

# MOSFET - N 沟道, SUPERFET® II

600 V, 47 A, 70 mΩ

FCH47N60

## 说明

SUPERFET MOSFET 是 onsemi 第一代利用电荷平衡技术实现出色低导通电阻和更低栅极电荷性能的高压超级结 (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 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。

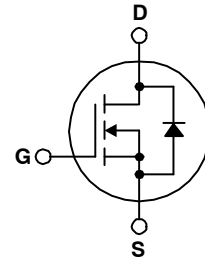
## 特性

- 650 V @  $T_J = 150^\circ\text{C}$
- 典型值  $R_{DS(on)} = 58\text{ m}\Omega$
- 超低栅极电荷 (典型值  $Q_g = 210\text{ nC}$ )
- 低有效输出电容 (典型值  $C_{oss(eff.)} = 420\text{ pF}$ )
- 100% 经过雪崩测试
- 符合 RoHS 标准
- This is a Pb-Free Device

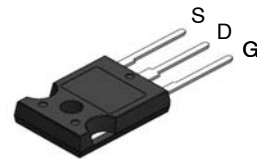
## 应用

- 光伏逆变器
- AC - DC 电源

$V_{DS}$	$R_{DS(on)}\text{ MAX}$	$I_D\text{ MAX}$
600 V	70 mΩ @ 10 V	47 A

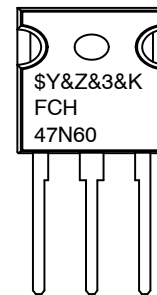


N-CHANNEL MOSFET



TO-247-3LD  
CASE 340CK

## MARKING DIAGRAM



\$Y	= onsemi Logo
&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
FCH47N60	= Specific Device Code

## ORDERING INFORMATION

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

# FCH47N60

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

符号	参数		FCH47N60_F133	单位
$V_{DSS}$	漏极-源极电压		600	V
$V_{GSS}$	栅极-源极电压		$\pm 30$	
$I_D$	漏极电流	连续 ( $T_C = 25^\circ\text{C}$ )	47	A
		连续 ( $T_C = 100^\circ\text{C}$ )	29.7	
$I_{DM}$	漏极电流	脉冲 (说明 1)	141	A
$E_{AS}$	单脉冲雪崩能量 (说明 2)		1800	mJ
$I_{AR}$	雪崩电流 (说明 1)		47	A
$E_{AR}$	重复雪崩能量 (说明 1)		41.7	mJ
$dv/dt$	二极管恢复 $dv/dt$ 峰值 (说明 3)		4.5	V/ns
$P_D$	功耗	( $T_C = 25^\circ\text{C}$ )	417	W
		超过 $25^\circ\text{C}$ 时降额	3.33	W/ $^\circ\text{C}$
$T_J, T_{STG}$	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.  $I_{AS} = 18\text{ A}$ ,  $V_{DD} = 50\text{ V}$ ,  $R_G = 25\ \Omega$ , 开始  $T_J = 25^\circ\text{C}$ 。

3.  $I_{SD} \leq 48\text{ A}$ ,  $di/dt \leq 200\text{ A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , 开始  $T_J = 25^\circ\text{C}$ 。

## 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
FCH47N60-F133	FCH47N60	TO-247	塑料管	N/A	N/A	30 单元

## 热性能

符号	参数	FCH47N60_F133	单位
$R_{\theta JC}$	结至外壳热阻最大值	0.3	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	外壳与散热器之间的热阻典型值	0.24	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	结至环境热阻最大值	41.7	$^\circ\text{C}/\text{W}$

# FCH47N60

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

$BV_{DSS}$	漏极至源极击穿 电压	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}, T_C = 25^\circ\text{C}$	600	–	–	V
		$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}, T_C = 150^\circ\text{C}$	–	650	–	
$\Delta BV_{DSS} / \Delta T_J$	击穿电压温度系数	$I_D = 250\text{ }\mu\text{A}$ , 温度参考 $25^\circ\text{C}$	–	0.6	–	$\text{V}/^\circ\text{C}$
$BV_{DS}$	漏源极雪崩击穿电压	$V_{GS} = 0\text{ V}, I_D = 47\text{ A}$	–	700	–	V
$I_{DSS}$	零栅极电压漏极电流	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$	–	–	1	$\mu\text{A}$
		$V_{DS} = 480\text{ V}, T_C = 125^\circ\text{C}$	–	–	10	
$I_{GSS}$	栅极 – 体漏电流	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	–	–	$\pm 100$	nA

## 导通特性

$V_{GS(th)}$	栅极阈值电压	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	3.0	–	5.0	V
$R_{DS(on)}$	漏极 – 源极静态导通电阻	$V_{GS} = 10\text{ V}, I_D = 23.5\text{ A}$	–	0.058	0.070	$\Omega$
$g_{FS}$	正向跨导	$V_{DS} = 40\text{ V}, I_D = 23.5\text{ A}$	–	40	–	S

## 动态特性

$C_{iss}$	输入电容	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	–	5900	8000	pF
$C_{oss}$	输出电容		–	3200	4200	pF
$C_{rss}$	反向传输电容		–	250	–	pF
$C_{oss}$	输出电容	$V_{DS} = 480\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	–	160	–	pF
$C_{oss(eff.)}$	有效输出电容	$V_{DS} = 0\text{ V}$ 至 $400\text{ V}, V_{GS} = 0\text{ V}$	–	420	–	pF

## 开关特性

$t_{d(on)}$	导通延迟	$V_{DD} = 300\text{ V}, I_D = 47\text{ A}, V_{GS} = 10\text{ V}, R_G = 25\text{ }\Omega$ (说明 4)	–	185	430	ns
$t_r$	开通上升时间		–	210	450	ns
$t_{d(off)}$	关断延迟		–	520	1100	ns
$t_f$	关断下降时间		–	75	160	ns
$Q_{g(tot)}$	10 V 时的栅极电荷总量	$V_{DS} = 480\text{ V}, I_D = 47\text{ A}, V_{GS} = 10\text{ V}$ (说明 4)	–	210	270	nC
$Q_{GS}$	栅极 – 源极栅极电荷		–	38	–	nC
$Q_{gd}$	栅极 – 漏极 “米勒” 电荷		–	110	–	nC

## 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		–	–	47	A
$I_{SM}$	漏极 – 源极二极管最大正向脉冲电流		–	–	141	A
$V_{SD}$	漏极 – 源极二极管正向电压	$V_{GS} = 0\text{ V}, I_{SD} = 47\text{ A}$	–	–	1.4	V
$t_{rr}$	反向恢复时间	$V_{GS} = 0\text{ V}, I_{SD} = 47\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	–	590	–	ns
$Q_{rr}$	反向恢复电荷		–	25	–	$\mu\text{C}$

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. 尤其是独立于工作温度。

## 典型性能特征

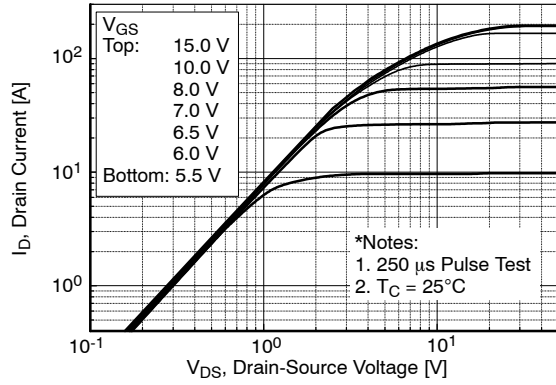


图 1. 导通区域特性

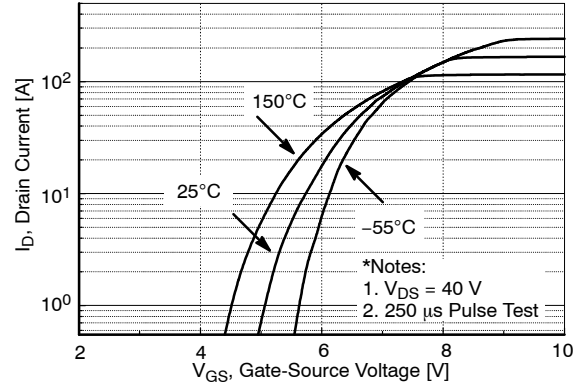


图 2. 传输特性

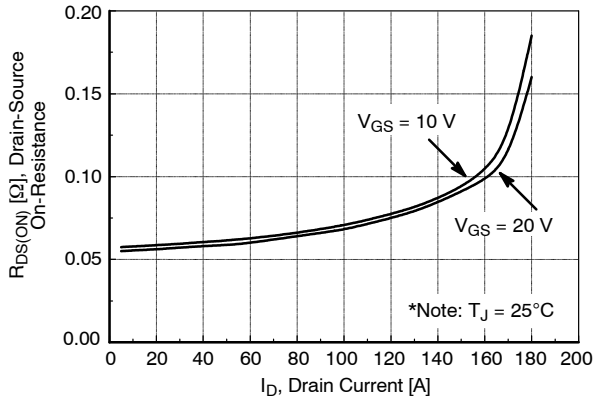


图 3. 导通电阻变化与漏极电流和栅极电压的关系

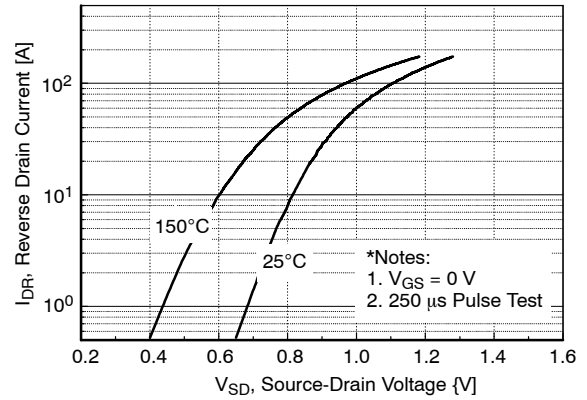


图 4. 体二极管正向电压变化与源电流和温度的关系

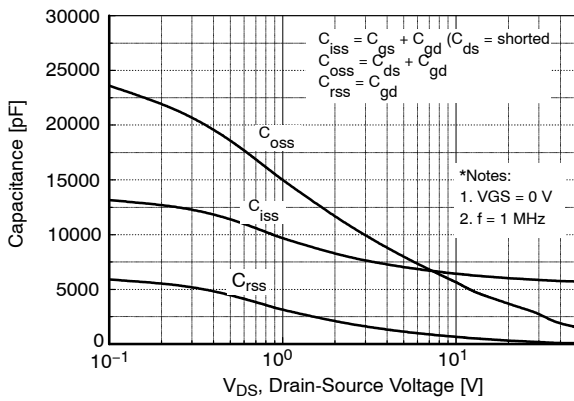


图 5. 电容特性

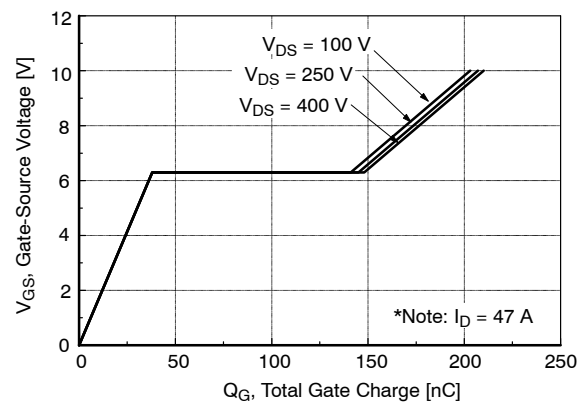


图 6. 栅极电荷特性

## 典型性能特征 (接上页)

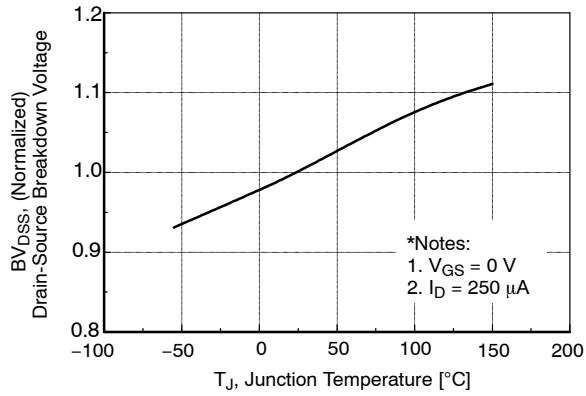


图 7. 击穿电压变化图与温度的关系

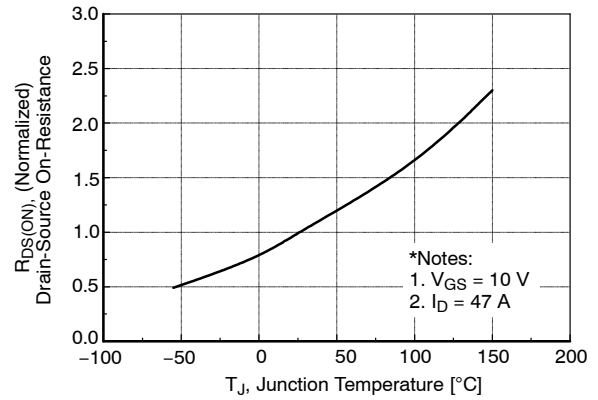


图 8. 导通电阻变化与温度的关系

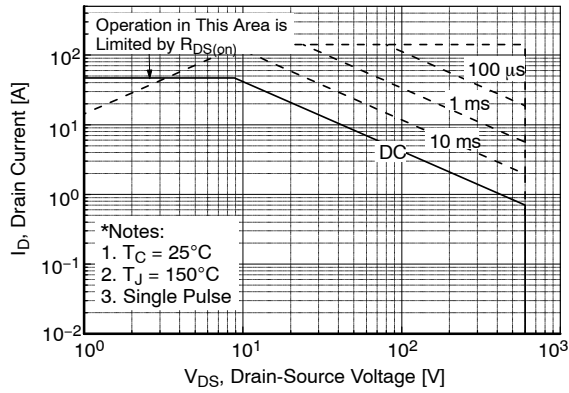


图 9. 安全工作区

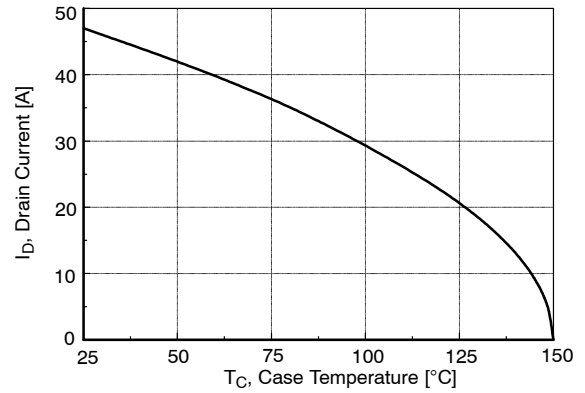


图 10. 最大漏极电流与壳温的关系

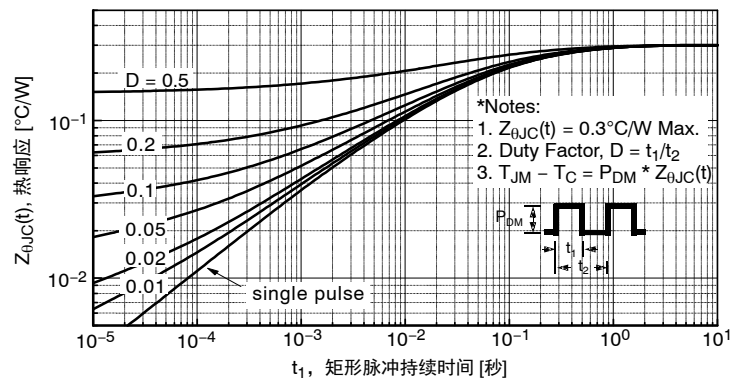


图 11. 瞬态热响应曲线

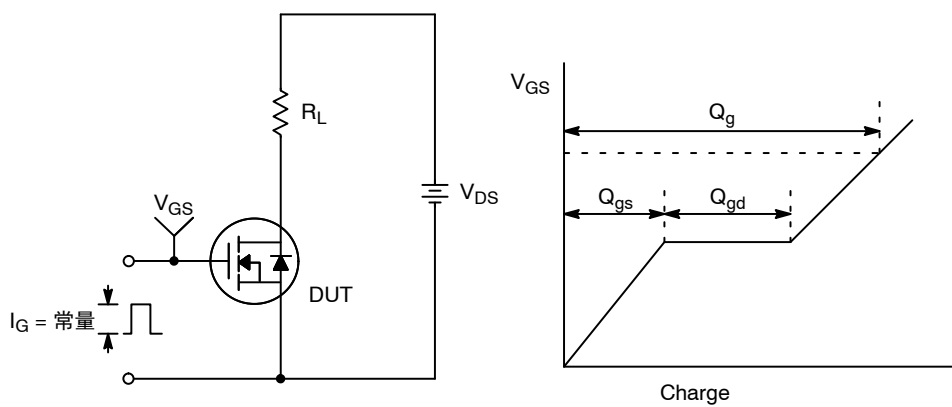


图 12. 栅极电荷测试电路与波形

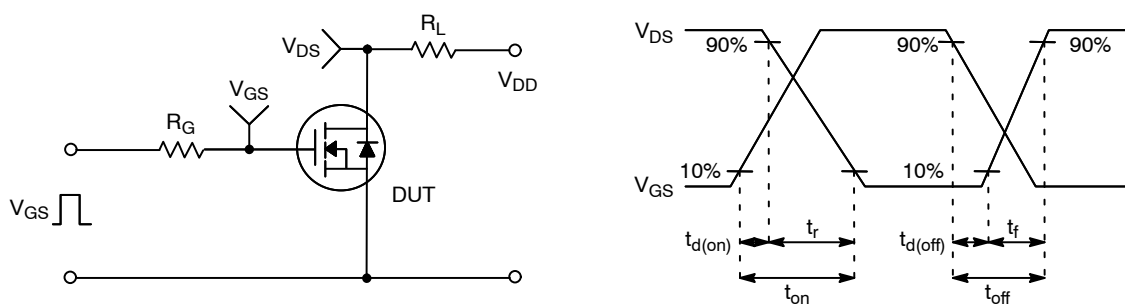


图 13. 阻性开关测试电路与波形

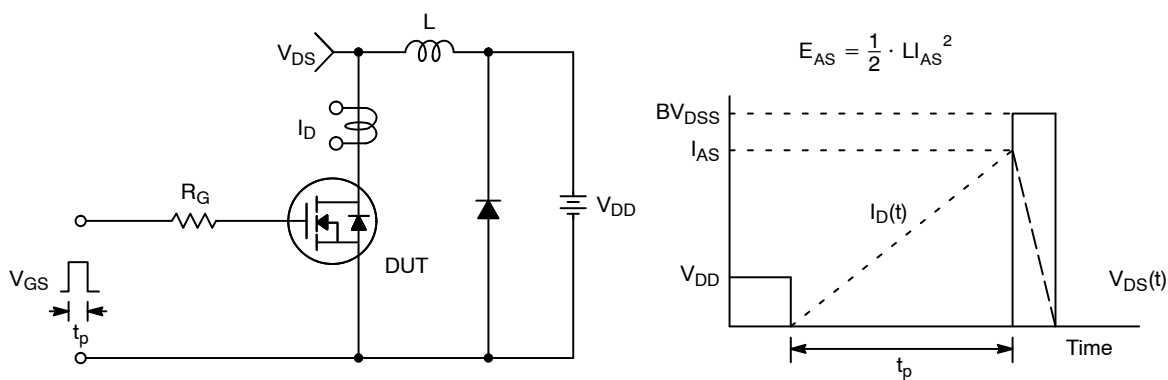


图 14. 非箝位电感开关测试电路与波形

# FCH47N60

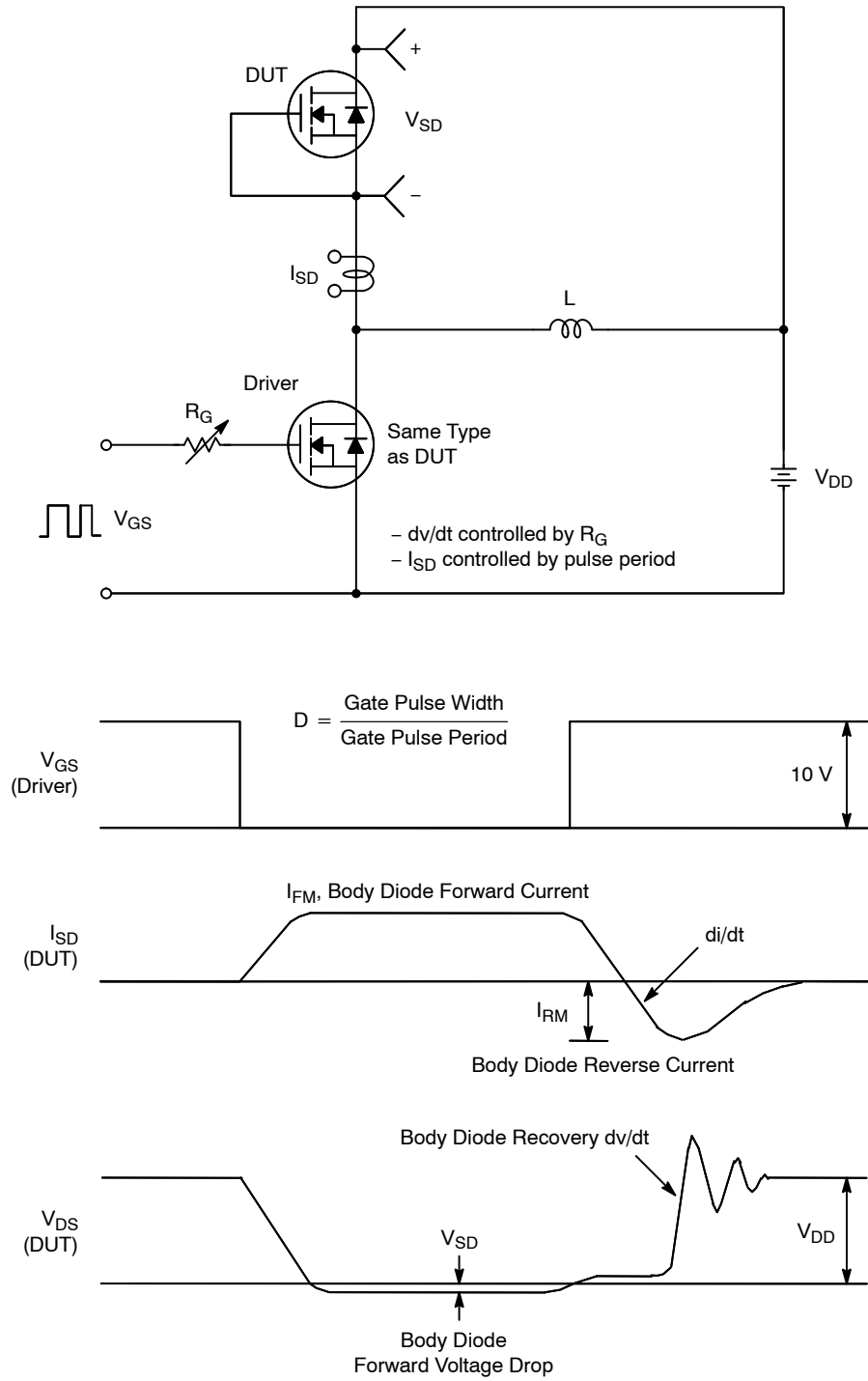


图 15. 二极管恢复  $dv/dt$  峰值测试电路与波形

FCH47N60

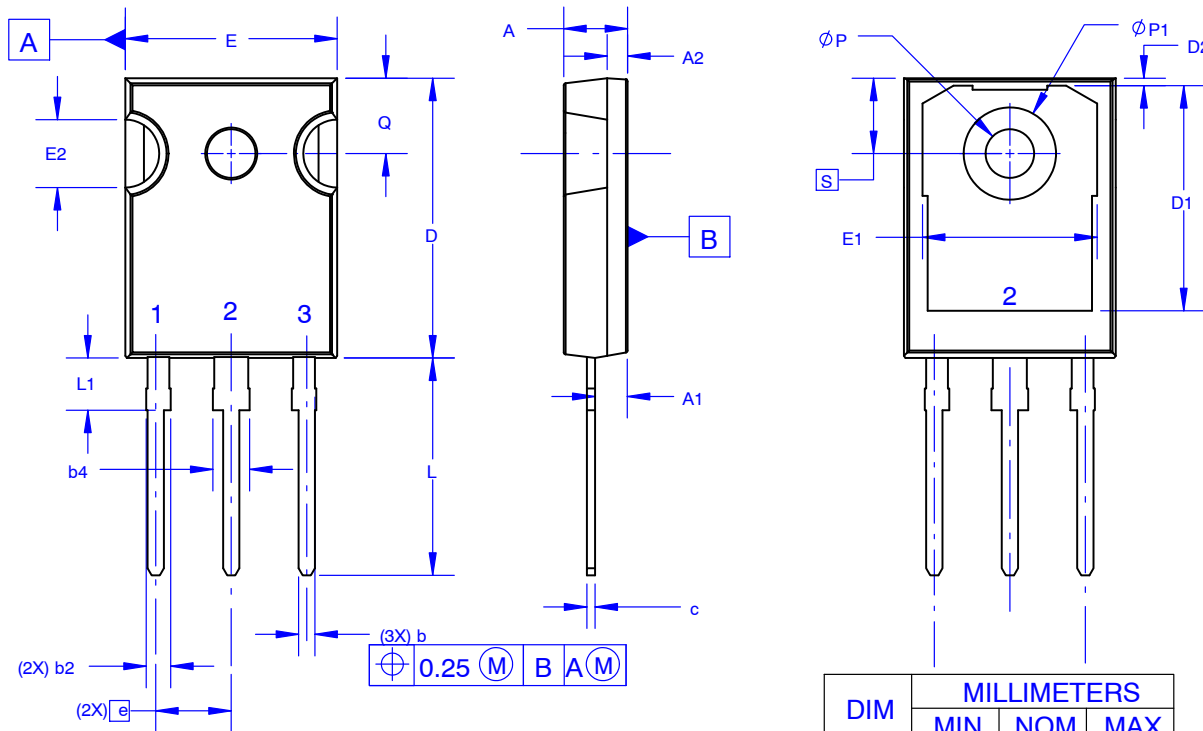
修订历史

修订	变更说明	日期
4	品牌重塑后相应更改文档	07/23/2025

本文件在加入此修订历史记录表之前已进行更新。此处记录的变更仅反映在所注明的批准日期所做的更新。

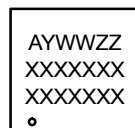
**TO-247-3LD SHORT LEAD**  
**CASE 340CK**  
**ISSUE A**

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.

**GENERIC**  
**MARKING DIAGRAM\***


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.

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
$\phi P$	3.51	3.58	3.65
$\phi P1$	6.60	6.80	7.00
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

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