MOSFET – N 沟道, SUPERFET II

600 V, 37 A, 104 mΩ

FCH104N60

ON Semiconductor®

www.onsemi.cn

V_{DSS}	$R_{DS(ON)}$ MAX	I_D MAX
600 V	104 mΩ	37 A

说明

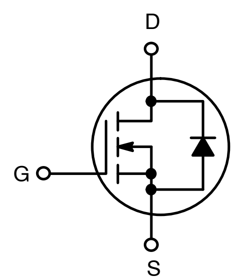
SUPERFET® II MOSFET 是飞兆半导体利用电荷平衡技术实现出色的低导通电阻和更低栅极电荷性能的全新高压超级结 (SJ) MOSFET 系列产品。这项先进技术专用于最小化传导损，提供卓越的开关性能，并承受极端 dv/dt 额定值和更高雪崩。因此，SUPERFET II MOSFET 适用于系统小型化和高效化的种 AC−DC 功率转换。

特性

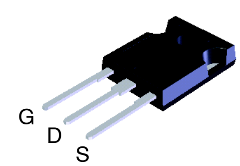
- 650 V @ $T_J = 150°C$
- 典型值 $R_{DS(on)} = 96$ mΩ
- 超低栅极电荷 (典型值 $Q_g = 63$ nC)
- 低有效输出电容 (典型值 $C_{oss(eff.)} = 280$ pF)
- 100% 经过雪崩测试
- 符合 RoHS 标准
- This is a Pb−Free Device

应用

- 通信 / 服务器电源
- 工业电源

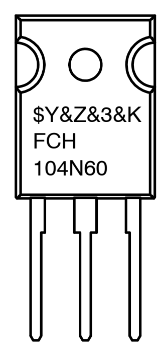


N-Channel MOSFET



TO−247
CASE 340CK

MARKING DIAGRAM



$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&3	= Data Code (Year & Week)
&K	= Lot Code
FCH104N60	= Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

April, 2021 − Rev. 3

Publication Order Number:
FCH104N60CN/D

绝对最大额定值 (T_C = 25°C 除非另有说明)

符号	参数		FCH104N60	单位
V_{DSS}	漏极－源极电压		600	V
V_{GSS}	栅极－源极电压	– DC	±20	V
		– AC (f > 1 Hz)	±30	
I_D	漏极电流	– 连续 (T_C = 25°C)	37	A
		– 连续 (T_C = 100°C)	24	
I_{DM}	漏极电流	– 脉冲 (说明 1)	111	A
E_{AS}	单脉冲雪崩能量 (说明 2)		809	mJ
I_{AR}	雪崩电流 (说明 1)		6.8	A
E_{AR}	重复雪崩能量 (说明 1)		3.57	mJ
dv/dt	MOSFET dv/dt		100	V/ns
	二极管恢复 dv/dt 峰值 (说明 3)		20	
P_D	功耗	(T_C = 25°C)	357	W
		– 高于 25°C 的功耗系数	2.85	W/°C
T_J, T_{STG}	工作和存储温度范围		–55 至 + 150	°C
T_L	用于焊接的最大引脚温度，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。

1. 重复额定值：脉冲宽度受限于最大结温。
2. I_{AS} = 6.8 A，R_G = 25 Ω，开始于 T_J = 25°C。
3. $I_{SD} \le$ 18.5 A，di/dt $\le$ 200 A/μs，$V_{DD} \le$ 380 V，开始于 T_J = 25°C。

热性能

符号	参数	FCH104N60	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.35	°C/W
$R_{\theta JA}$	结至环境热阻最大值	40	

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
FCH104N60	FCH104N60	TO–247	塑料管	N/A	N/A	30 颗

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	V_{GS} = 0 V, I_D = 10 mA, T_J = 25°C	600	–	–	V
		V_{GS} = 0 V, I_D = 10 mA, T_J = 150°C	650	–	–	
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	I_D = 10 mA, 参考 25°C 数值	–	0.67	–	V/°C
I_{DSS}	零栅极电压漏极电流	V_{DS} = 600 V, V_{GS} = 0 V	–	–	1	μA
		V_{DS} = 480 V, V_{GS} = 0 V, T_C = 125 °C	–	1.98	–	
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	–	3.5	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 18.5 A	–	96	104	mΩ
g_{FS}	正向跨导	V_{DS} = 20 V, I_D = 18.5 A	–	33	–	S
动态特性						
C_{iss}	输入电容	V_{DS} = 380 V, V_{GS} = 0 V, f = 1 MHz	–	3130	4165	pF
C_{oss}	输出电容		–	75	100	pF
C_{rss}	反向传输电容		–	3.66	–	pF
$C_{oss(eff.)}$	有效输出电容	V_{DS} = 0 V 至 400 V, V_{GS} = 0 V	–	280	–	pF
$Q_{g(tot)}$	10 V 电压的栅极电荷总量	V_{DS} = 380 V, I_D = 18.5 A, V_{GS} = 10 V (说明 4)	–	63	82	nC
Q_{gs}	栅极 – 源极栅极电荷		–	14	–	nC
Q_{gd}	栅极 – 漏极 “米勒” 电荷		–	15	–	nC
ESR	等效串联电阻	f = 1 MHz	–	0.97	–	Ω
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 380 V, I_D = 18.5 A, V_{GS} = 10 V, R_G = 4.7 Ω (说明 4)	–	26	62	ns
t_r	导通上升时间		–	18	46	ns
$t_{d(off)}$	关断延迟时间		–	72	154	ns
t_f	关断下降时间		–	3.3	17	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		–	–	37	A
I_{SM}	漏极 – 源极二极管最大正向脉冲电流		–	–	114	A
V_{SD}	漏极 – 源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 18.5 A	–	–	1.2	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, I_{SD} = 18.5 A, dI_F/dt = 100 A/μs	–	414	–	ns
Q_{rr}	反向恢复电荷		–	8.8	–	μC

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. 典型特性本质上独立于工作温度。

典型特性

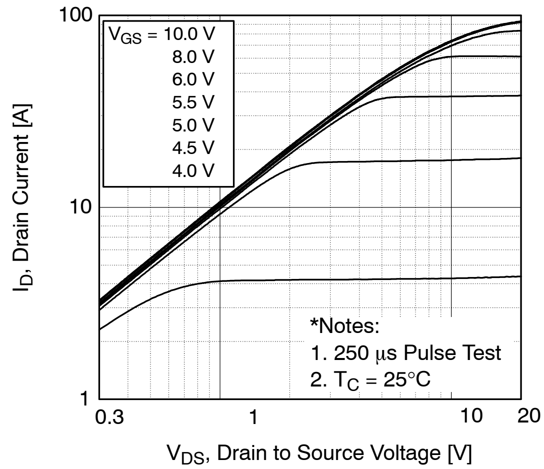


图 1. 导通区域特性

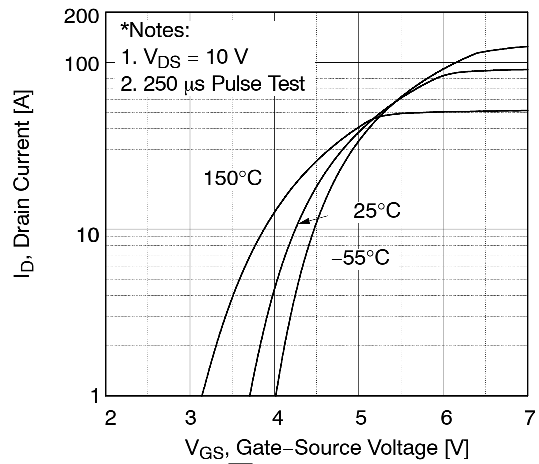


图 2. 传输特性

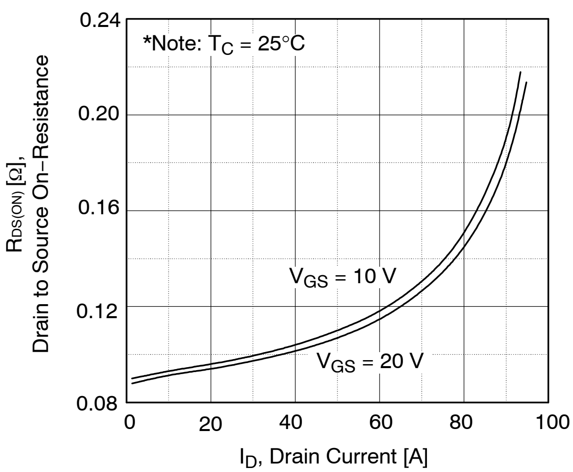


图 3. 导通电阻变化与漏极电流和栅极电压的关系

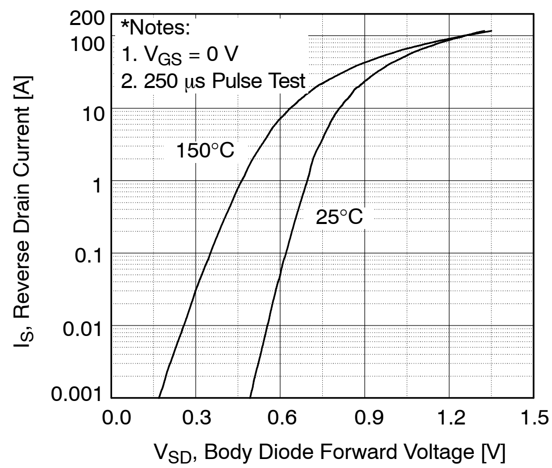


图 4. 体二极管正向电压变化与源极电流和温度的关系

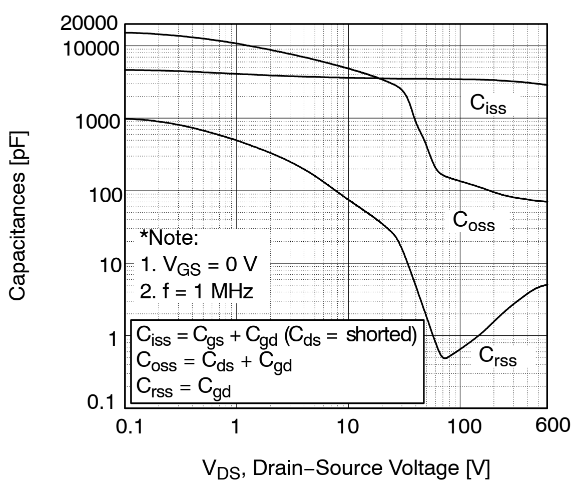


图 5. 电容特性

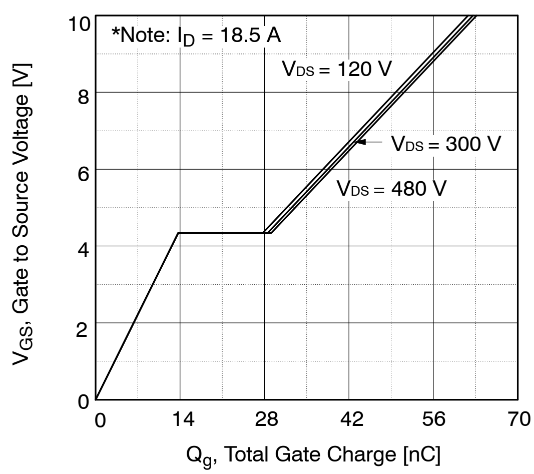


图 6. 栅极电荷特性

典型特性 （接上页）

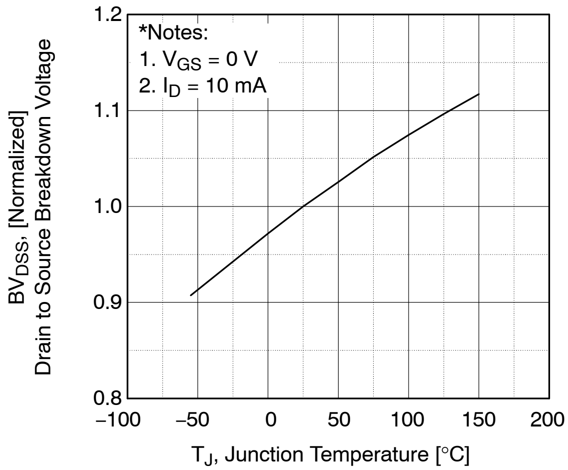


图 7. 击穿电压变化与温度的关系

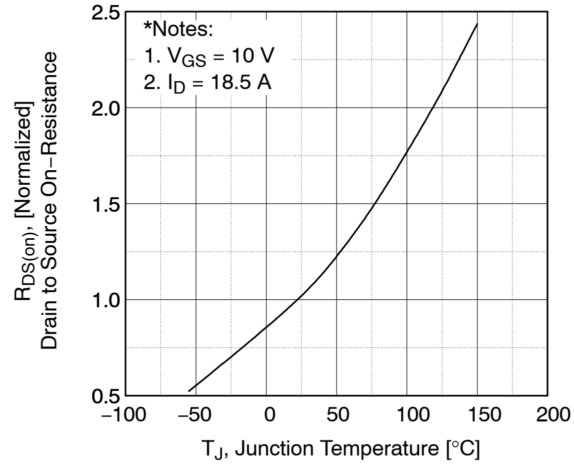


图 8. 导通电阻变化与温度的关系

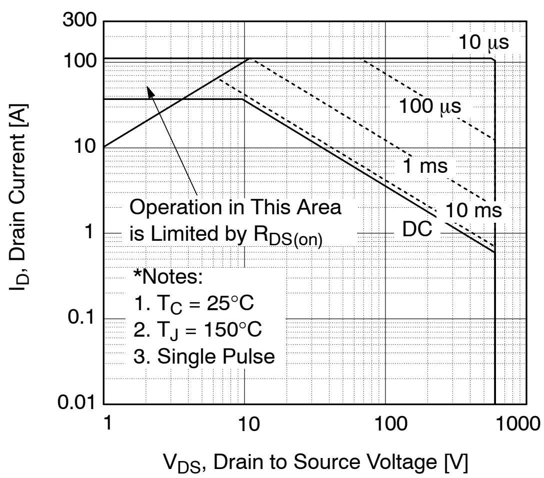


图 9. 最大安全工作区

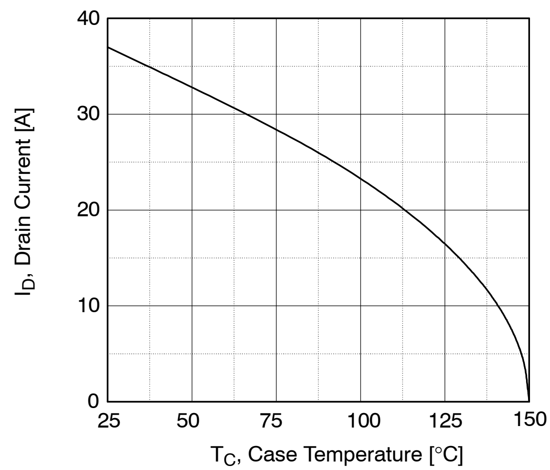


图 10. 最大漏极电流与壳温的关系

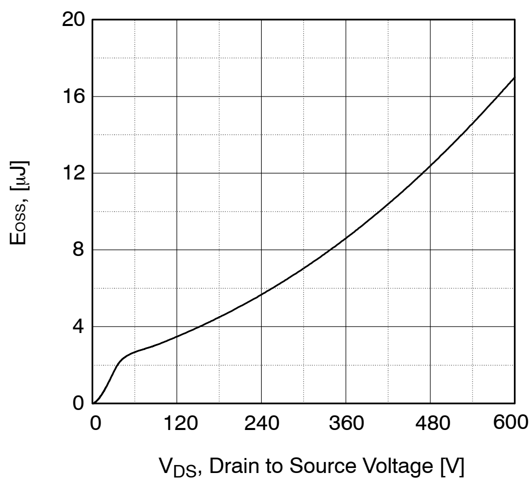


图 11. **Eoss** 与漏源极电压的关系

典型特性 （接上页）

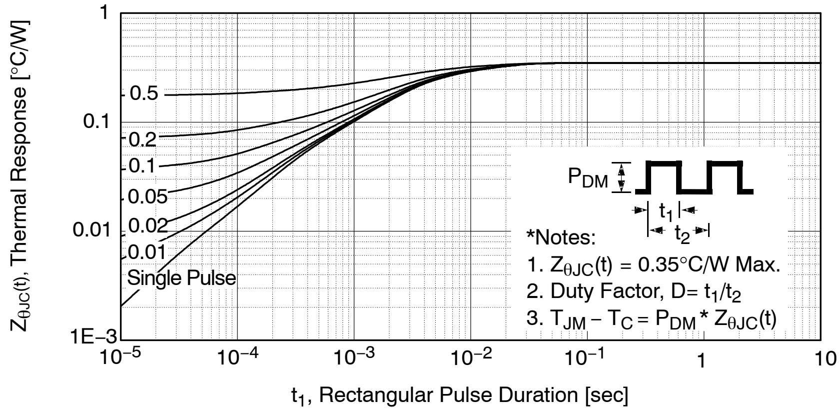


图 12. 瞬态热响应曲线

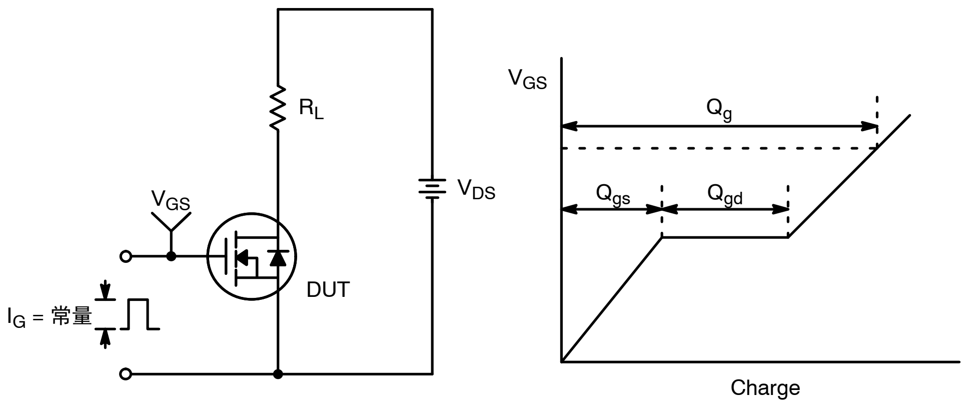


图 13. 栅极电荷测试电路与波形

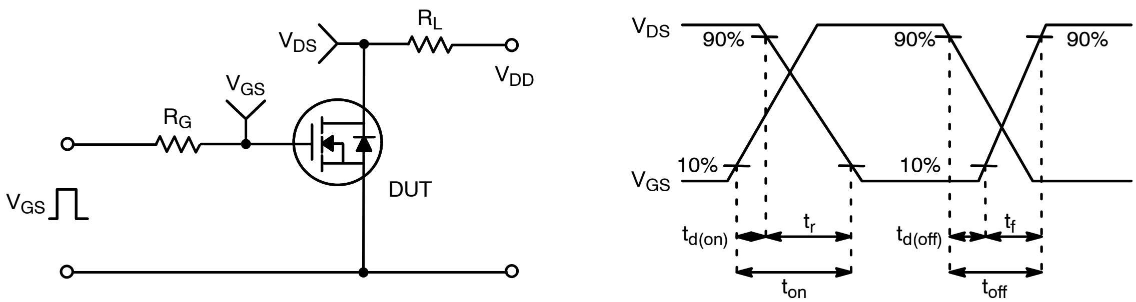


图 14. 阻性开关测试电路与波形

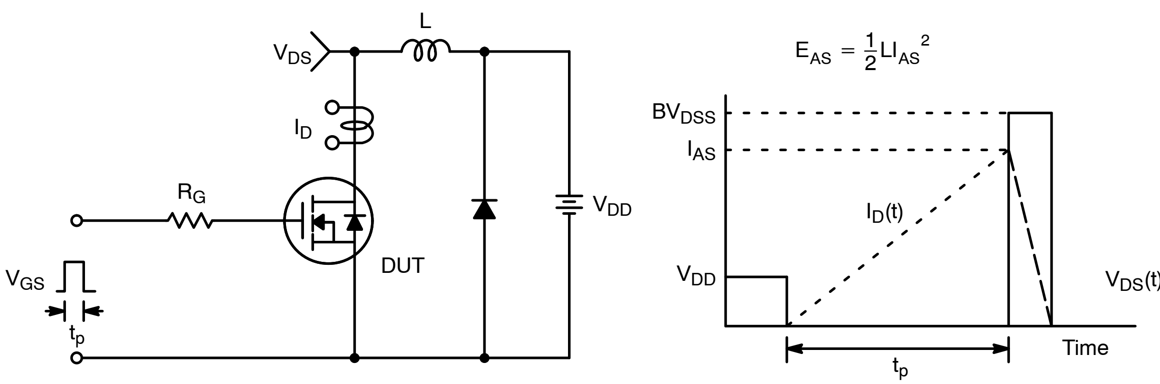
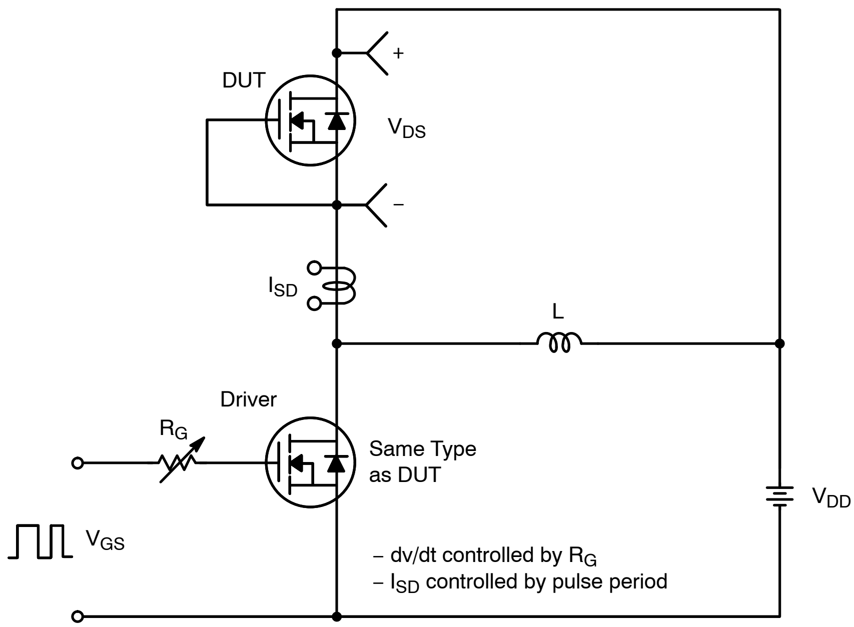


图 15. 非箝位电感开关测试电路与波形



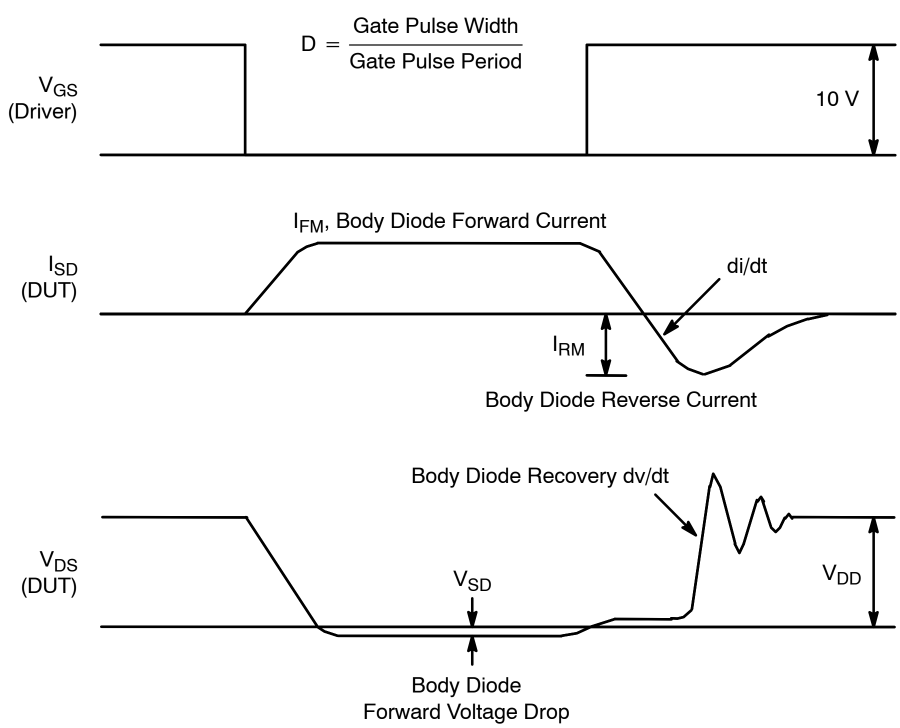


图 16. 二极管恢复 **dv/dt** 峰值测试电路与波形

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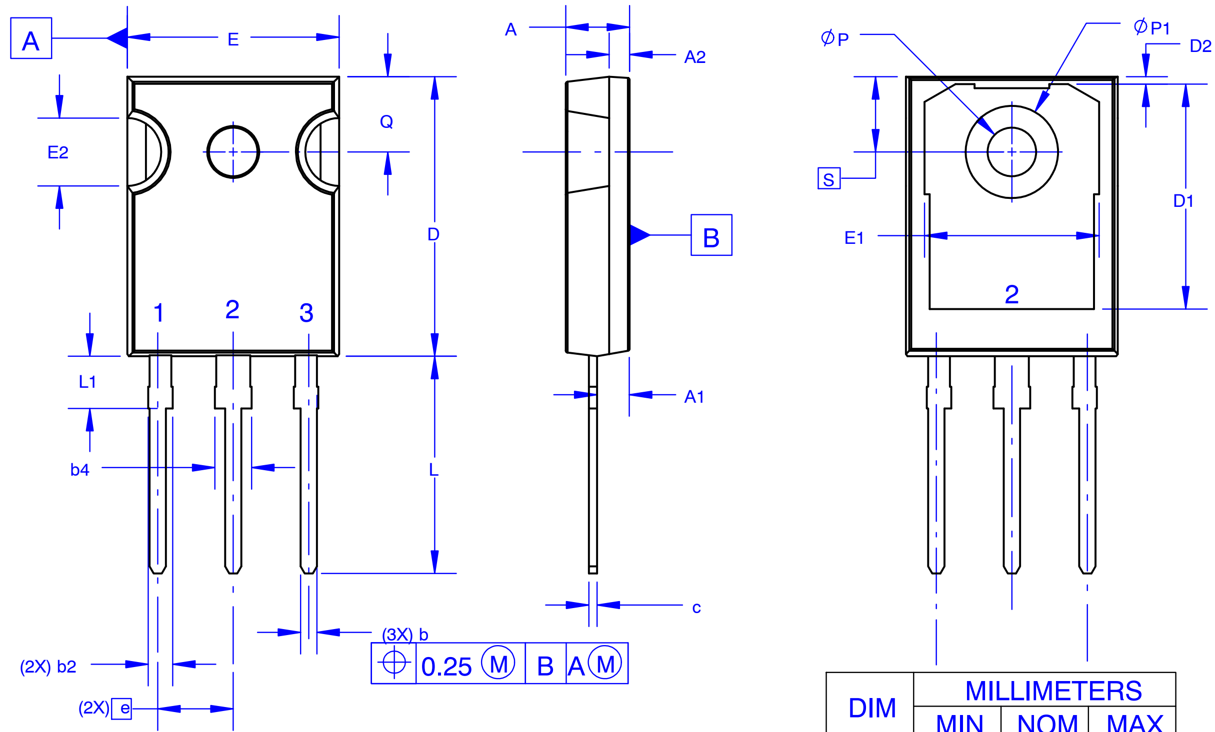
TO−247−3LD SHORT LEAD
CASE 340CK
ISSUE A

DATE 31 JAN 2019



NOTES: UNLESS OTHERWISE SPECIFIED.

A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
b4	2.42	2.54	2.66
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	5.56	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
ØP	3.51	3.58	3.65
ØP1	6.60	6.80	7.00
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

GENERIC MARKING DIAGRAM*

AYWWZZ
XXXXXXX
XXXXXXX
∘

XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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