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2014 年 1 月

FCI7N60

N 沟道 SuperFET® MOSFET

600 V, 7 A, 600 mΩ

特性

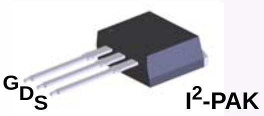
- 650 V @ T_J = 150°C
- 典型值 $R_{DS(on)}$ = 530 mΩ
- 超低栅极电荷 （典型值 Q_g = 23 nC）
- 低有效输出电容 （典型值 $C_{oss(eff.)}$= 60 pF）
- 100% 经过雪崩测试
- 符合 RoHS 标准

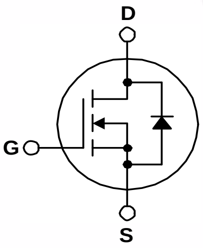
应用

- 照明
- 太阳能逆变器
- AC-DC 电源

说明

SuperFET®MOSFET 是飞兆半导体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。





MOSFET 最大额定值 T_C = 25°C 除非另有说明。

符号	参数		FCI7N60	单位
V_{DSS}	漏极 - 源极电压		600	V
I_D	漏极电流	- 连续 (T_C = 25°C)	7	A
		- 连续 (T_C = 100°C)	4.4	
I_{DM}	漏极电流	- 脉冲 （注 1）	21	A
V_{GSS}	栅极 - 源极电压		±30	V
E_{AS}	单脉冲雪崩能量	（注 2）	230	mJ
I_{AR}	雪崩电流	（注 1）	7	A
E_{AR}	重复雪崩能量	（注 1）	8.3	mJ
dv/dt	二极管恢复 dv/dt 峰值	（注 3）	4.5	V/ns
P_D	功耗	(T_C = 25°C)	83	W
		- 超过 25°C 时降额	0.67	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

热性能

符号	参数	FCI7N60	单位
$R_{\theta JC}$	结至外壳热阻最大值	1.5	°C/W
$R_{\theta JA}$	结至环境热阻最大值	62.5	°C/W

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
FCI7N60	FCI7N60	I^2-PAK	塑料管	不适用	不适用	50 单元

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 = 250 μA, T_C = 25°C	600	-	-	V
		V_{GS} = 0 V, I_D = 250 μA, T_C = 150°C	-	650	-	V
ΔBV_{DSS} / ΔT_J	击穿电压温度系数	I_D = 250 μA，参考 25°C	-	0.6	-	V/°C
BV_{DS}	漏源极雪崩击穿电压	V_{GS} = 0 V, I_D = 7 A	-	700	-	V
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, T_C = 125°C	-	-	10	
I_{GSS}	栅极 - 体漏电流	V_{GS} = ±30 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	3.0	-	5.0	V
$R_{DS(on)}$	漏极至源极静态导通电阻	V_{GS} = 10 V, I_D = 3.5 A	-	0.53	0.6	Ω
g_{FS}	正向跨导	V_{DS} = 40 V, I_D = 3.5 A	-	6	-	S
动态特性						
C_{iss}	输入电容	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	-	710	920	pF
C_{oss}	输出电容		-	380	500	pF
C_{rss}	反向传输电容		-	34	-	pF
C_{oss}	输出电容	V_{DS} = 480 V, V_{GS} = 0 V, f = 1 MHz	-	22	29	pF
$C_{oss(eff.)}$	有效输出电容	V_{DS} = 0 V to 400 V, V_{GS} = 0 V	-	60	-	pF
开关特性						
$t_{d(on)}$	导通延迟时间	V_{DD} = 300 V, I_D = 7 A, V_{GS} = 10 V, R_G = 25 Ω （说明 4）	-	35	80	ns
t_r	开通上升时间		-	55	120	ns
$t_{d(off)}$	关断延迟时间		-	75	160	ns
t_f	关断下降时间		-	32	75	ns
$Q_{g(tot)}$	10 V 的栅极电荷总量	V_{DS} = 480 V, I_D = 7 A, V_{GS} = 10 V （说明 4）	-	23	30	nC
Q_{gs}	栅极 - 源极栅极电荷		-	4.2	5.5	nC
Q_{gd}	栅极 - 漏极 “ 密勒 ” 电荷		-	11.5	-	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		-	-	7	A
I_{SM}	漏极 - 源极二极管最大正向脉冲电流		-	-	21	A
V_{SD}	漏极 - 源极二极管正向电压	V_{GS} = 0 V, I_{SD} = 7 A	-	-	1.4	V
t_{rr}	反向恢复时间	V_{GS} = 0 V, I_{SD} = 7 A, dI_F/dt = 100 A/μs	-	360	-	ns
Q_{rr}	反向恢复电荷		-	4.5	-	μC

注意：

1. 重复额定值：脉冲宽度受限于最大结温。
2. I_{AS} = 3.5 A， V_{DD} = 50 V， R_G = 25Ω，启动 T_J = 25°C。
3. I_{SD} ≤ 7 A， di/dt ≤ 200 A/μs， V_{DD} ≤ BV_{DSS}，启动 T_J = 25°C。
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

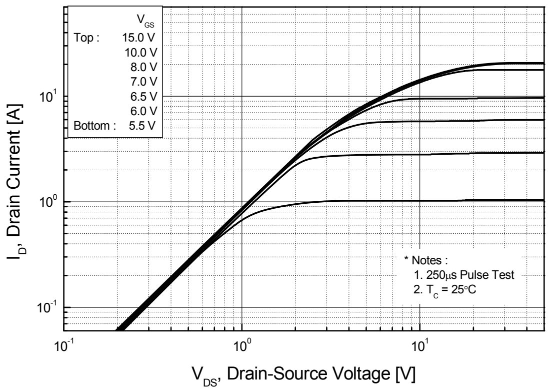


图 2. 传输特性

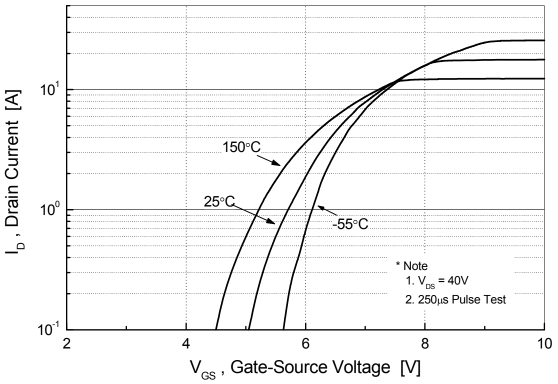


图 3. 导通电阻变化与漏极电流和栅极电压

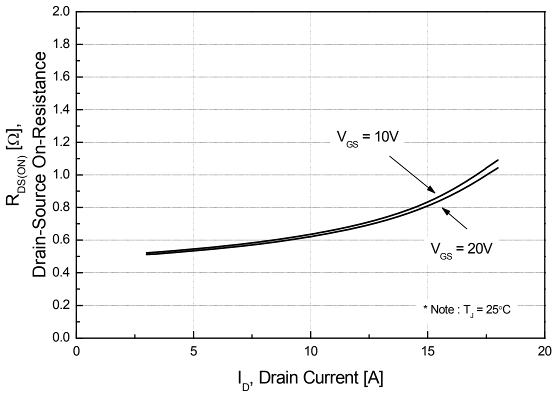


图 4. 体二极管正向电压变化与源极电流和温度的关系

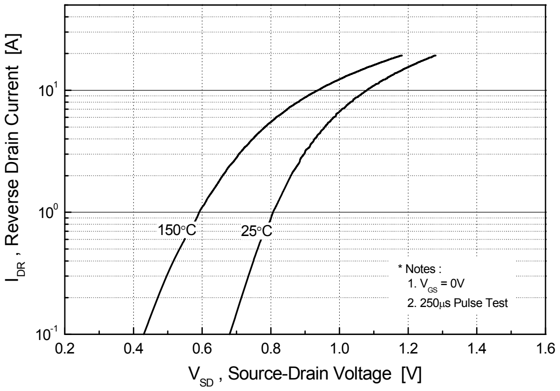


图 5. 电容特性

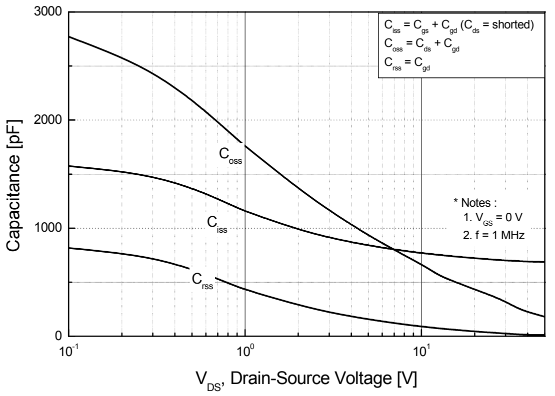
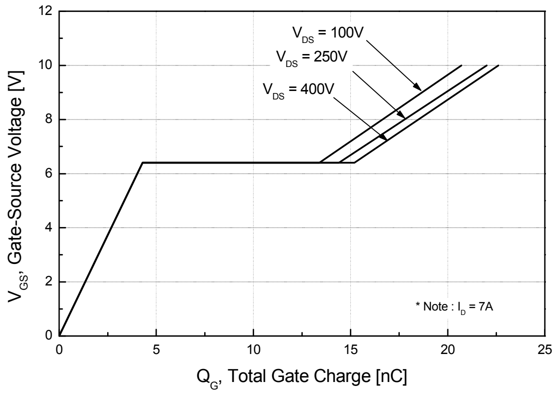


图 6. 栅极电荷



典型性能特征 （接上页）

图 7. 击穿电压变化与温度

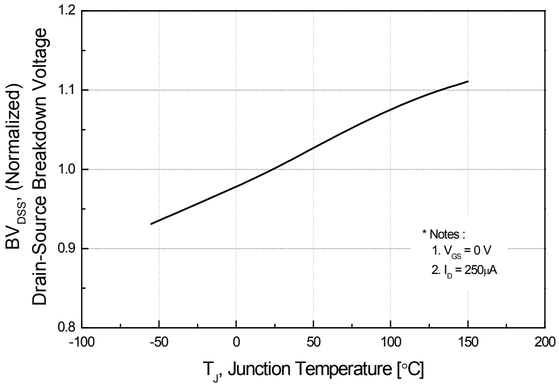


图 8. 导通电阻变化与温度

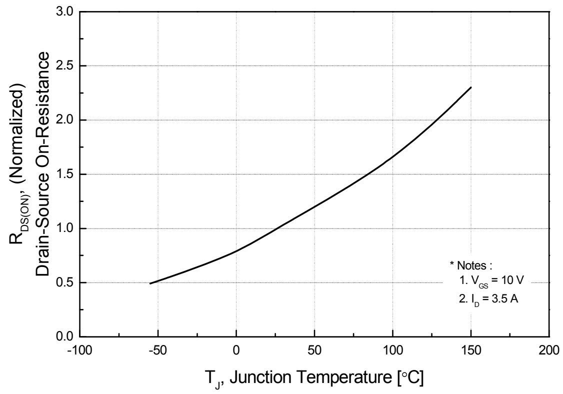


图 9. 最大安全工作区

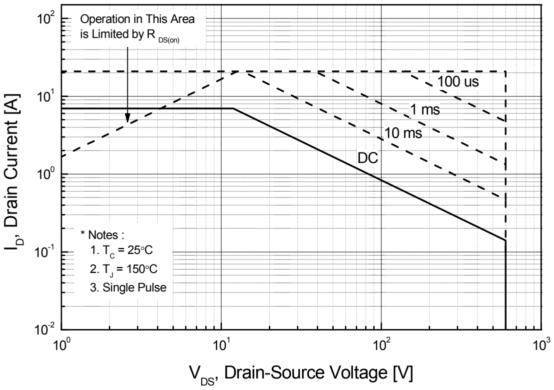


图 10. 最大漏极电流与壳体温度

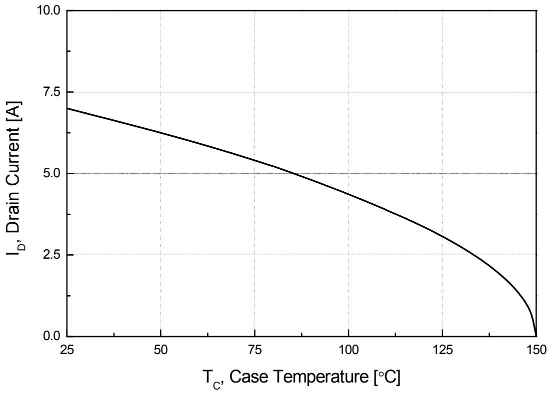
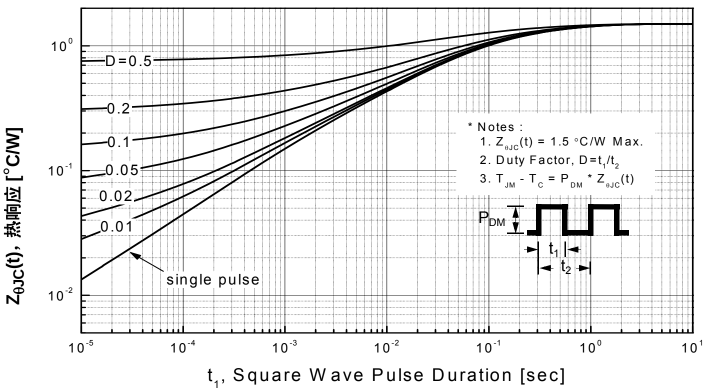


图 11. 瞬态热响应曲线



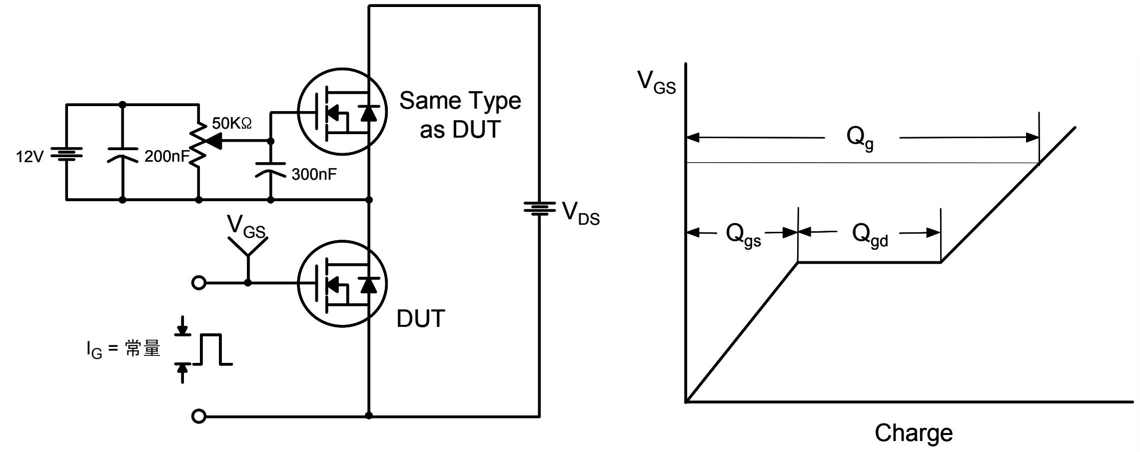


图 12. 栅极电荷测试电路与波形

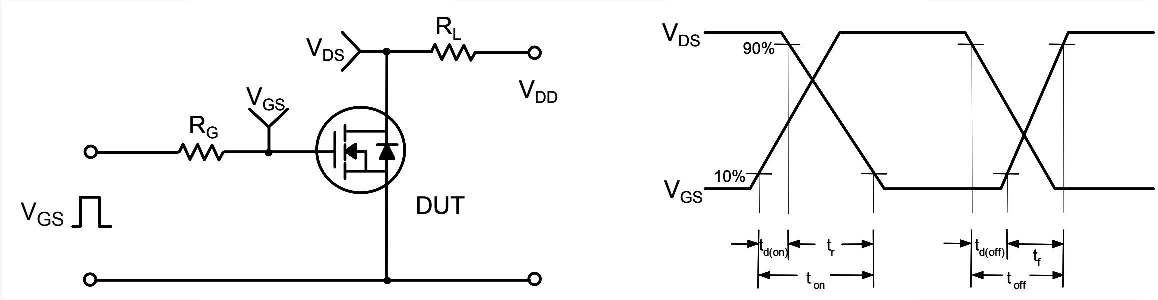


图 13. 阻性开关测试电路与波形

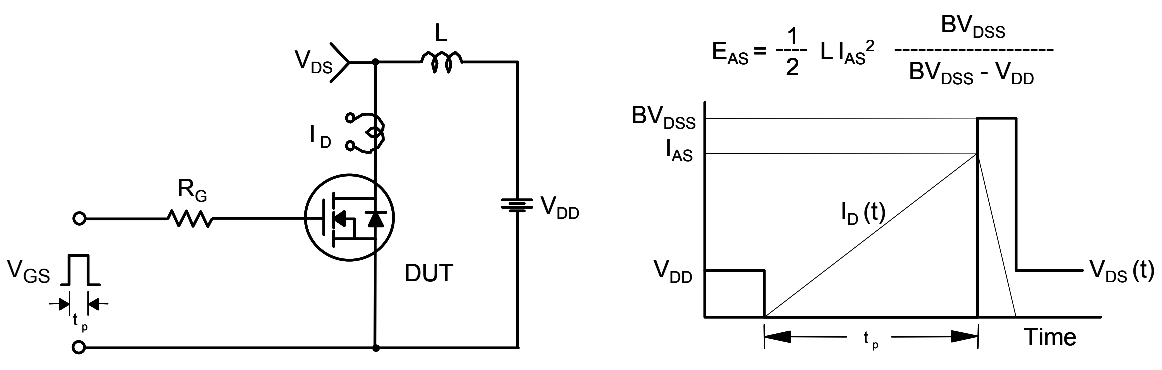


图 14. 非箝位感性开关测试电路与波形

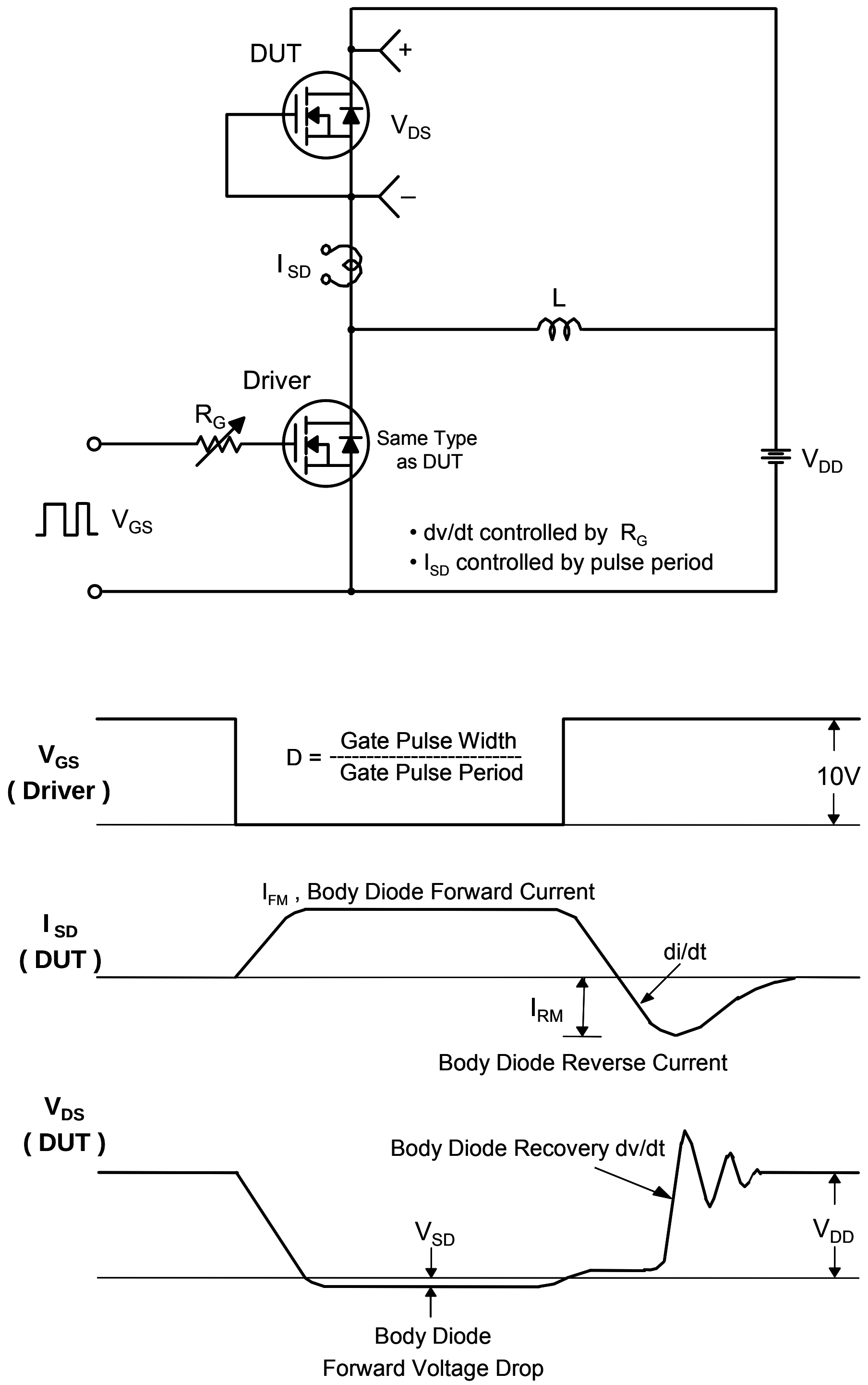
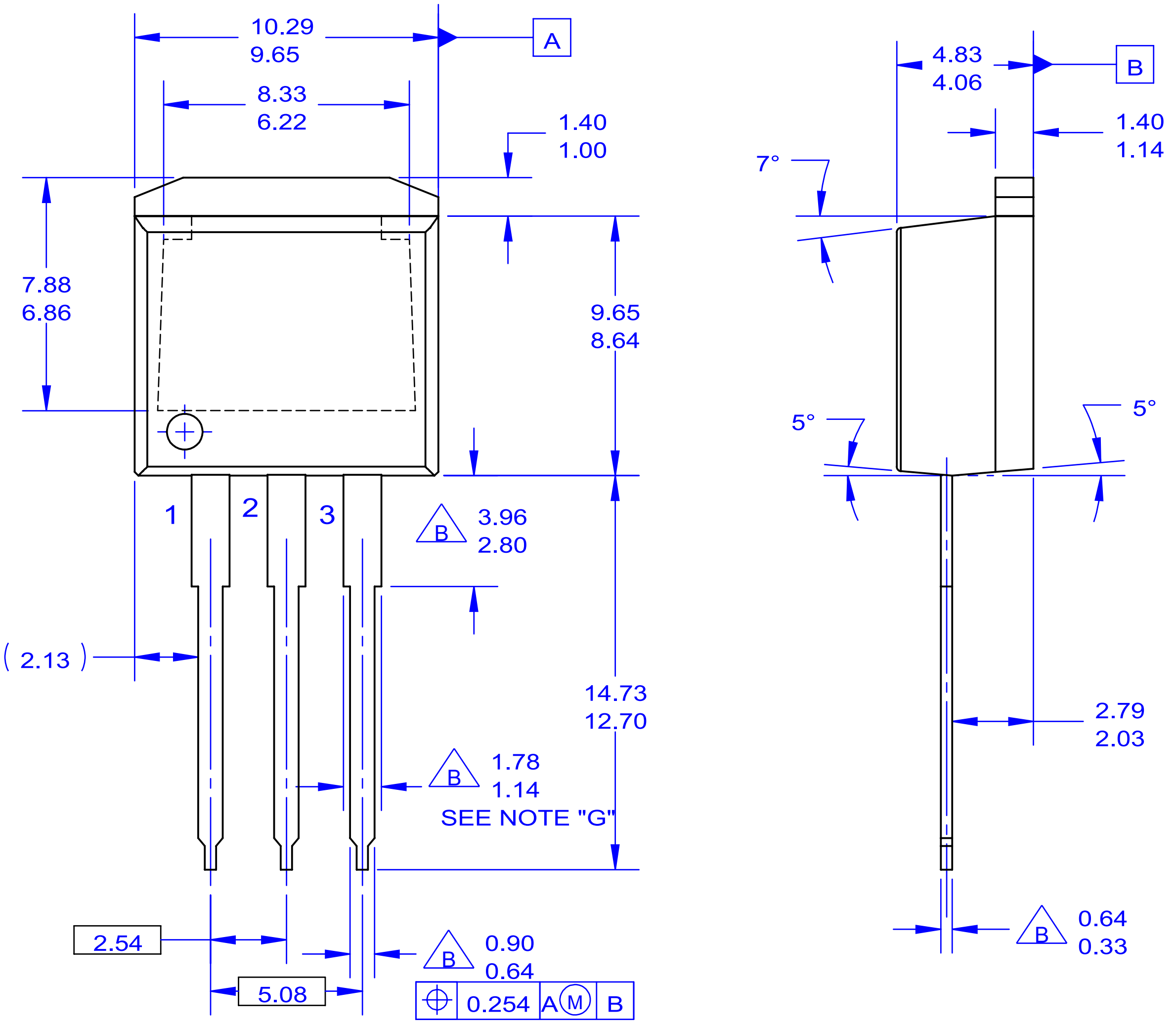


图 15. 二极管恢复 dv/dt 峰值测试电路与波形



NOTES:

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B. DOES NOT COMPLY JEDEC STD. VALUE.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
E. DIMENSION AND TOLERANCE AS PER ANSI Y14.5-1994.
F. LOCATION OF PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF PACKAGE)
G. MAXIMUM WIDTH FOR F102 DEVICE = 1.35 MAX.
H. DRAWING FILE NAME: TO262A03REV6

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