工业型号	公司型号	通俗命名	H	封装标识	包装方式	每管数量	每盒数量	每箱数量
FQU2N60C FQD2N60C	H2N60U H2N60D	2N60	HAOHAI	U: TO-251 D: TO-252	条管装 卷盘装	80只/管 2.5K/卷	4Kpcs/盒 5Kpcs/盒	24Kpcs 25Kpcs

■Features

I_D=1.8A
BV_{DSS}=600V
$R_{DS(on)}$=4.0Ω

Originative New Design
Superior Avalanche Rugged Technology
Robust Gate Oxide Technology
Very Low Intrinsic Capacitances
Excellent Switching Characteristics
Unrivalled Gate Charge: 5.5nC(Typ.)
Extended Safe Operating Area
Lower $R_{DS(ON)}$: 4.0Ω(Typ.) @ V_{GS}=10V
100% Avalanche Tested
Package: TO-251 & TO-252（IPAK & DPAK）

■特点

导通电阻低,开关速度快,驱动简单,可并联使用,输入阻抗高,符合RoHS规范

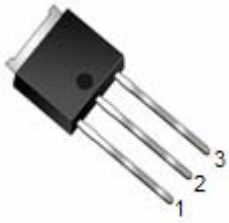
■应用范围

开关电源、LCD电源、LED驱动电源、机箱电源、UPS电源、
各种充电器、电子整流器、电子变压器、逆变器、控制器、转换器、
风扇控制板、以及电源适配器、汽车稳压器等线性放大和功率开关电路

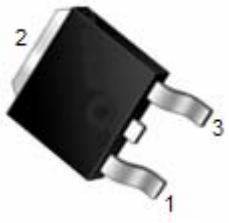
■封装形式

TO-251（IPAK）
TO-252（DPAK）

2N60 Series Pin Assignment

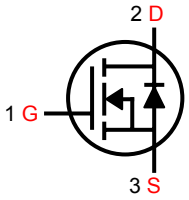


3-Lead Plastic TO-251
Package Code: U
Pin 1: Gate
Pin 2: Drain
Pin 3: Source



3-Lead Plastic TO-252
Package Code: D
Pin 1: Gate
Pin 2: Drain
Pin 3: Source

Series Symbol:



■ Absolute Maximum Ratings（T_C=25℃ unless otherwise specified）

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current－Continuous（T_C=25℃）	1.8	A
	Drain Curren－Continuous（T_C=100℃）	1.1	
I_{DM}	Drain Current – Pulsed（Note 1）	7.2	
V_{GS}	Gate-Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy（Note 2）	116	mJ
I_{AR}	Avalanche Current（Note 1）	1.8	A
E_{AR}	Repetitive Avalanche Energy（Note 1）	4.2	mJ
dv/dt	Peak Diode Recovery dv/dt（Note 3）	4.5	V/ns
P_D	Power Dissipation（T_A=25℃）*	2.5	W
	Power Dissipation（T_C=25℃）	42	
	Power Dissipation - Derate above 25℃	0.34	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range	-50 ~ +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8” from case for 5 seconds	300	

■ Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	2.98	℃/W
$R_{\theta JA}$	Junction-to-Ambient *	--	50	
$R_{\theta JA}$	Junction-to-Ambient	--	110	

* *When mounted on the minimum pad size recommended (PCB Mount)*

■ Electrical Characteristics（T_C=25℃ unless otherwise specified）

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
On Characteristics						
V_{GS}	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	2.5	--	4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=0.9A	--	4.0	5.0	Ω
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	600	--	--	V
$\triangle BV_{DSS}/\triangle T_J$	Breakdown Voltage Temperature Coefficient	I_D=250μA, Referenced to 25℃	--	0.6	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=600V, V_{GS}=0V	--	--	1	μA
		V_{DS}=480V, T_C=25℃	--	--	10	
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30V, V_{DS}=0V	--	--	±100	nA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V V_{GS}=0V f=1.0MHz	--	320	420	pF
C_{oss}	Output Capacitance		--	38	50	
C_{rss}	Reverse Transfer Capacitance		--	6.5	8.5	
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS}=300V I_D=2A R_G=25Ω （Note 4,5）	--	20	50	nS
t_r	Turn-On Rise Time		--	20	50	
$t_{d(off)}$	Turn-Off Delay Time		--	30	70	
t_f	Turn-Off Fall Time		--	20	50	
Q_g	Total Gate Charge	V_{DS}=480V, I_D=2.0A V_{GS}=10V（Note 4,5）	--	5.5	7.5	nC
Q_{gs}	Gate-Source Charge		--	1.8	--	
Q_{gd}	Gate-Drain Charge		--	3.5	--	
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	1.8	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	7.2	
V_{SD}	Source-Drain Diode Forward Voltage	I_S=1.8A, V_{GS}=0V	--	--	1.4	V
t_{rr}	Reverse Recovery Time	I_S=2.0A, V_{GS}=0V di_F/dt=100μA/μs（Note 4）	--	206	--	nS
Q_{rr}	Reverse Recovery Charge		--	0.76	--	μC

Notes:

1. *Repetitive Rating: Pulse width limited by maximum junction temperature*
2. *L=53mH, I_{AS}=2A, V_{DD}=50V, R_G=25Ω, Starting T_J=25 ℃*
3. *I_{SD} ≤1.8A, di/dt ≤200A/μS, V_{DD} ≤BV_{DSS}, Starting T_J=25 ℃*
4. *Pulse Test: Pulse Width ≤300μS, Duty Cycle ≤2%*
5. *Essentially Independent of Operating Temperature*

Typical Performance Characteristics

Fig-1. On Region Characteristics

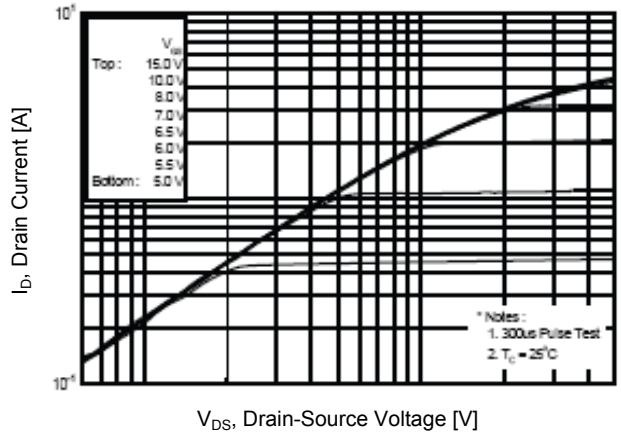


Fig-2. Transfer Characteristics

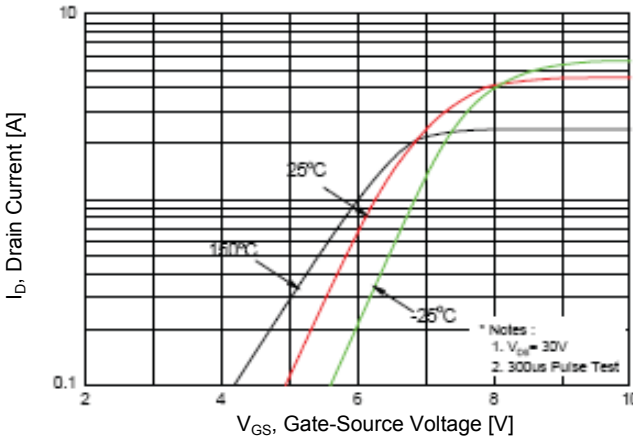


Fig-3. On Resistance Variation vs Drain Current and Gate Voltage

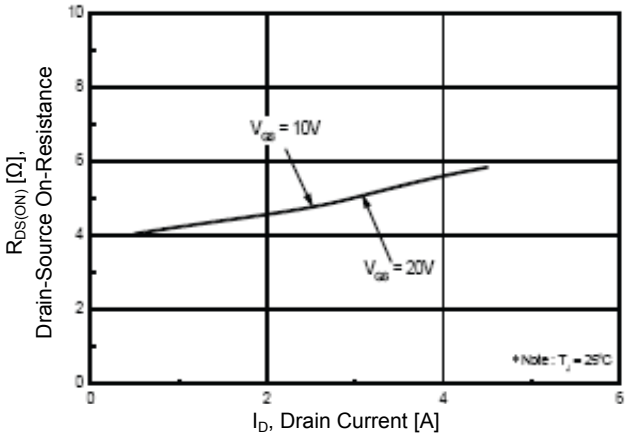


Fig-4. Body Diode Forward Voltage Variation with Source Current and Temperature

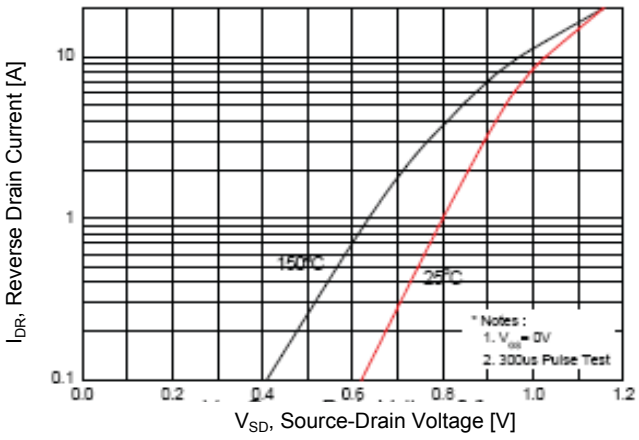


Fig-5. Capacitance Characteristics

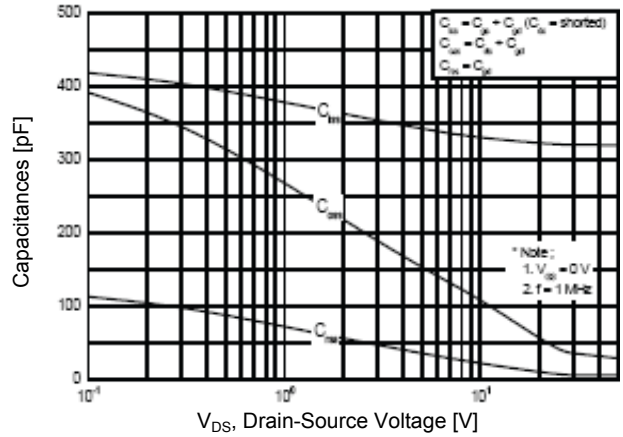
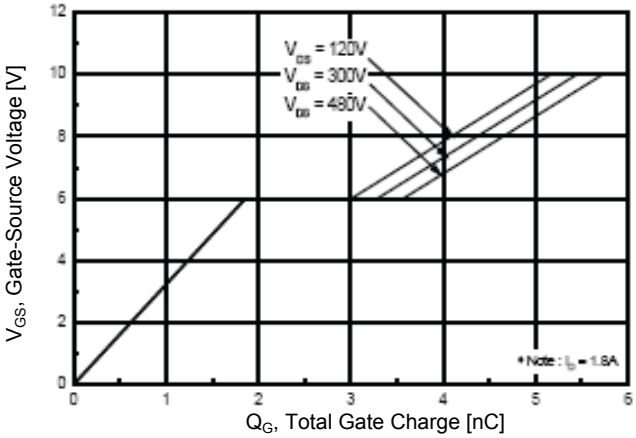


Fig-6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Fig-7. Breakdown Voltage Variation vs Temperature

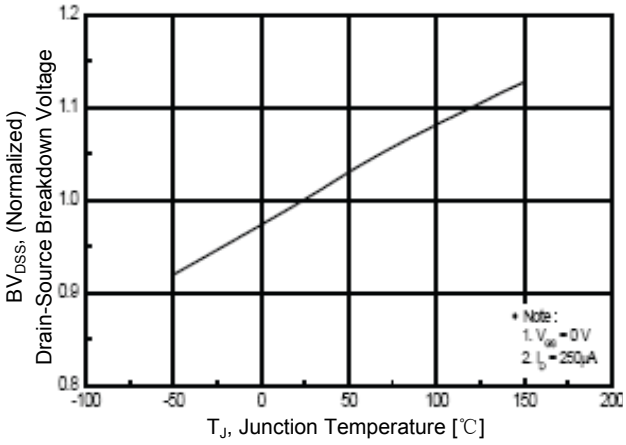


Fig-8. On-Resistance Variation vs Temperature

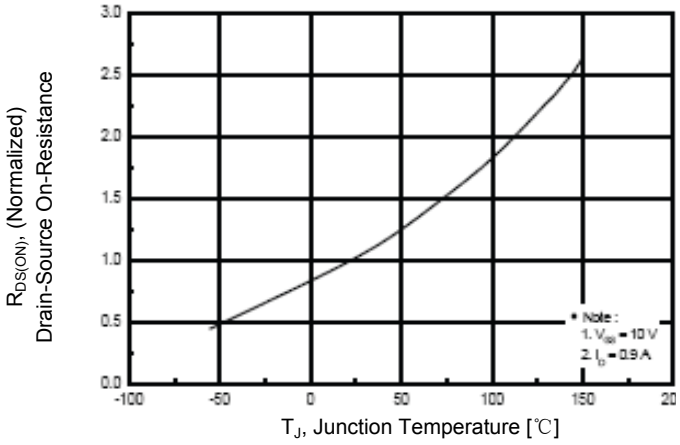


Fig-9. Maximum Safe Operating Area

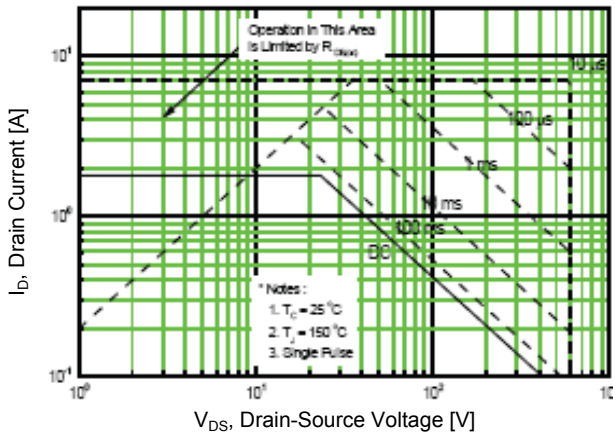


Fig-10. Maximum Drain Current vs Case Temperature

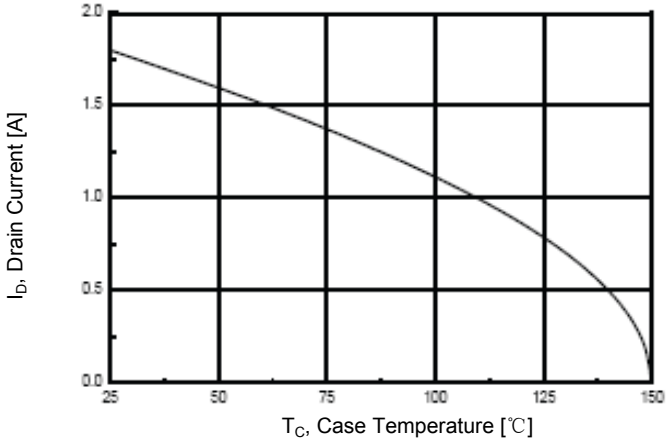


Fig-11. Transient Thermal Response Curve

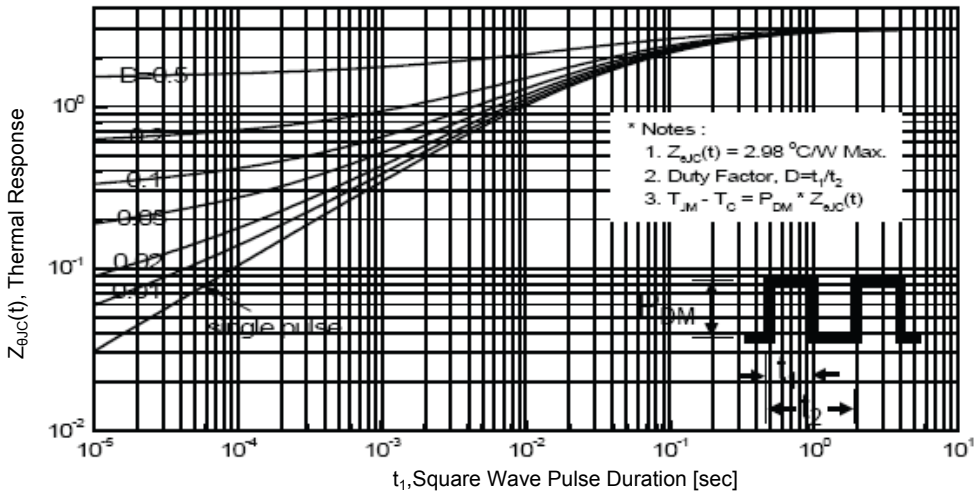


Fig-12. Gate Charge Test Circuit & Waveform

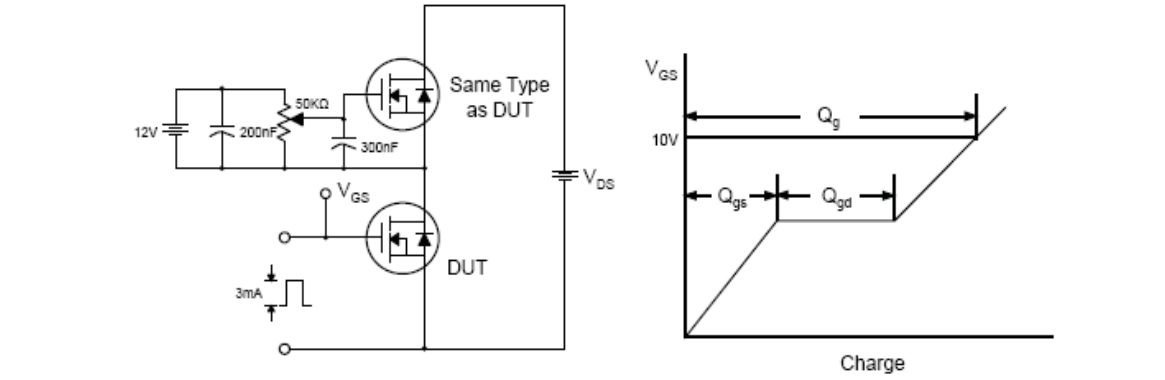


Fig-13. Resistive Switching Test Circuit & Waveforms

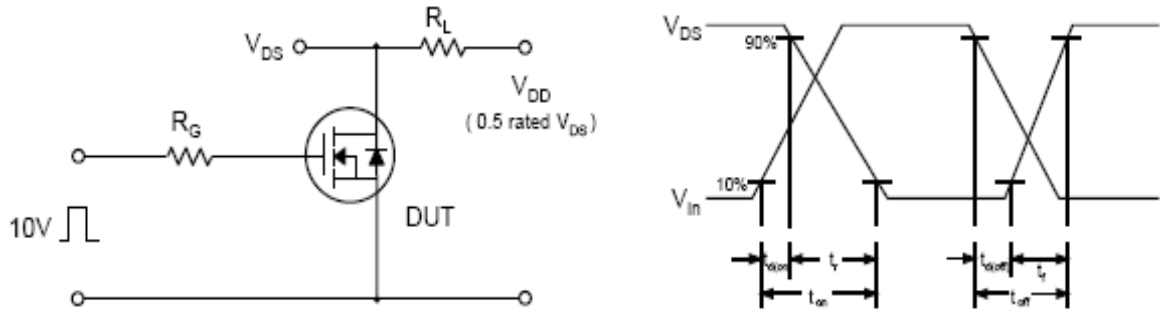


Fig-14. Unclamped Inductive Switching Test Circuit & Waveforms

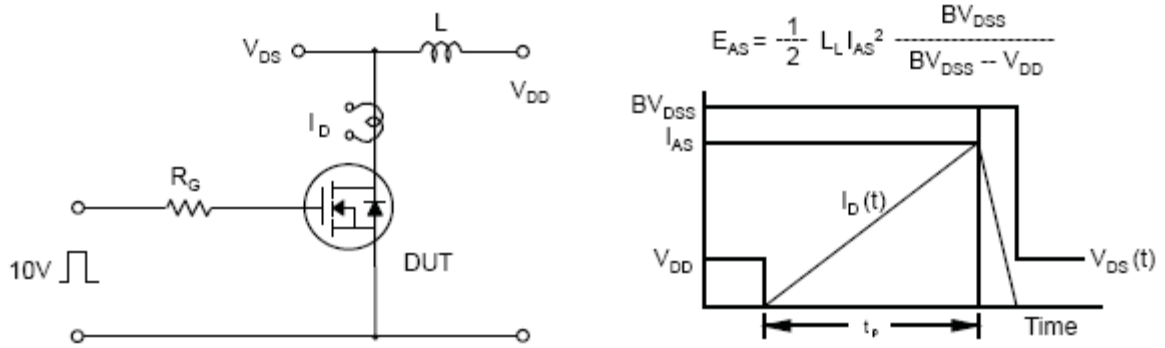
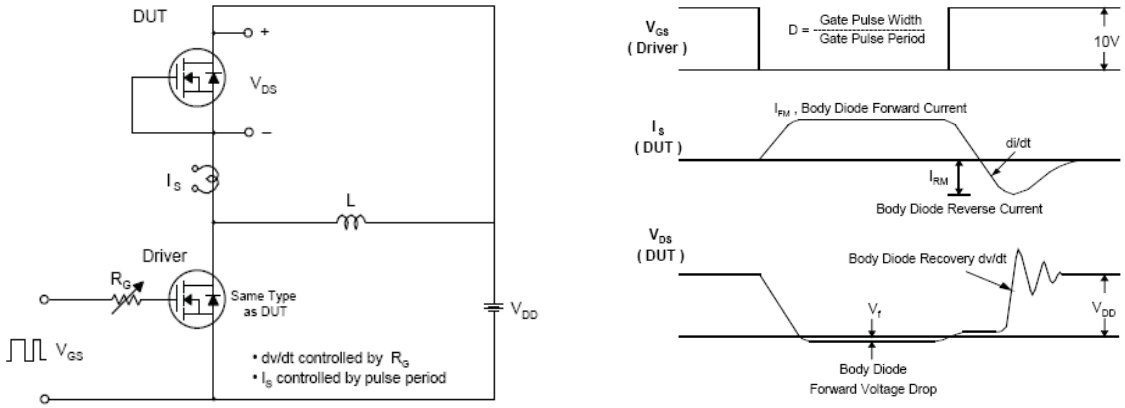
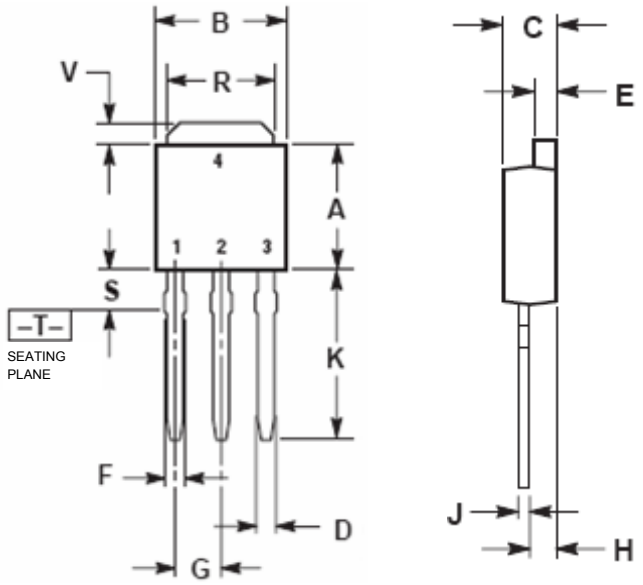


Fig-15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



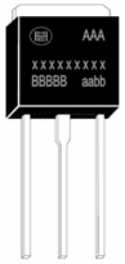
PACKAGE DIMENSIONS

■ TO-251（IPAK）Dimension（封装尺寸数据, 单位: mm）



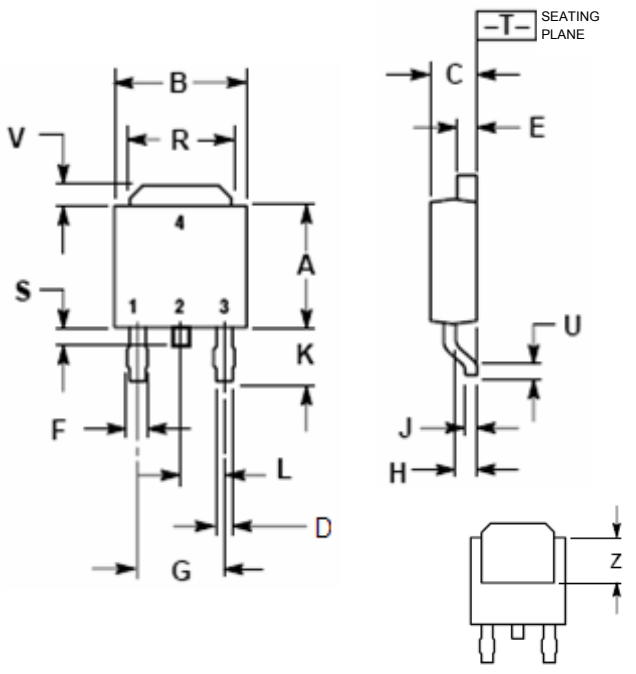
DIM	MILLIMETERS	
	Min.	Max.
A	5.97	6.35
B	6.35	6.73
C	2.19	2.38
D	0.69	0.88
E	0.84	1.01
F	0.94	1.19
G	2.29 BSC	
H	0.87	1.01
J	0.46	0.58
K	8.89	9.65
R	4.45	5.46
S	1.27	2.28
V	0.77	1.27

元件打印标识



左上角:公司LOGO
AAA:芯片代码
XXXXXXXXX:器件型号
BBBBB:批次代码
aabb:出厂批号
其中:
aa:出厂年份
bb:出厂自然周 (01-53)

■ TO-252（DPAK）Dimension（封装尺寸数据, 单位: mm）



DIM	MILLIMETERS	
	Min.	Max.
A	5.97	6.35
B	6.35	6.73
C	2.19	2.38
D	0.69	0.88
E	0.84	1.01
F	0.94	1.19
G	4.58 BSC	
H	0.87	1.01
J	0.46	0.58
K	2.60	2.89
L	2.29 BSC	
R	4.45	5.46
S	0.51	1.27
U	0.51	--
V	0.77	1.27
Z	3.51	--

元件打印标识

左上角:公司LOGO
AAA:芯片代码
XXXXXXXXX:器件型号
BBBBB:批次代码
aabb:出厂批号
其中:
aa:出厂年份
bb:出厂自然周 (01-53)

Manufacturers version information
2007-03-11， HAOHAI ™ Product Data-U1.0
2010-04-10， HAOHAI ™ Product Data-U1.1
2014-07-11， HAOHAI ™ Product Data-U1.2

深圳市浩海電子有限公司
SHENZHEN HAOHAI ELECTRONICS CO., LTD.

2 floor(whole floor), BAOXIN Building. 0 Lane on the 8th. Yufeng Garden.
82 District. BAOAN District, Shenzhen City, Guangdong Province, China.

中國 廣東省 深圳市 寶安區 82区 裕豐花園 零巷8號 寶馨樓 二楼 (全层)

公司电话 TEL: +86-755-29955080、29955081、29955082、29955083
总机八线 29955090、29955091、29955092、29955093

FAX: +86-755-27801767 E-mail:kkg@kkg.com.cn

http://www.szhhe.com http://www.kkg.com.cn