

MOSFET – N 沟道, POWERTRENCH®

100 V, 50 A, 15 mΩ

FDP150N10A

说明

此 N 沟道 MOSFET 采用 onsemi 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。

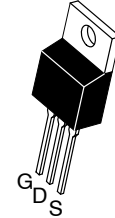
特性

- $R_{DS(on)} = 12.5 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 10 \text{ V}$, $I_D = 50 \text{ A}$
- 快速开关速度
- 低栅极电荷, $Q_G = 16.2 \text{ nC}$ (典型值)
- 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

应用

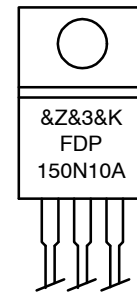
- 用于 ATX / 服务器 / 电信 PSU 的同步整流
- 电机驱动和不间断电源
- 微型光伏逆变器

V_{DSS}	$R_{DS(on)} \text{ MAX}$	$I_D \text{ MAX}$
100 V	15.0 mΩ @ 10 V	50 A

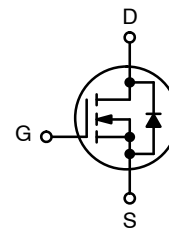


TO-220
CASE 221A

MARKING DIAGRAM



&Z = Assembly Plant Code
 &3 = 3-Digit Date Code Format
 &K = 2-Digits Lot Run Traceability Code
 FDP150N10A = Device Code



N-Channel MOSFET

ORDERING INFORMATION

See detailed ordering and shipping information on page 8 of this data sheet.

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

符号	参数	FDP150N10A-F102	单位
V_{DSS}	漏极-源极电压	100	V
V_{GSS}	栅极-源极电压	± 20	V
I_D	漏极电流	- 连续 ($T_C = 25^\circ\text{C}$)	A
		- 连续 ($T_C = 100^\circ\text{C}$)	
I_{DM}	漏极电流	- 脉冲 (说明 1)	A
E_{AS}	单脉冲雪崩能量 (说明 2)	84.6	mJ
dv/dt	二极管恢复 dv/dt 峰值 (说明 3)	6.0	V/ns
P_D	功耗	($T_C = 25^\circ\text{C}$)	W
		- 降低至 25°C 以上	$W/^\circ\text{C}$
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	$^\circ\text{C}$

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. 重复额定值: 脉冲宽度受限于最大结温。

2. $L = 2\text{ mH}$, $I_{AS} = 9.2\text{ A}$, $R_G = 25\ \Omega$, 开始 $T_J = 25^\circ\text{C}$ 。

3. $I_{SD} \leq 100\text{ A}$, $di/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, 开始 $T_J = 25^\circ\text{C}$ 。

热性能

符号	参数	FDP150N10A-F102	单位
$R_{\theta JC}$	结至外壳热阻最大值	1.6	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻最大值	62.5	

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
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关断特性

BV_{DSS}	漏极 - 源极击穿电压	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0\ \text{V}$	100	–	–	V
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	$I_D = 250\ \mu\text{A}$, 温度参考 25°C	–	0.08	–	V/ $^\circ\text{C}$
I_{DSS}	零栅极电压漏极电流	$V_{DS} = 80\ \text{V}$, $V_{GS} = 0\ \text{V}$	–	–	1	μA
		$V_{DS} = 80\ \text{V}$, $T_C = 150^\circ\text{C}$	–	–	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	$V_{GS} = V_{DS}$, $I_D = 250\ \mu\text{A}$	2.0	–	4.0	V
$R_{DS(on)}$	漏极至源极静态导通电阻	$V_{GS} = 10\ \text{V}$, $I_D = 50\ \text{A}$	–	12.5	15.0	m Ω
g_{FS}	正向跨导	$V_{DS} = 10\ \text{V}$, $I_D = 50\ \text{A}$	–	40	–	S

动态特性

C_{iss}	输入电容	$V_{DS} = 50\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	–	1080	1440	pF
C_{oss}	输出电容		–	267	355	pF
C_{rss}	反向传输电容		–	11	–	pF
$C_{oss(er)}$	能量相关输出电容	$V_{DS} = 50\ \text{V}$, $V_{GS} = 0\ \text{V}$	–	436	–	pF
$Q_{g(tot)}$	10 V 的栅极电荷总量	$V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 50\ \text{A}$ (说明 4)	–	16.2	21.0	nC
Q_{gs}	栅极 - 源极栅极电荷		–	5.3	–	nC
Q_{gs2}	栅极平台电荷阈值		–	2.6	–	nC
Q_{gd}	栅极 - 漏极 “米勒” 电荷		–	3.7	–	nC
ESR	等效串联电阻 (G-S)	$f = 1\ \text{MHz}$	–	1.3	–	Ω

开关特性

$t_{d(on)}$	导通延迟时间	$V_{DD} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_G = 4.7\ \Omega$ (说明 4)	–	13	36	ns
t_r	开通上升时间		–	16	42	ns
$t_{d(off)}$	关断延迟时间		–	21	52	ns
t_f	关断下降时间		–	5	20	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		–	–	50	A
I_{SM}	漏极 - 源极二极管最大正向脉冲电流		–	–	200	A
V_{SD}	漏极 - 源极二极管正向电压	$V_{GS} = 0\ \text{V}$, $I_{SD} = 50\ \text{A}$	–	–	1.3	V
t_{rr}	反向恢复时间	$V_{GS} = 0\ \text{V}$, $V_{DD} = 50\ \text{V}$, $I_{SD} = 50\ \text{A}$, $di_F/dt = 100\ \text{A}/\mu\text{s}$	–	50	–	ns
Q_{rr}	反向恢复电荷		–	55	–	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。

4. 本质上独立于工作温度的典型特性。

典型性能特征

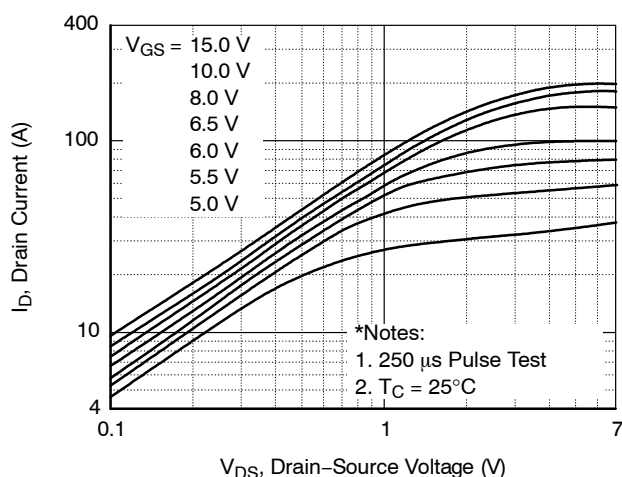


图 1. 导通区域特性

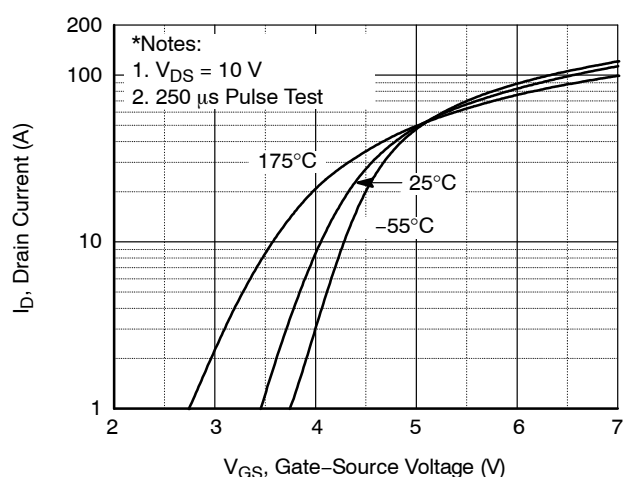


图 2. 传输特性

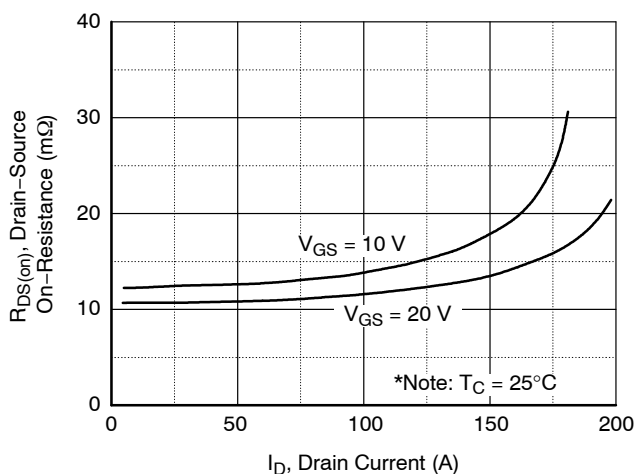


图 3. 导通电阻变化与漏极电流和栅极电压的关系

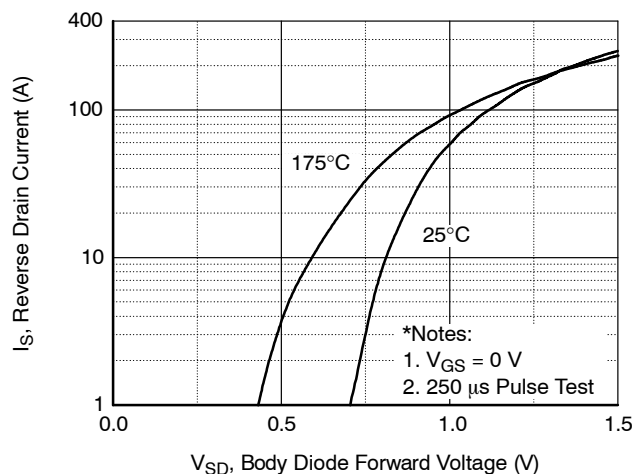


图 4. 体二极管正向电压变化与源极电流和温度的关系

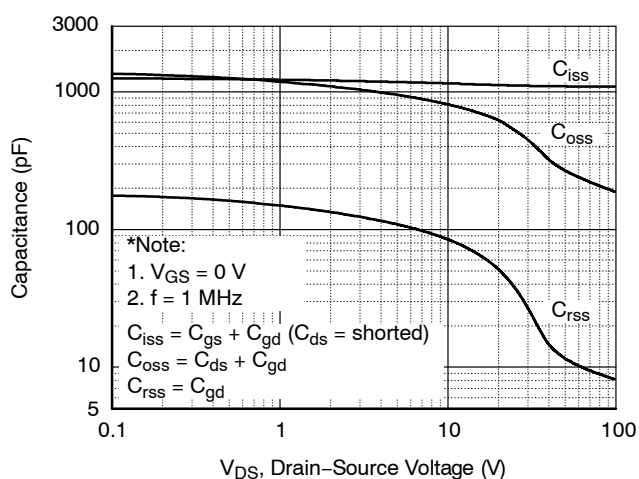


图 5. 电容特性

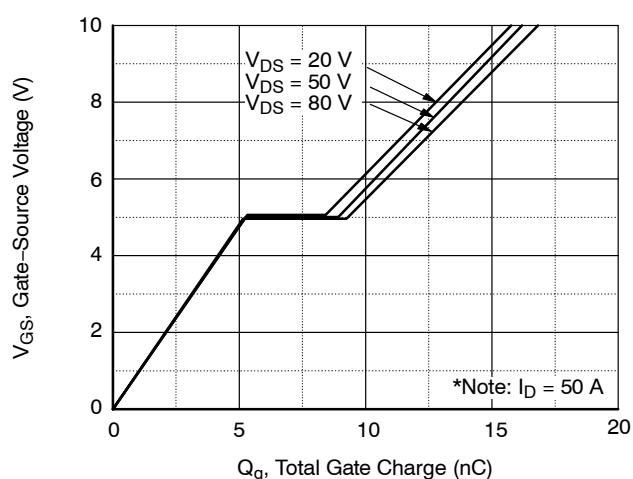


图 6. 栅极电荷特性

典型性能特性 (接上页)

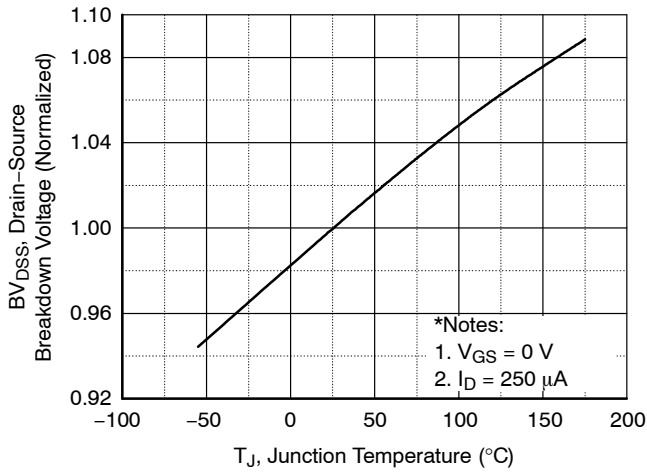


图 7. 击穿电压变化与温度的关系

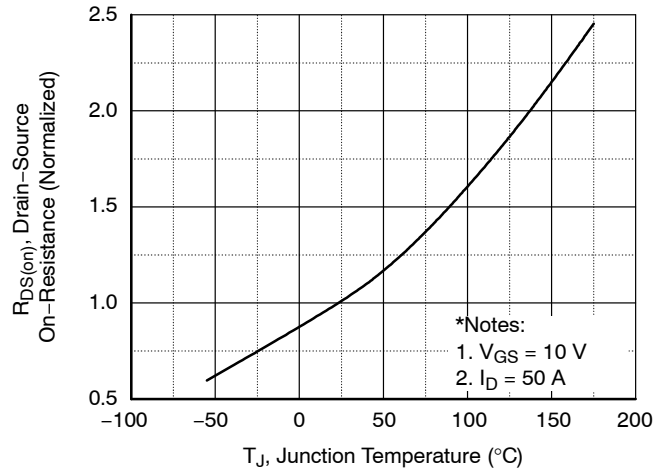


图 8. 导通电阻变化与温度的关系

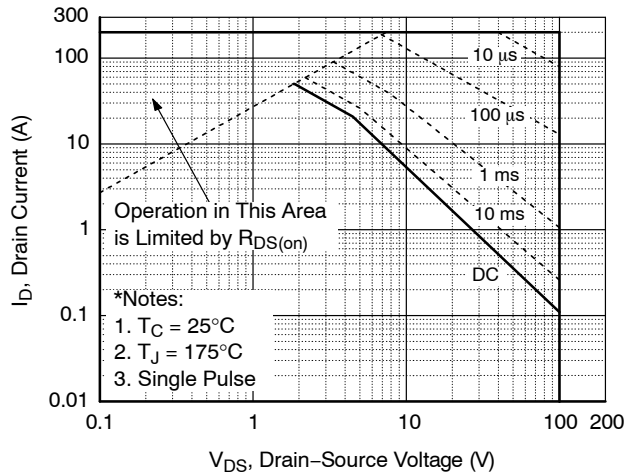


图 9. 最大安全工作区

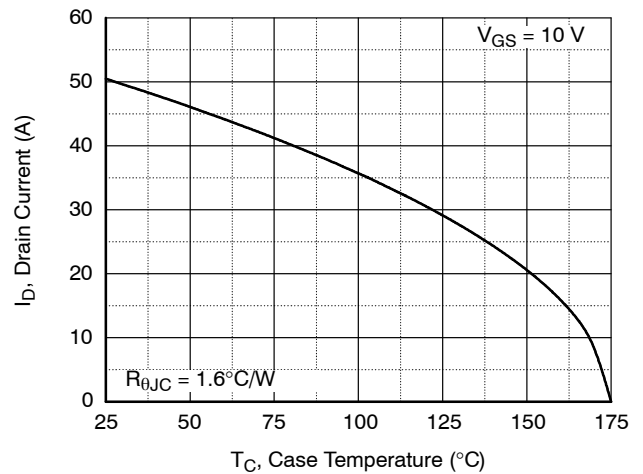


图 10. 最大漏极电流与壳温的关系

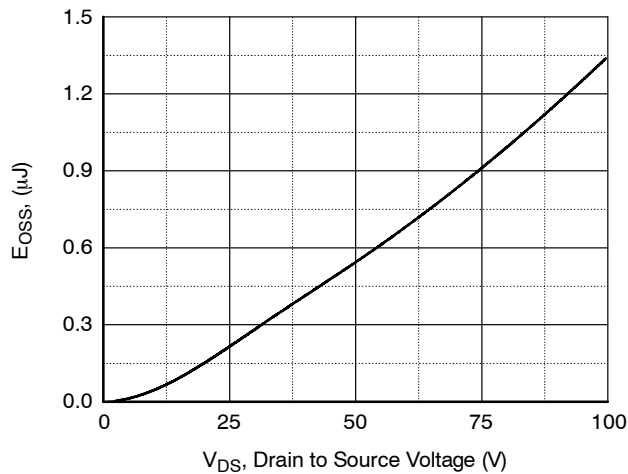


图 11. (E_{oss}) 与漏源极电压的关系

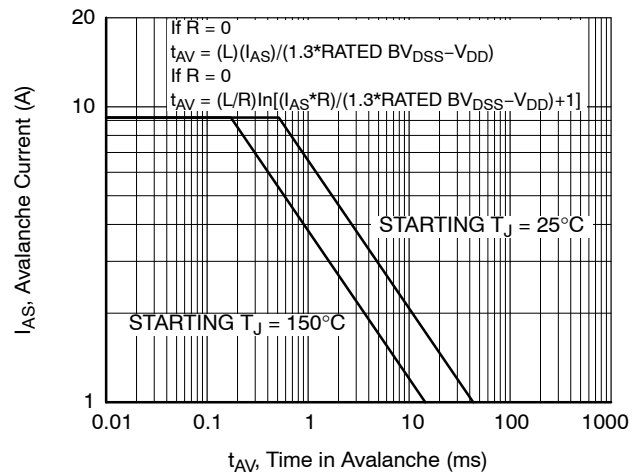


图 12. 非箱感性开关特性

典型性能特性 (接上页)

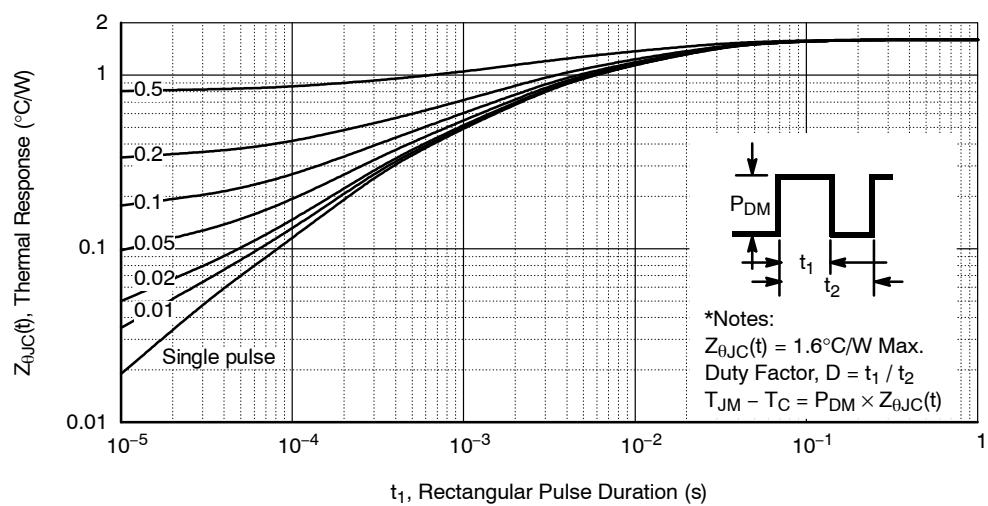


图 13. 瞬态热响应曲线

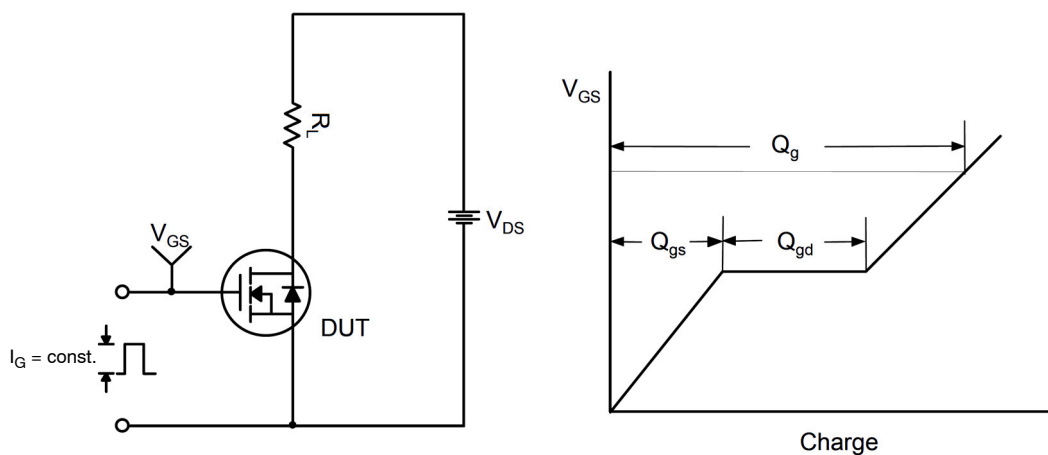


图 14. 栅极电荷测试电路与波形

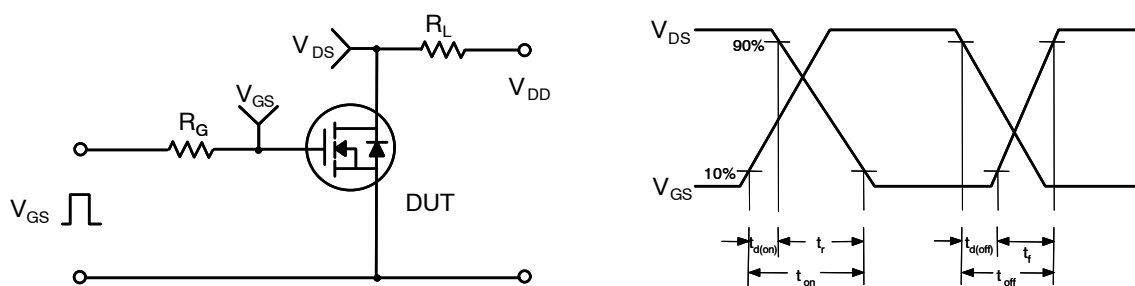


图 15. 阻性开关测试电路与波形

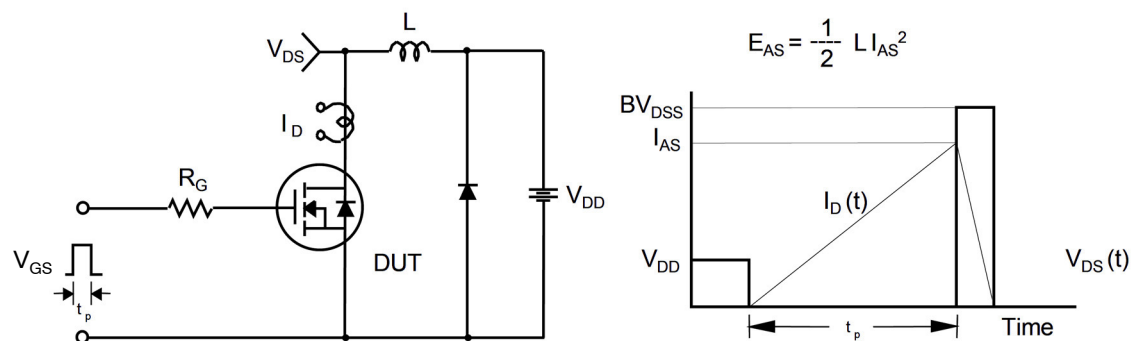


图 16. 非箝位电感开关测试电路与波形

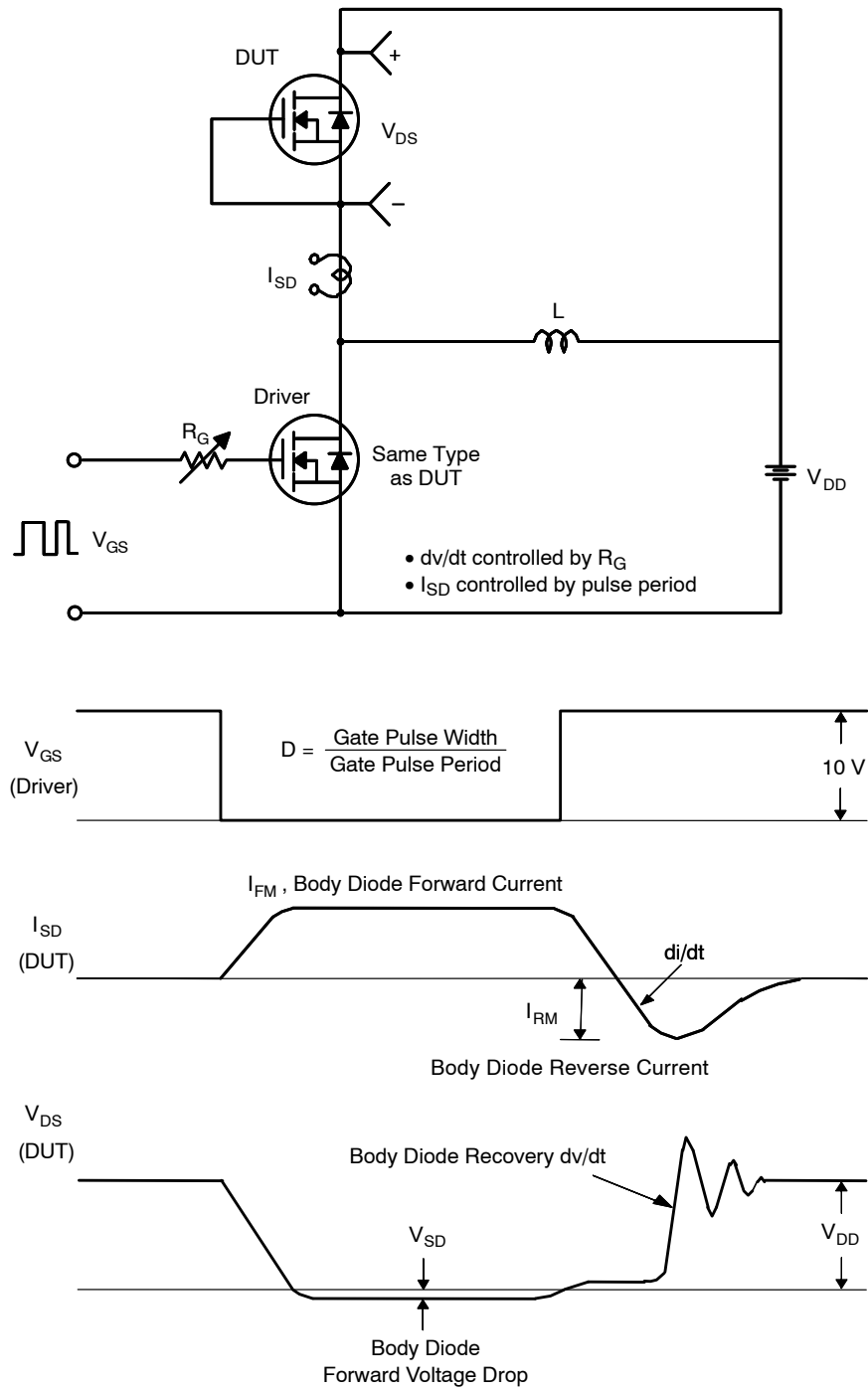
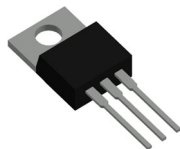


图 17. 二极管恢复 dv/dt 峰值测试电路与波形

封装标识与订购信息

器件编号	顶标	封装	卷尺寸	带宽	Shipping
FDP150N10A-F102	FDP150N10A	TO-220	不适用	不适用	800 个 / 塑料管

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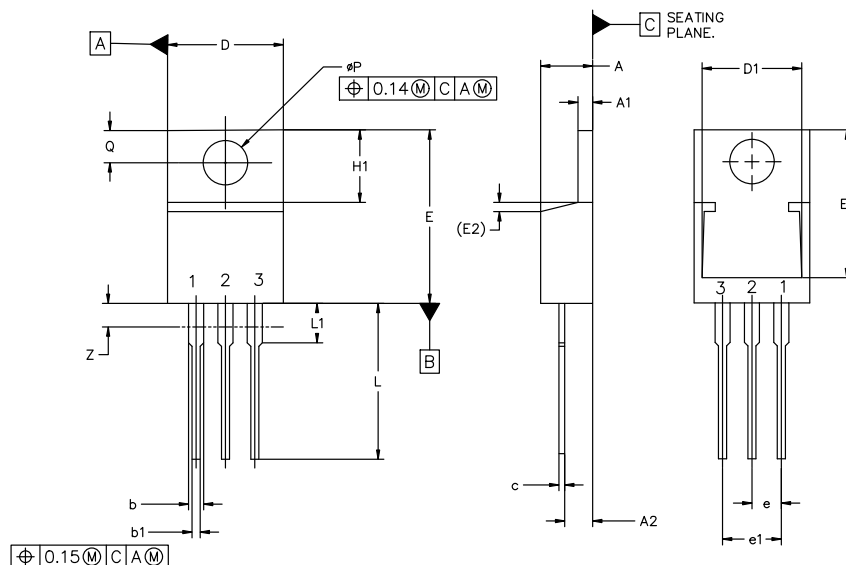


TO-220-3 10.10x15.12x4.45, 2.54P

CASE 221A

ISSUE AL

DATE 05 FEB 2025



MILLIMETERS			
DIM	MIN	NOM	MAX
A	4.07	4.45	4.83
A1	1.15	1.28	1.41
A2	2.04	2.42	2.79
b	1.15	1.34	1.52
b1	0.64	0.80	0.96
c	0.36	0.49	0.61
D	9.66	10.10	10.53
D1	8.43	8.63	8.83
E	14.48	15.12	15.75
E1	12.58	12.78	12.98
E2	1.27 REF		

MILLIMETERS			
DIM	MIN	NOM	MAX
e	2.42	2.54	2.66
e1	4.83	5.08	5.33
H1	5.97	6.22	6.47
L	12.70	13.49	14.27
L1	2.80	3.45	4.10
Q	2.54	2.79	3.04
øP	3.60	3.85	4.09
Z	---	---	3.48

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
4. EMITTER

STYLE 3:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 4:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

STYLE 5:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

STYLE 8:
PIN 1. CATHODE
2. ANODE
3. EXTERNAL TRIP/DELAY
4. ANODE

STYLE 9:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 10:
PIN 1. GATE
2. SOURCE
3. DRAIN
4. SOURCE

STYLE 11:
PIN 1. DRAIN
2. SOURCE
3. GATE
4. SOURCE

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. NOT CONNECTED

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