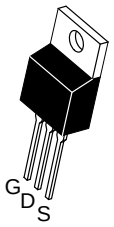
MOSFET – N 沟道, POWERTRENCH®

80 V, 171 A, 3.9 mΩ

FDP039N08B-F102

V_{DSS}	$R_{DS(on)}$ TYP	I_D MAX
80 V	3.16 mΩ @ 10 V	171 A*

*封装限制电流为 120 安。



TO−220
CASE 221A

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。

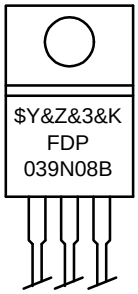
特性

- $R_{DS(on)}$ = 3.16 mΩ (典型值) @ V_{GS} = 10 V, I_D = 100 A
- 低 FOM $R_{DS(on)}$ * QG
- 低反向恢复电荷，Q_{rr} = 87.9 nC
- 软反向恢复体二极管
- 可实现高效同步整流
- 开关速度快
- 100% 经过 UIL 测试
- 符合 RoHS 标准

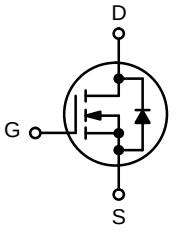
应用

- 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

MARKING DIAGRAM



$Y	= Logo
&Z	= Assembly Plant Code
&3	= 3−Digit Date Code Format
&K	= 2−Digits Lot Run Traceability Code
FDP039N08B	= Device Code



N−Channel MOSFET

ORDERING INFORMATION

See detailed ordering and shipping information on page 9 of this data sheet.

最大绝对额定值 (T_C = 25°C 除非另有说明)

符号	参数		FDP039N08B−F102	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)	171*	A
		− 连续 (T_C = 100°C, 硅限制)	121*	
		− 连续 (T_C = 25°C, 封装限制)	120	
I_{DM}	漏极电流	− 脉冲 (注意 1)	684	A
E_{AS}	单脉冲雪崩能量 (注意 2)		547	mJ
dv/dt	二极管恢复 dv/dt 峰值 (注意 3)		6.0	V/ns
P_D	功耗	(T_C = 25°C)	214	W
		− 降低至 25°C 以上	1.43	W/°C
T_J, T_{STG}	工作和存储温度范围		−55 至 +175	°C
T_L	用于焊接的最大引线温度，距离外壳 1/8"，持续 5 秒		300	°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。
*封装限制电流为 120 安。
1. 重复额定值：脉冲宽度受限于最大结温。
2. L = 3 mH, I_{AS} = 19.1 A，开始 T_J = 25°C.
3. I_{SD} ≤ 100 A, di/dt ≤ 200 A/ms, V_{DD} ≤ BV_{DSS}，开始 T_J = 25°C.

热性能

符号	参数	FDP039N08B−F102	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.7	°C/W
$R_{\theta JA}$	结至环境热阻最大值	62.5	

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
ΔBV_{DSS} / ΔT_J	击穿电压温度系数	I_D = 250 μA, 参考 25°C	−	0.089	−	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	−	3.16	3.9	mΩ
g_{FS}	正向跨导	V_{DS} = 10 V, I_D = 100 A	−	180	−	S
动态特性						
C_{iss}	输入电容	V_{DS} = 40 V, V_{GS} = 0 V, f = 1 MHz	−	7105	9450	pF
C_{oss}	输出电容		−	1110	1475	pF
C_{rss}	反向传输电容		−	30	−	pF
$C_{oss(er)}$	能量相关输出电容	V_{DS} = 40 V, V_{GS} = 0 V	−	1656	−	pF
$Q_{g(tot)}$	10 V 能量相关输出电容	V_{DS} = 40 V, I_D = 100 A, V_{GS} = 10 V (注意 4)	−	102	133	nC
Q_{gs}	栅极 − 源极栅极电荷		−	39.9	−	nC
Q_{gd}	栅极 − 漏极 “米勒” 电荷		−	22	−	nC
$V_{plateau}$	栅极平台电压		−	5.6	−	V
Q_{sync}	总栅极电荷同步	V_{DS} = 0 V, I_D = 50 A	−	87.4	−	nC
Q_{oss}	输出电荷	V_{DS} = 40 V, V_{GS} = 0 V	−	99.2	−	nC
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 (注意 4)	−	36	82	ns
t_r	开通上升时间		−	49	108	ns
$t_{d(off)}$	关断延迟时间		−	71	152	ns
t_f	关断下降时间		−	29	68	ns
ESR	等效串联电阻 (G−S)	f = 1 MHz	−	2.2	−	Ω
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		−	−	171*	A
I_{SM}	漏极 − 源极二极管最大正向脉冲电流		−	−	684	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	−	70.1	−	ns
Q_{rr}	反向恢复电荷		−	87.9	−	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。

*封装限制电流为 120 安。

4. 本质上独立于工作温度的典型特性。

典型性能特征

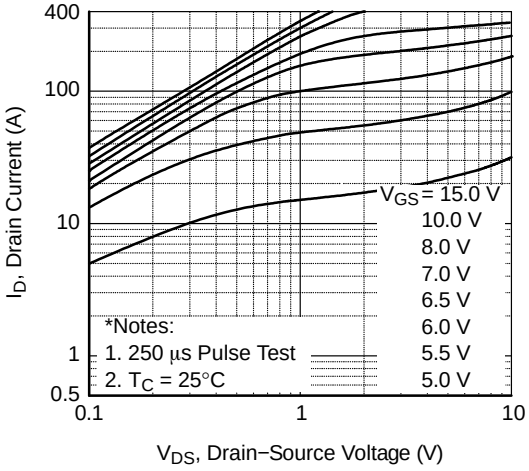


图 1. 导通区域特性

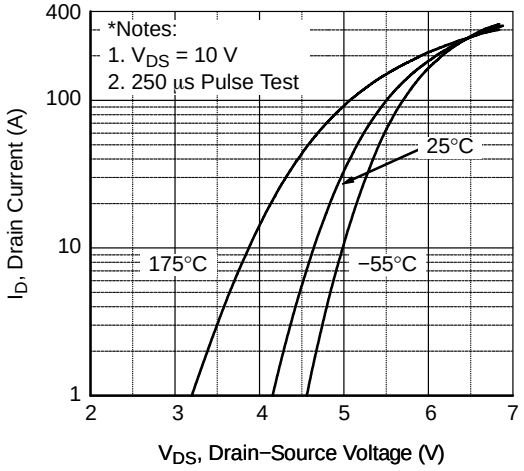


图 2. 传输特性

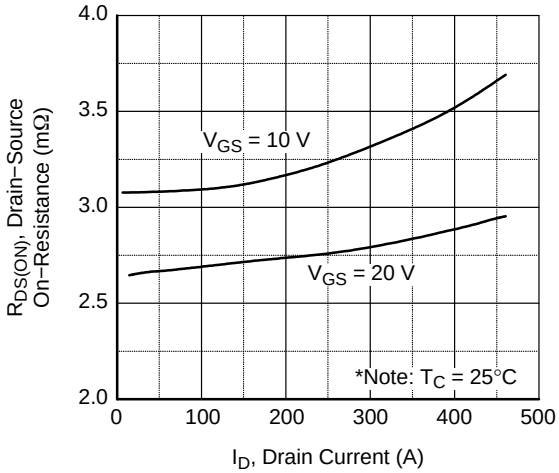


图 3. 导通电阻变化与漏极电流和栅极电压的关系

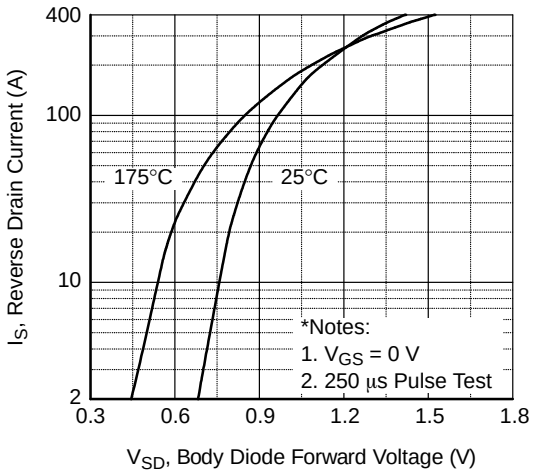


图 4. 体二极管正向电压变化与源极电流和温度的关系

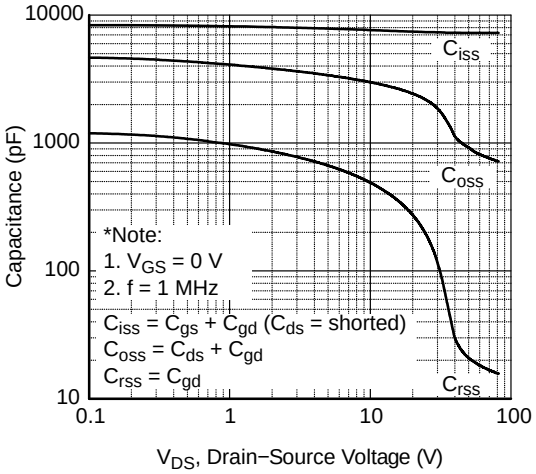


图 5. 电容特性

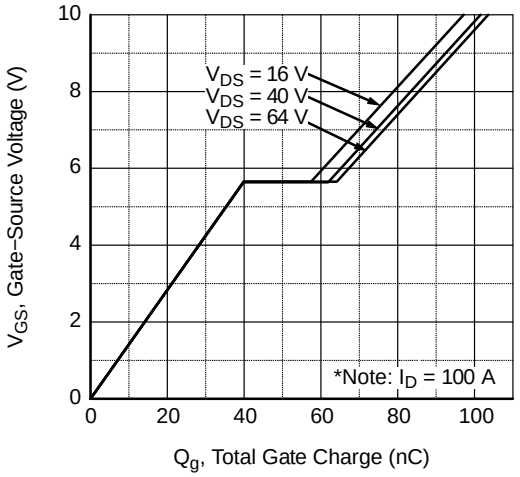


图 6. 栅极电荷特性

典型性能特征 (接上页)

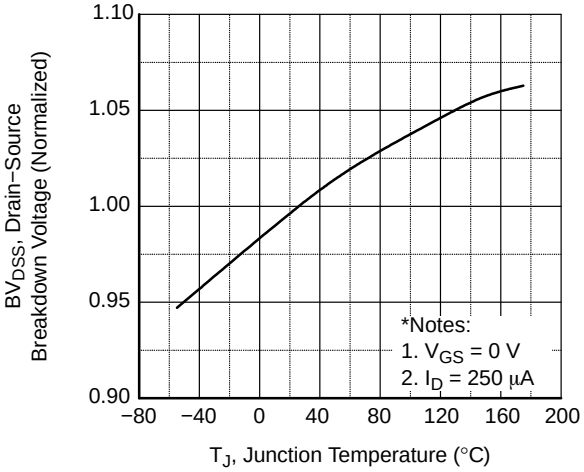


图 7. 击穿电压变化与温度的关系

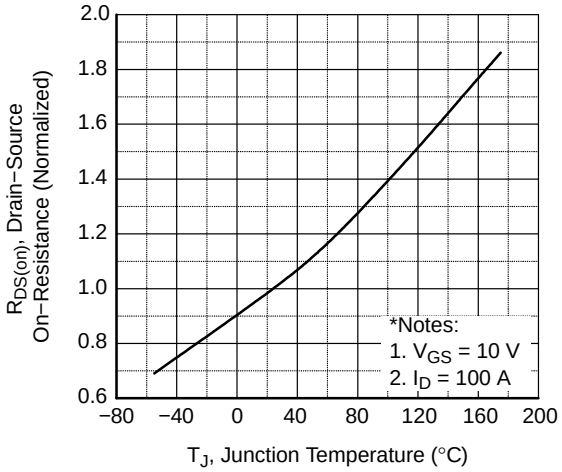


图 8. 导通电阻变化与温度的关系

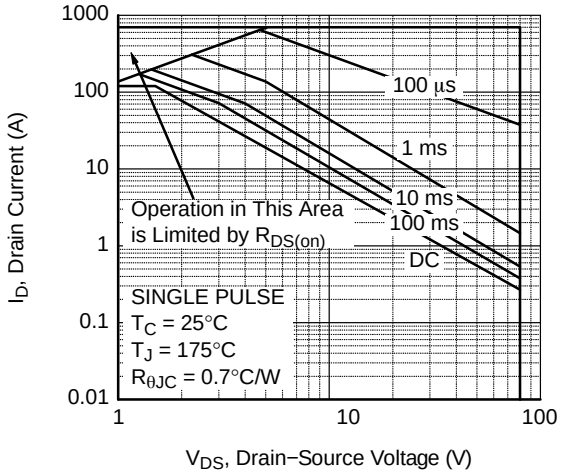


图 9. 最大安全工作区

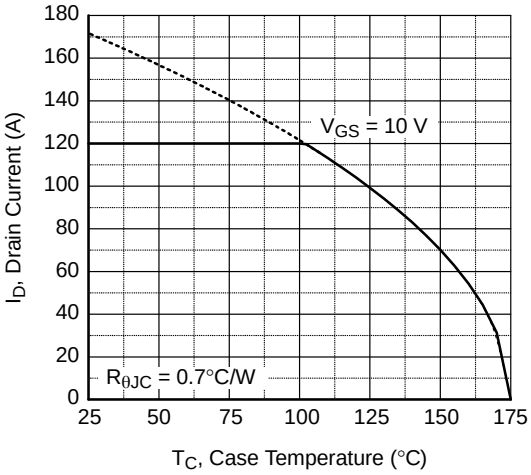


图 10. 最大漏极电流与壳温的关系

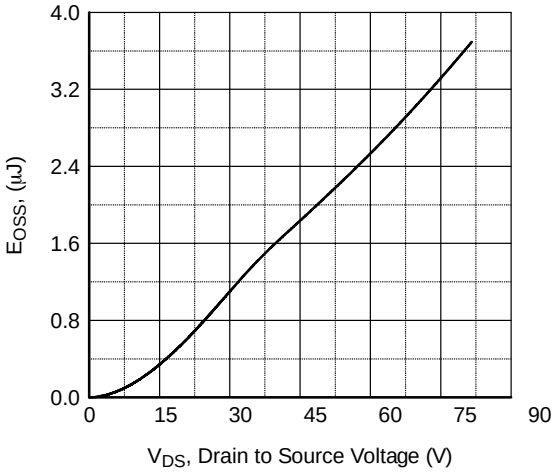


图 11. 输出电容 (Eoss) 与漏源极电压的关系

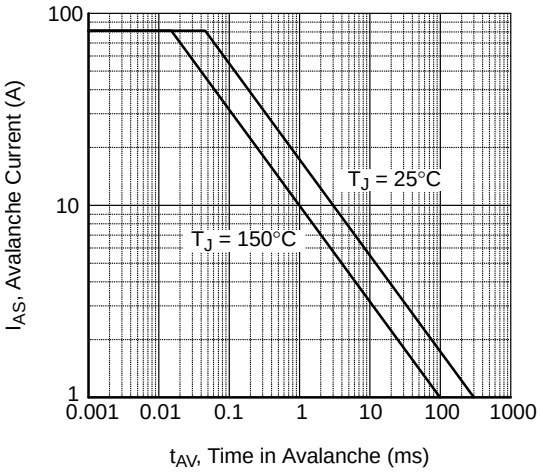


图 12. 非箝位电感开关能力

典型性能特征 (接上页)

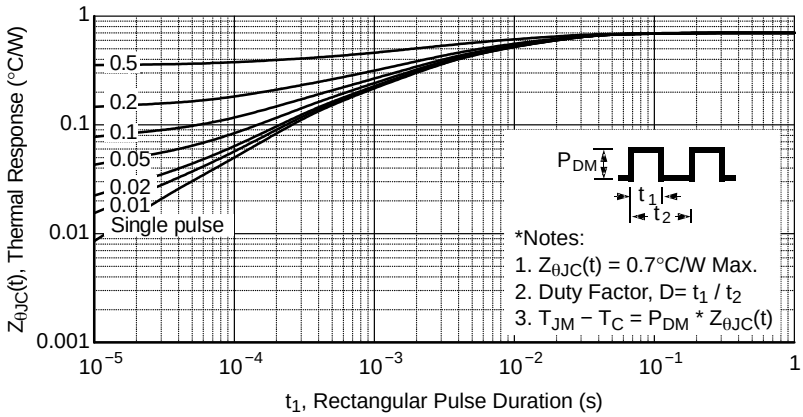


图 13. 瞬态热响应曲线

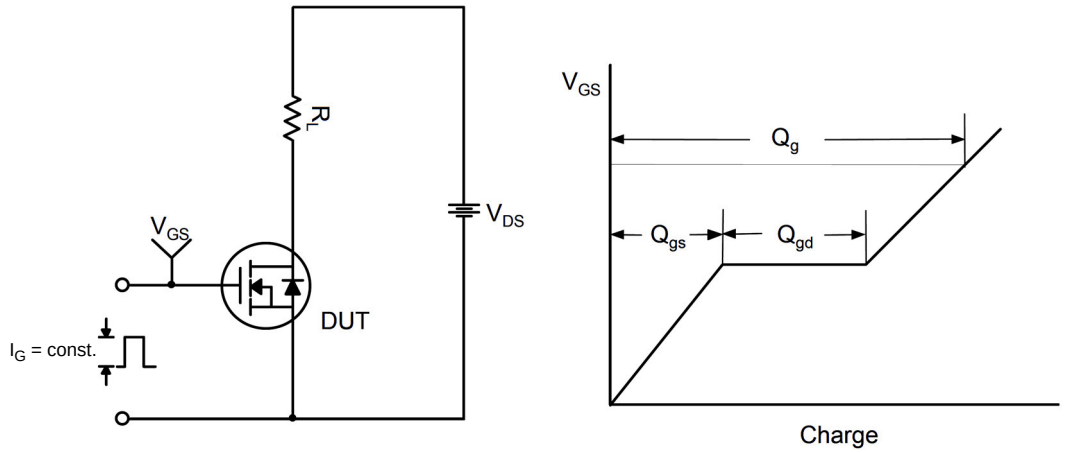


图 14. 栅极电荷测试电路与波形

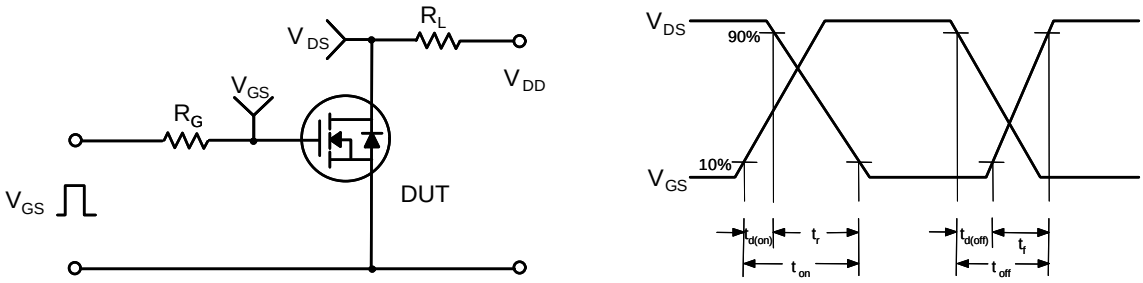


图 15. 阻性开关测试电路与波形

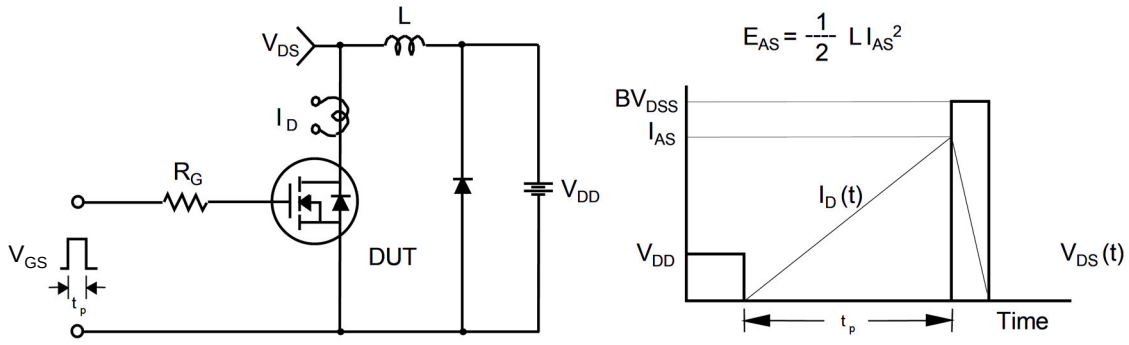


图 16. 非箝位电感开关测试电路与波形

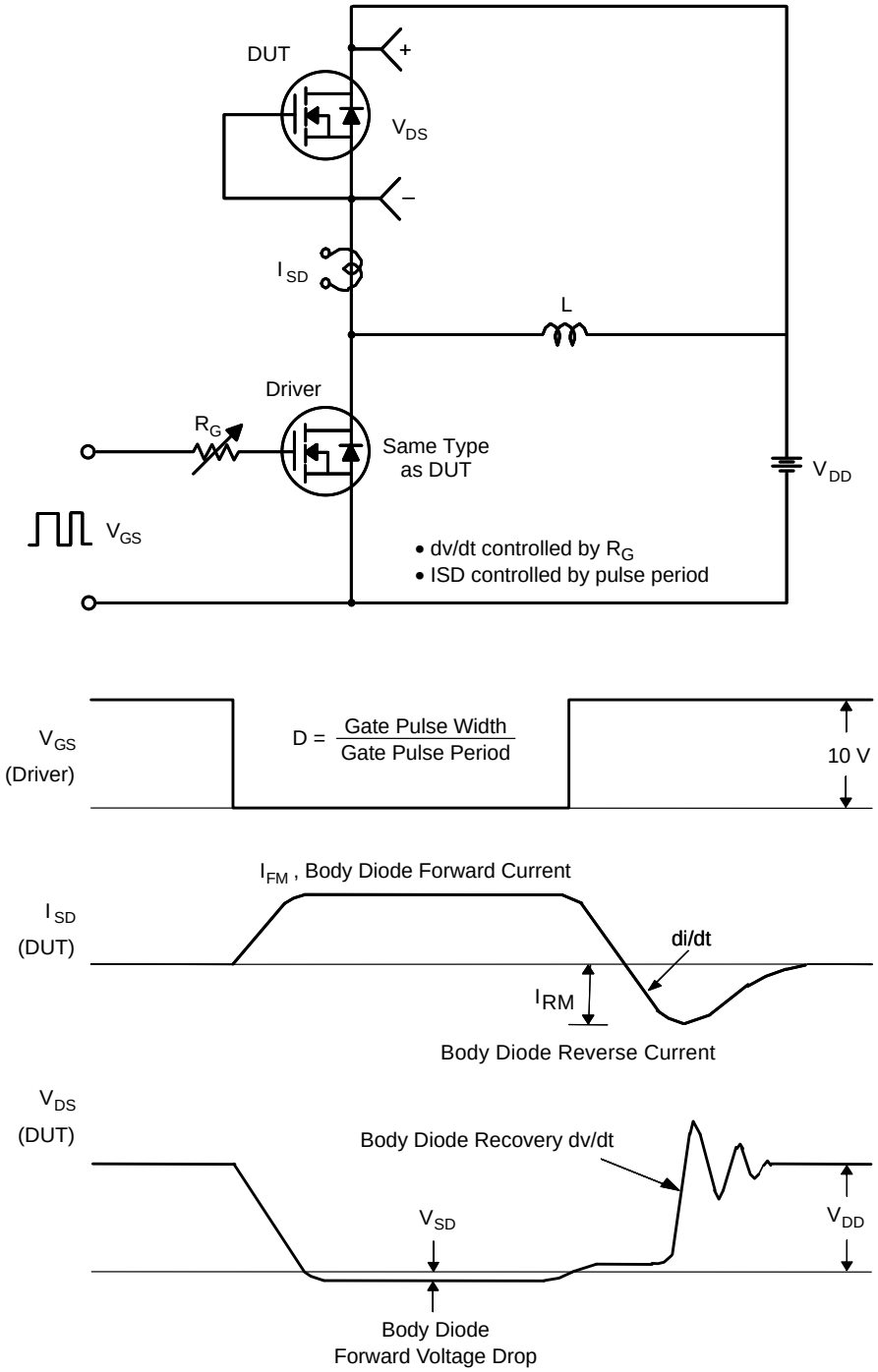


图 17. 二极管恢复 dv/dt 峰值测试电路与波形

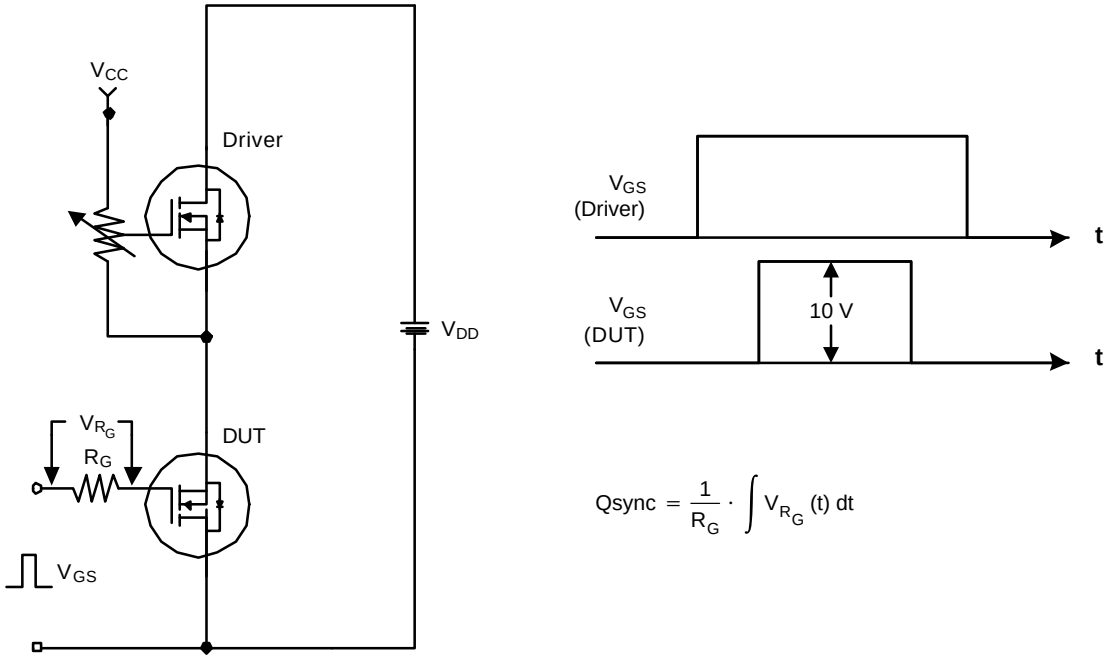


图 18. 总栅极电荷 Qsync 测试电路与波形

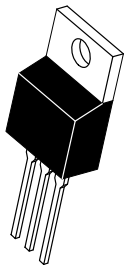
封装标识与定购信息

器件编号	顶标	封装	数量 / 包装方法
FDP039N08B−F102	FDP039N08B	TO−220	50 个 / 塑料管

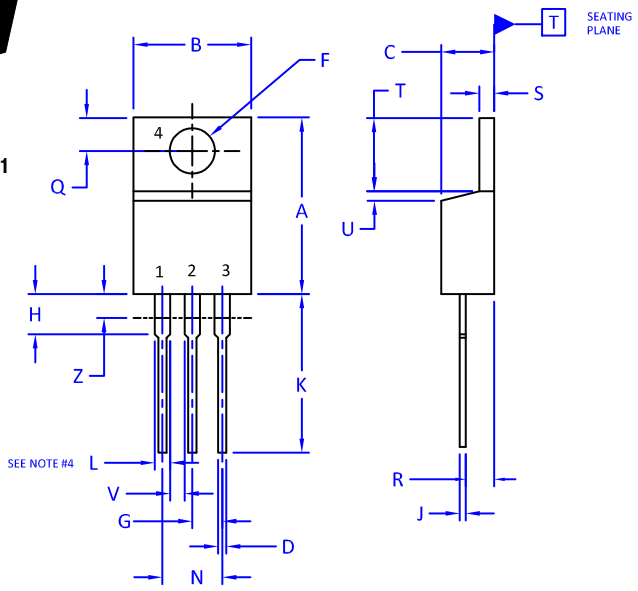
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

TO−220
CASE 221A
ISSUE AK

DATE 13 JAN 2022



SCALE 1:1



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

	INCHES		MILLIMETERS	
DIM	MIN.	MAX.	MIN.	MAX.
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.60	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.41
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	----	1.15	---
Z	----	0.080	---	2.04

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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