

MOSFET – N 沟道, SUPERFET[®] II, FRFET[®]

650 V, 76 A, 41 mΩ

FCH041N65F

描述

SUPERFET II MOSFET 是安森美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。这项技术专用于最小化导通损耗并提供卓越的开关性能、dv/dt 额定值和更高雪崩能量。因此，SUPERFET II MOSFET 非常适合开关电源应用，如功率因数校正 (PFC)、服务器 / 电信电源、平板电视电源、ATX 电源及工业电源应用。SUPERFET II FRFET MOSFET 优化体二极管的反向恢复性能可去除额外元件，提高系统可靠性。

特性

- 700 V @ $T_J = 150^\circ\text{C}$
- 典型值 $R_{DS(on)} = 36\text{ m}\Omega$
- 超低栅极电荷 (典型值 $Q_g = 226\text{ nC}$)
- 低有效输出电容 (典型值 $C_{oss(eff.)} = 1278\text{ pF}$)
- 100% 经过雪崩测试
- 符合 RoHS 标准
- Pb-Free 产品

应用

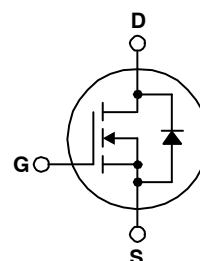
- LCD / LED / PDP TV
- 通信 / 服务器电源
- 太阳能逆变器
- AC-DC 电源



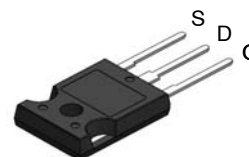
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V_{DS}	$R_{DS(on)}\text{ MAX}$	$I_D\text{ MAX}$
650 V	41 mΩ @ 10 V	76 A

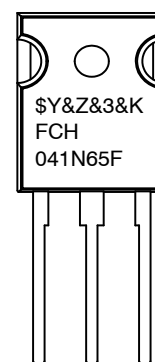


N-CHANNEL MOSFET



TO-247-3LD
CASE 340CH

MARKING DIAGRAM



\$Y = ON Semiconductor Logo
&Z = Assembly Plant Code
&3 = Numeric Date Code
&K = Lot Code
FCH041N65F = Specific Device Code

ORDERING INFORMATION

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

FCH041N65F

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

符号	参数		FCH041N65F-F155	单位
V_{DSS}	漏极-源极电压		650	V
V_{GSS}	栅极-源极电压		± 20	V
	- DC	($f > 1 \text{ Hz}$)	± 30	
I_D	漏极电流		76	A
	- 连续 ($T_C = 25^\circ\text{C}$)	- 连续 ($T_C = 100^\circ\text{C}$)	48.1	
I_{DM}	漏极电流		228	A
E_{AS}	单脉冲雪崩能量 (注 2)		2025	mJ
I_{AR}	雪崩电流 (注 1)		15	A
E_{AR}	重复雪崩能量 (注 1)		5.95	mJ
dv/dt	MOSFET dv/dt		100	V/ns
	二极管恢复 dv/dt 峰值 (注 3)		50	
P_D	功耗		595	W
	($T_C = 25^\circ\text{C}$)	- 高于 25°C 的功耗系数	4.76	
T_J, T_{STG}	工作和存储温度范围		-55 至 +150	$^\circ\text{C}$
T_L	用于焊接的最高引脚温度, 距离外壳 1/8", 持续 5 秒		300	$^\circ\text{C}$

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. $I_{AS} = 15 \text{ A}$, $R_G = 25 \Omega$, 开始于 $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 38 \text{ A}$, $di/dt \leq 200 \text{ A}/\mu\text{s}$, $V_{DD} \leq 380 \text{ V}$, 开始于 $T_J = 25^\circ\text{C}$ 。

封装标识与订购信息

器件编号	顶标	封装	包装方法	卷尺寸	带宽	数量
FCH041N65F-F155	FCH041N65F	TO-247-3LD	塑料管	N/A	N/A	30 颗

热性能

符号	参数	FCH041N65F-F155	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.21	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻最大值	40	

FCH041N65F

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
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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	650	-	-	V
		V _{GS} = 0 V, I _D = 10 mA, T _J = 150°C	700	-	-	
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	击穿电压温度系数	I _D = 10 mA, 参考 25°C 数值	-	0.72	-	V/°C
I _{DSS}	零栅极电压漏极电流	V _{DS} = 650 V, V _{GS} = 0 V	-	-	10	μA
		V _{DS} = 520 V, T _C = 125°C	-	232	-	
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 = 7.6 mA	3	-	5	V
R _{DS(on)}	漏极至源极静态导通电阻	V _{GS} = 10 V, I _D = 38 A	-	36	41	mΩ
g _{FS}	正向跨导	V _{DS} = 20 V, I _D = 38 A	-	18	-	S

动态特性

C _{iss}	输入电容	V _{DS} = 100 V, V _{GS} = 0 V, f = 1 MHz	-	9790	13020	pF
C _{oss}	输出电容		-	355	470	pF
C _{rss}	反向传输电容		-	32	-	pF
C _{oss}	输出电容	V _{DS} = 380 V, V _{GS} = 0 V, f = 1 MHz	-	192	-	pF
C _{oss(eff.)}	有效输出电容	V _{DS} = 0 V 至 400 V, V _{GS} = 0 V	-	1278	-	pF
Q _{g(tot)}	10 V 电压的栅极电荷总量	V _{DD} = 380 V, I _D = 38 A, V _{GS} = 10 V (注 4)	-	226	294	nC
Q _{gs}	栅极 - 源极栅极电荷		-	50	-	nC
Q _{gd}	栅极 - 漏极 “米勒” 电荷		-	90	-	nC
ESR	等效串联电阻	f = 1 MHz	-	0.6	-	Ω

开关特性

t _{d(on)}	导通延迟时间	V _{DD} = 380 V, I _D = 38 A, V _{GS} = 10 V, R _g = 4.7 Ω (注 4)	-	60	130	ns
t _r	导通上升时间		-	47	104	ns
t _{d(off)}	关断延迟时间		-	190	390	ns
t _f	关断下降时间		-	6.5	23	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	-	-	76	A	
I _{SM}	漏极 - 源极二极管最大正向脉冲电流	-	-	228	A	
V _{SD}	漏极 - 源极二极管正向电压	V _{GS} = 0 V, I _{SD} = 38 A	-	-	1.2	V
t _{rr}	反向恢复时间	V _{GS} = 0 V, I _{SD} = 38 A, dI _F /dt = 100 A/μs	-	213	-	ns
Q _{rr}	反向恢复电荷		-	1.3	-	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。

典型性能特征

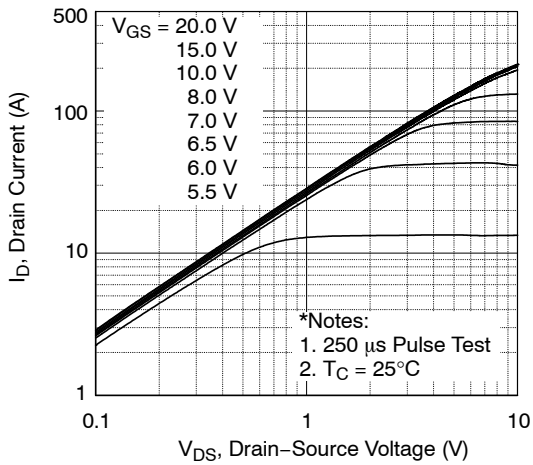


图 1. 导通区域特性图

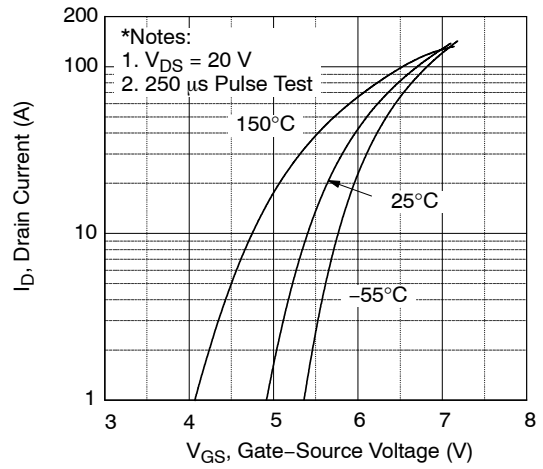


图 2. 传输特性

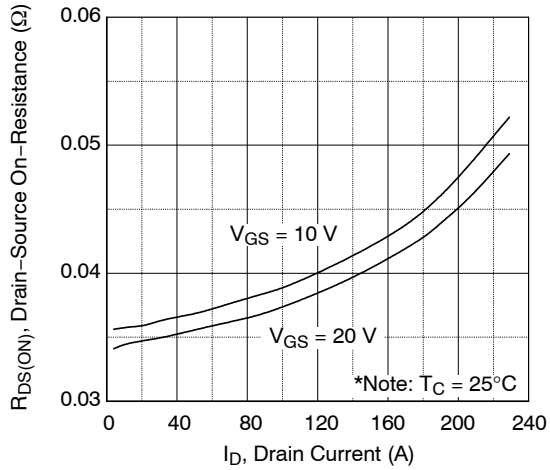


图 3. 导通电阻变化与漏极电流和栅极电压的关系

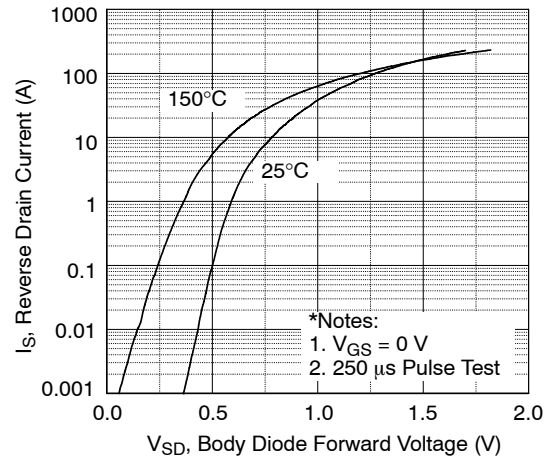


图 4. 体二极管正向电压变化与源极电流和温度的关系

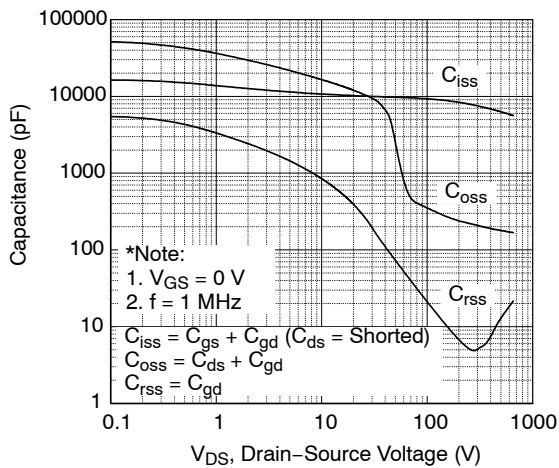


图 5. 电容特性

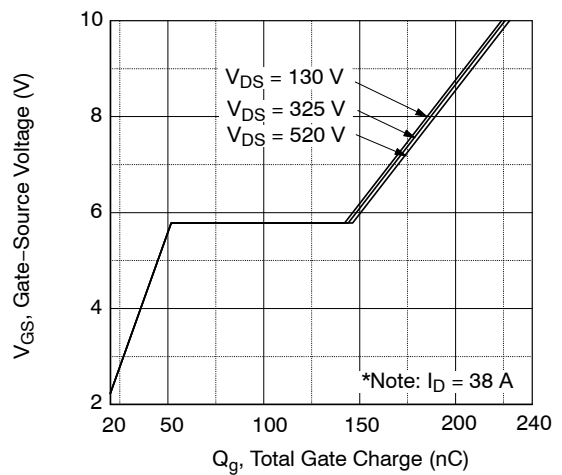


图 6. 栅极电荷特性

典型性能特征 (接上页)

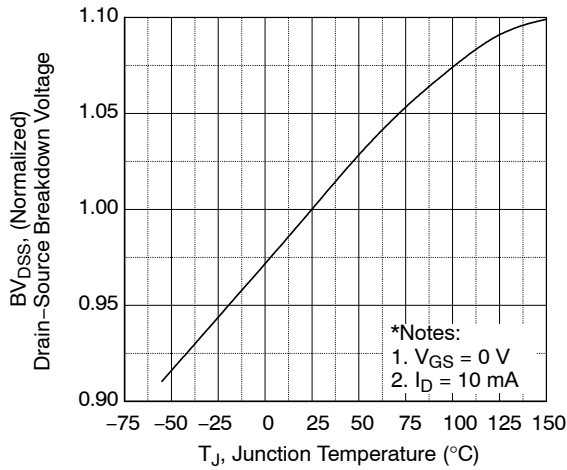


图 7. 击穿电压变化与温度的关系

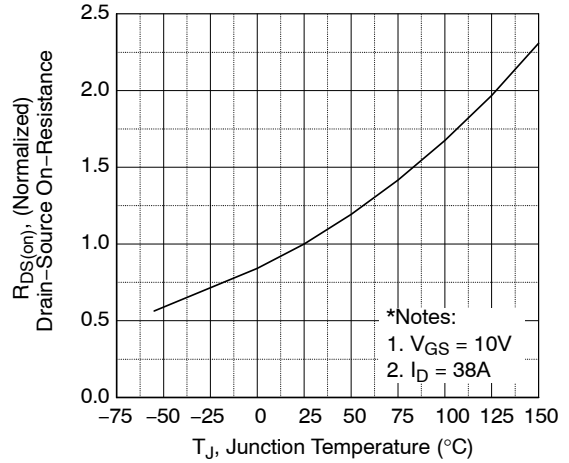


图 8. 导通电阻变化与温度的关系

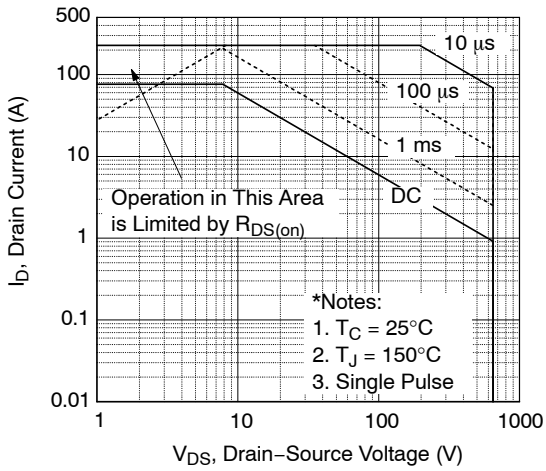


图 9. 最大安全工作区

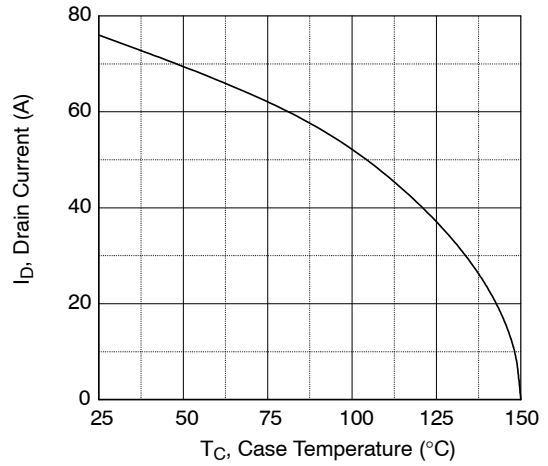


图 10. 最大漏极电流与壳温的关系

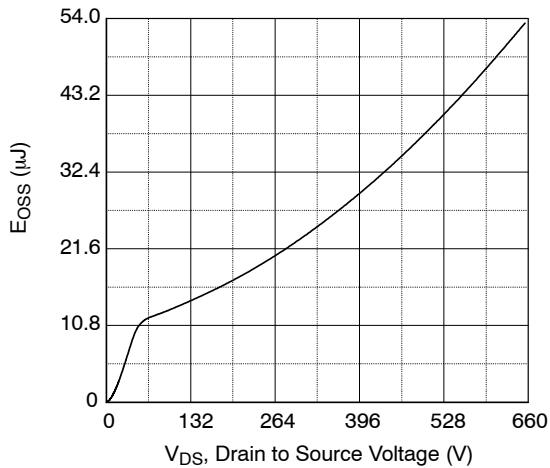


图 11. E_{OSS} 与漏源极电压的关系

FCH041N65F

典型性能特征 (接上页)

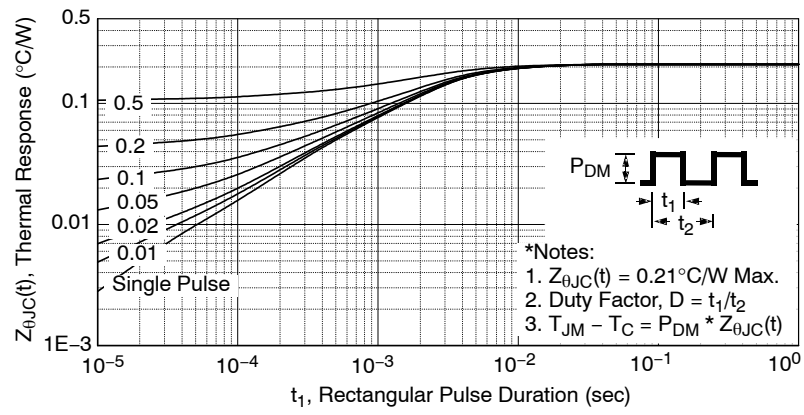


图 12. 瞬态热响应曲线

FCH041N65F

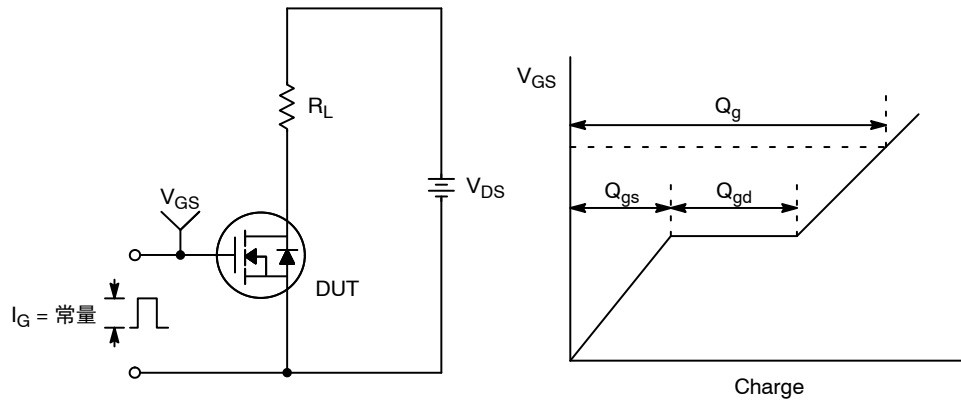


图 13. 栅极电荷测试电路与波形

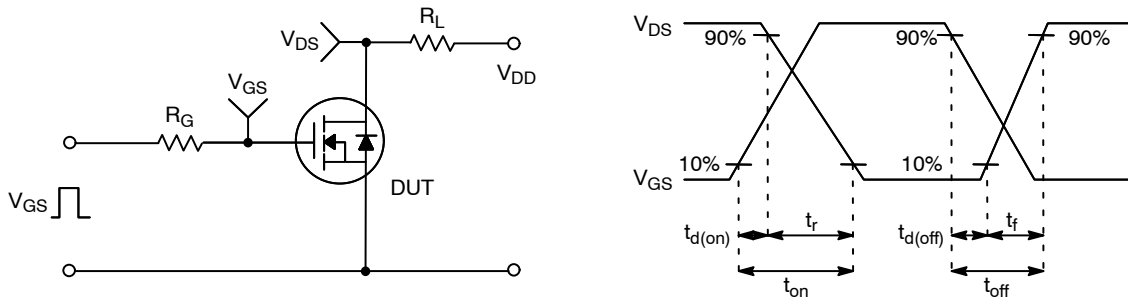


图 14. 阻性开关测试电路与波形

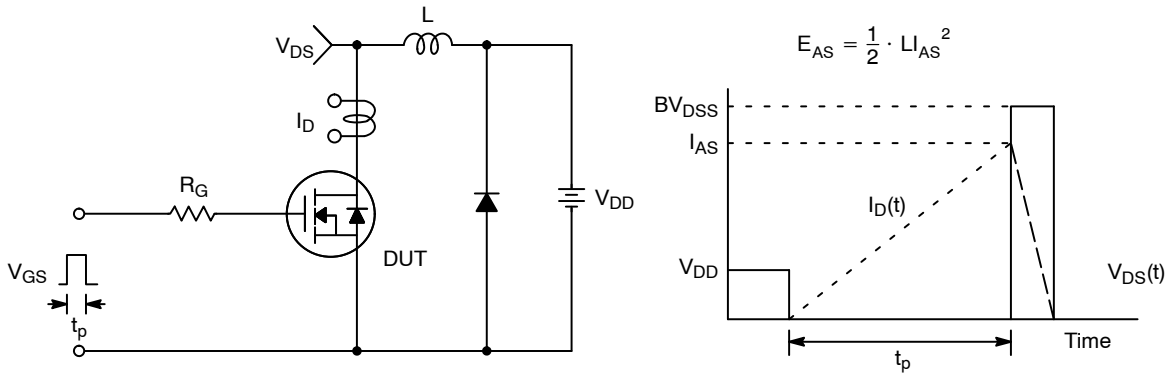


图 15. 非箱位感性开关测试电路与波形

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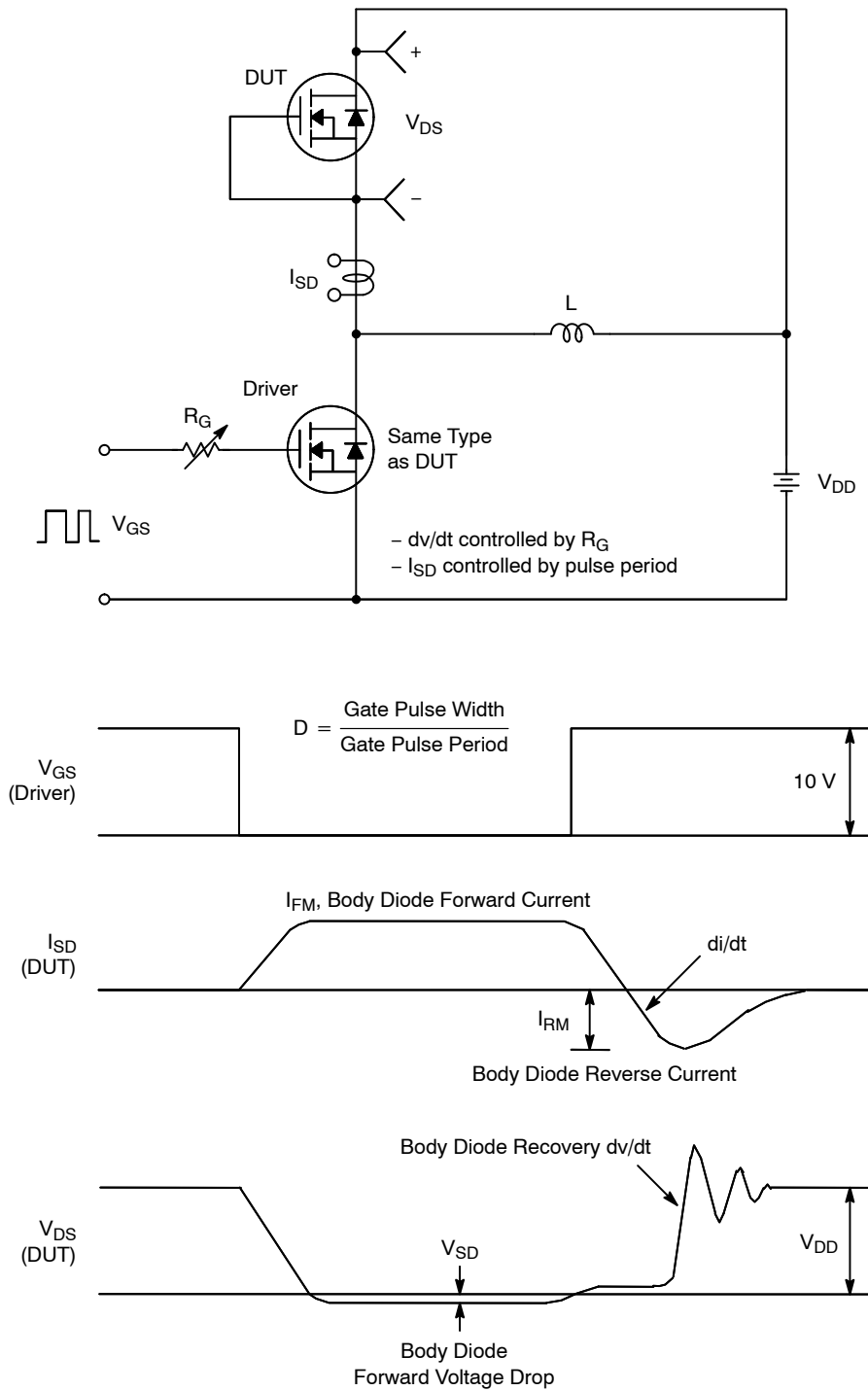


图 16. 二极管恢复 dv/dt 峰值测试电路与波形

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MECHANICAL CASE OUTLINE

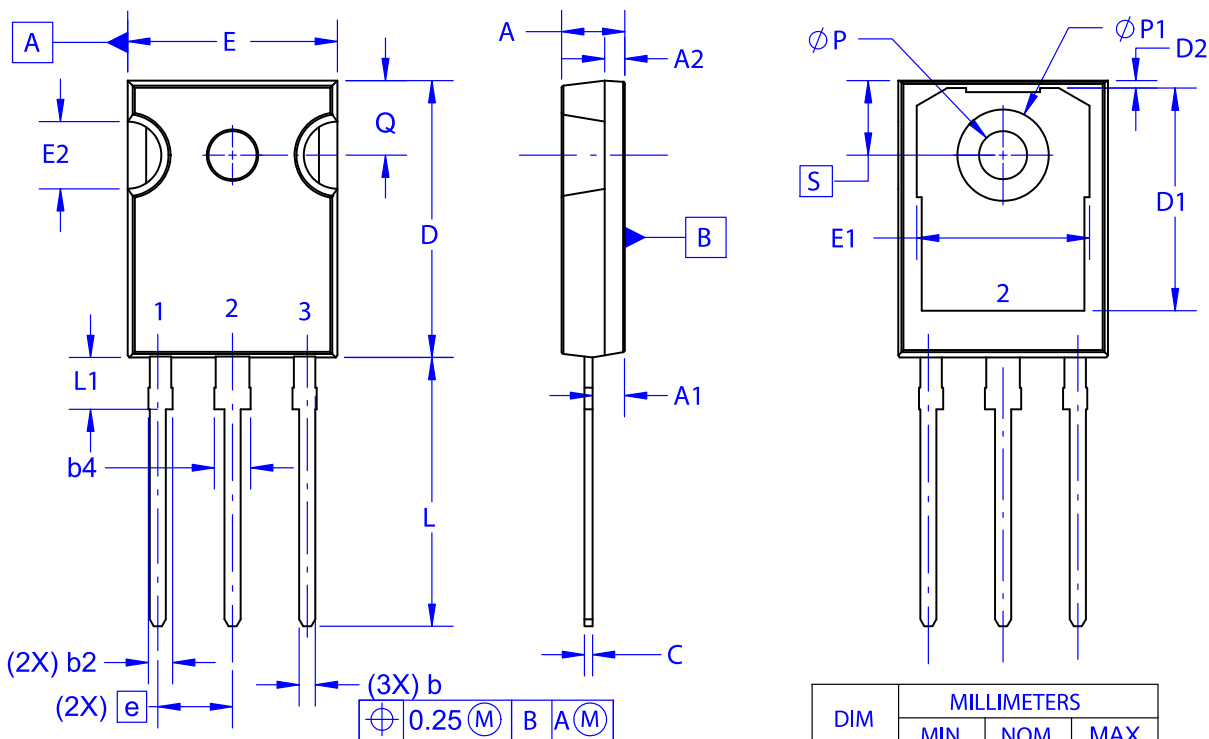
PACKAGE DIMENSIONS

ON Semiconductor®



TO-247-3LD
CASE 340CH
ISSUE A

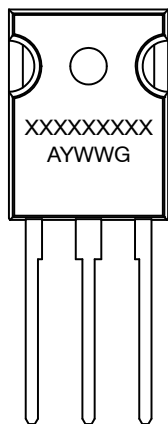
DATE 09 OCT 2019



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.

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

*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.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.29	2.475	2.66
A2	1.40	1.50	1.60
D	20.32	20.57	20.82
E	15.37	15.62	15.87
E2	4.96	5.08	5.20
e	~	5.56	~
L	19.75	20.00	20.25
L1	3.69	3.81	3.93
ϕP	3.51	3.58	3.65
Q	5.34	5.46	5.58
S	5.34	5.46	5.58
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
D1	13.08	~	~
D2	0.51	0.93	1.35
E1	12.81	~	~
$\phi P1$	6.61	6.73	6.85

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