Ω (说明 4) A,	-	340 140 47 164 86 83 53 19	450 210 104 338 182 176	pF pF ns ns ns ns nC
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> <b>开关特性</b> d(on) dr d(off) dr Q <sub>g(tot)</sub> Q <sub>gs</sub>	输出电容   反向传输电   导通延迟时   开通上升时   关断下降时   10 V 的栅机   栅极 - 源极	间  间  间 吸电荷总量		f = 1 MHz $V_{DD} = 50 V, I_D = 49 V$ $V_{GS} = 10 V, R_G = 25$ $V_{DS} = 80 V, I_D = 49 V$	À, Ω (说明 4)	-	340 140 47 164 86 83 53	450 210 104 338 182 176 69	pF pF ns ns ns ns nC
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> 开关特性 td(on) tr td(off) tr Q <sub>g(tot)</sub> Q <sub>gs</sub> Q <sub>gd</sub>	输出电容   反向传输电   导通延迟时   开通上升时   关断下降时   10 V 的栅机   栅极 - 源极	间  间  间  回 吸电荷总量  栅极电荷   " 米勒 " 电荷		f = 1 MHz $V_{DD} = 50 V, I_D = 49 V$ $V_{GS} = 10 V, R_G = 25$ $V_{DS} = 80 V, I_D = 49 V$	A, Ω (说明 4) A,	-	340 140 47 164 86 83 53 19	450 210 104 338 182 176 69	pF pF ns ns ns ns nC
Ciss Coss Crss H关特性 d(on) f Q <sub>g(tot</sub> ) Q <sub>gs</sub> Q <sub>gd</sub> <b>漏极 - 源权</b>	输出电容 反向传输电 导通延迟时时 关断下降时 10 V 的栅极 栅极 - 源极 极二极管特性	i间 i间 t间 吸电荷总量 栅极电荷 " 米勒 " 电荷		f = 1 MHz $V_{DD} = 50 V, I_D = 49 V$ $V_{GS} = 10 V, R_G = 25$ $V_{DS} = 80 V, I_D = 49 V$	A, Ω (说明 4) A,	-	340 140 47 164 86 83 53 19	450 210 104 338 182 176 69	pF pF ns ns ns ns nC
Ciss Coss Crss H关特性 d(on) r d(off) f Q <sub>g(tot)</sub> Q <sub>gs</sub> Q <sub>gd</sub> <b>漏极 - 源材</b> S	输出电容 反向传输电 导通延迟时时 关断下的时时 10 V 的栅极 栅极 - 源极 极二极管特性 漏极 - 源极	间   		f = 1 MHz $V_{DD} = 50 V, I_D = 49 V$ $V_{GS} = 10 V, R_G = 25$ $V_{DS} = 80 V, I_D = 49 V$	A, Ω (说明 4) A,	- - - - - - - - - - -	340 140 47 164 86 83 53 19 15	450 210 104 338 182 176 69 - -	pF pF ns ns ns nC nC
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> <b>开关特性</b> <sup>t</sup> d(on) t <sub>r</sub> t <sub>d</sub> (off) t <sub>f</sub> Q <sub>g(tot)</sub> Q <sub>gg</sub> Q <sub>gd</sub> <b>漏极 - 源极</b> I <sub>S</sub>	输出电容     输出电容     反向传输电     导通延迟时     开通上升时     关断下路地区降时     10 V 的栅极     栅极 - 源极     人、一极管特性     漏极 - 源极     漏极 - 源极	i间 i间 t间 吸电荷总量 栅极电荷 " 米勒 " 电荷		f = 1 MHz $V_{DD} = 50 V, I_D = 49 V$ $V_{GS} = 10 V, R_G = 25$ $V_{DS} = 80 V, I_D = 49 V$	A, Ω (说明 4) A, (说明 4)	- - - - - - - - - - -	340 140 47 164 86 83 53 19 15	450 210 104 338 182 176 69 - - - 57	pF pF ns ns ns nc nC nC
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub> 开关特性 t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub> t <sub>f</sub> Q <sub>g(tot)</sub> Q <sub>gs</sub> Q <sub>gd</sub> 漏极 - 源材	输出电容     输出电容     反向传输电     导通延迟时     开通上升时     关断下路地区降时     10 V 的栅极     栅极 - 源极     人、一极管特性     漏极 - 源极     漏极 - 源极	1间 1间 1间 处电荷总量 栅极电荷 "米勒"电荷 <b>走</b> 二极管最大正向连续 二极管最大正向脉冲 二极管正向电压		f = 1 MHz $V_{DD} = 50 V, I_D = 49 V$ $V_{GS} = 10 V, R_G = 25$ $V_{DS} = 80 V, I_D = 49 V$ $V_{GS} = 10 V$	A, Ω (说明 4) A, (说明 4)		340 140 47 164 86 83 53 19 15	450 210 104 338 182 176 69 - - - 57 228	pF pF ns ns ns nC nC nC A A

注意:

**1**. 重复额定值: 脉冲宽度受限于最大结温。 2: L=0.11 mH, I<sub>AS</sub>=49 A, V<sub>DD</sub>=50 V, R<sub>G</sub>=25 Ω, 开始 T<sub>J</sub>=25°C。 3: I<sub>SD</sub> ≤ 49 A, di/dt ≤ 200 A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, 开始 T<sub>J</sub>=25°C。 4: 本质上独立于工作温度的典型特性。

FDI150N10 — N 沟道 PowerTrench<sup>®</sup> MOSFET

### 典型性能特征



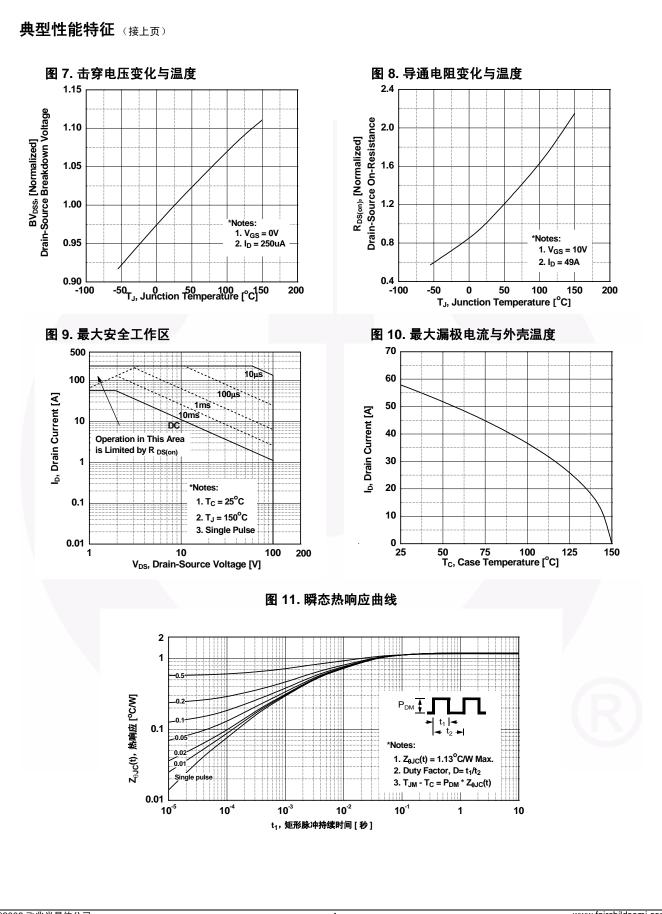
FDI150N10 — N 沟道 PowerTrench<sup>®</sup> MOSFET

8

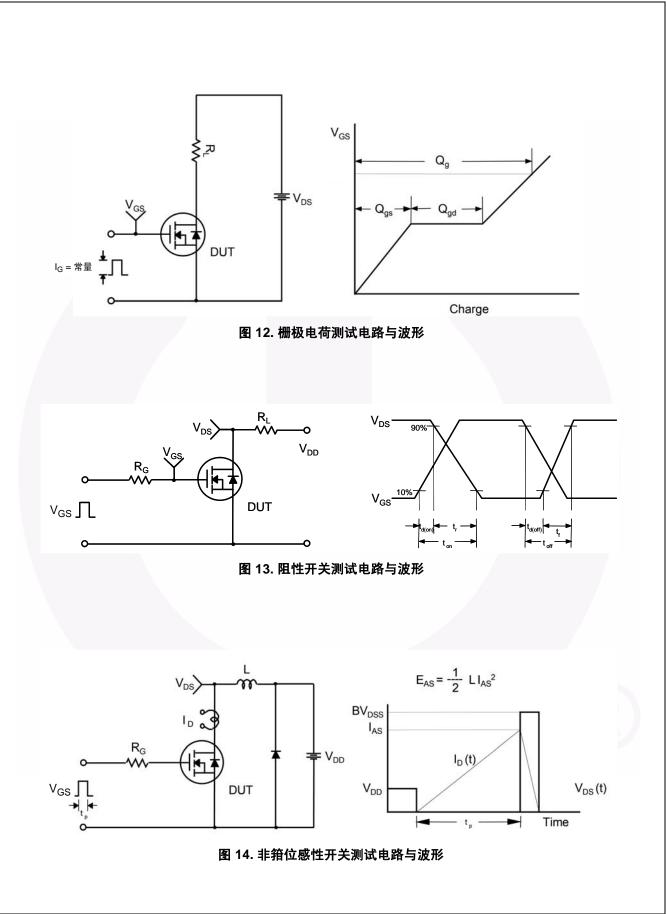
1.6

60

3

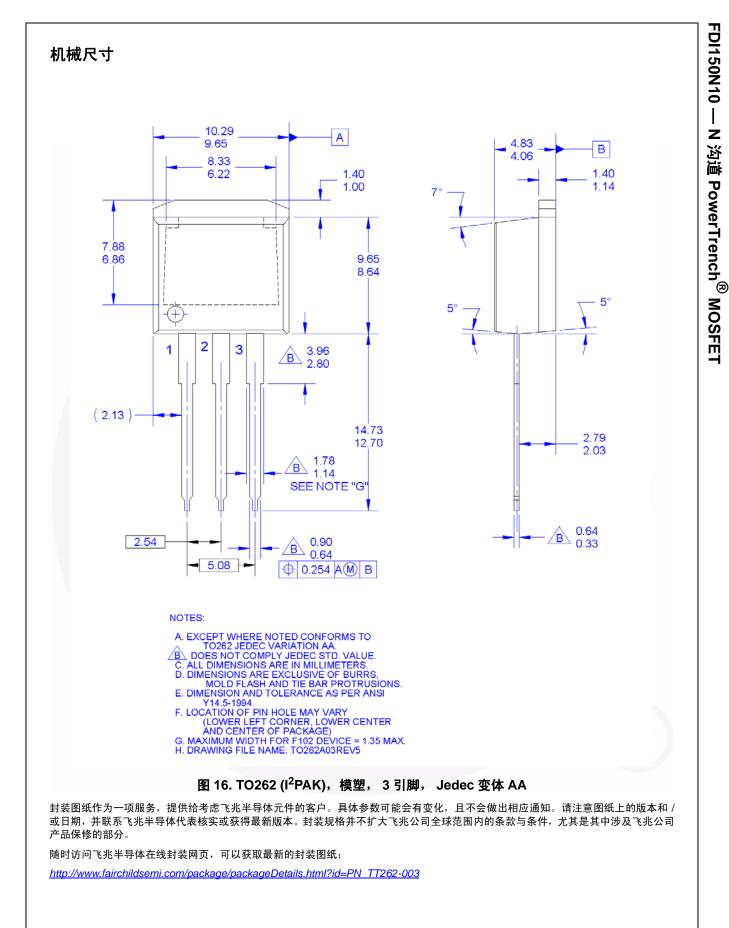


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DUT +  $V_{DS}$ a ۱<sub>sd</sub> م L Driver R<sub>G</sub>€ Same Type as DUT L F ∨<sub>DD</sub> ∏∏ V<sub>GS</sub> • dv/dt controlled by  $R_{G}$ • I<sub>SD</sub> controlled by pulse period ſ Gate Pulse Width Gate Pulse Period V<sub>GS</sub> D = 10V (Driver) I<sub>FM</sub>, Body Diode Forward Current I <sub>SD</sub> di/dt (DUT)  $I_{RM}$ Body Diode Reverse Current  $V_{DS}$ (DUT) Body Diode Recovery dv/dt  $V_{\text{SD}}$ V<sub>DD</sub> Body Diode Forward Voltage Drop 图 15. 峰值二极管恢复 dv/dt 测试电路与波形





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Datasheet Identification	Product Status	Definition
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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.

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