

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
FQU4N65C FQD4N65C	H4N65U H4N65D	4N65	HAOHAI	U: TO-251 D: TO-252	条管装 载带卷盘	80只/管 2.5K/卷	4Kpcs/盒 5Kpcs/盒	24Kpcs 25Kpcs

DESCRIPTION

The H4N65 is a high voltage power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristic. This power MOSFET is usually used in high speed switching applications including power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

FEATURES

- $R_{DS(ON)} \leq 2.5 @ V_{GS}=10V$
- Fast Switching Capability
- Avalanche Energy Specified
- Improved dv/dt Capability, High Ruggedness
- RoHS COMPLIANT
- Package: TO-251 or TO-252 (IPAK & DPAK)

$I_D=4A$
 $V_{DS}=650V$
 $R_{DS(on)}=2.5\Omega$

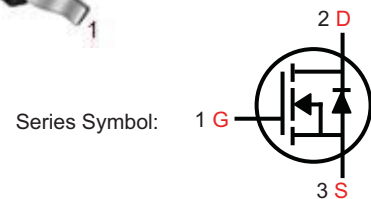
4N65 Series Pin Assignment



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



ABSOLUTE MAXIMUM RATINGS (T_c=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	650	V
gate-Source Voltage		V _{GSS}	±30	
Continuous Drain Current	Continuous	I _D	4.0	A
	Pulsed (Note2)	I _{DM}	16	
Avalanche Energy	Single Pulsed (Note3)	E _{AS}	50	mJ
	Repetitive (Note2)	E _{AR}	10.6	
Peak Diode Recovery dv/dt (Note4)		dv/dt	4.5	V/ns
Power Dissipation	TO-251, TO-252	P _D	50	W
Junction Temperature		T _j	+150	°C
Operating Temperature		T _{OPR}	-55~+150	
Storage Temperature		T _{STG}	-55~+150	

Notes:

- Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
- Repetitive Rating : Pulse width limited by maximum junction temperature
- L=6.25mH, I_{AS}=4A, V_{DD}=50V, R_θ=25Ω, Starting T_J=25 °C
- I_{SD} ≤ 4.4A, di/dt ≤ 200A/μS, V_{DD} ≤ BV_{DSS}, Starting T_J=25 °C

■ THERMAL DATA

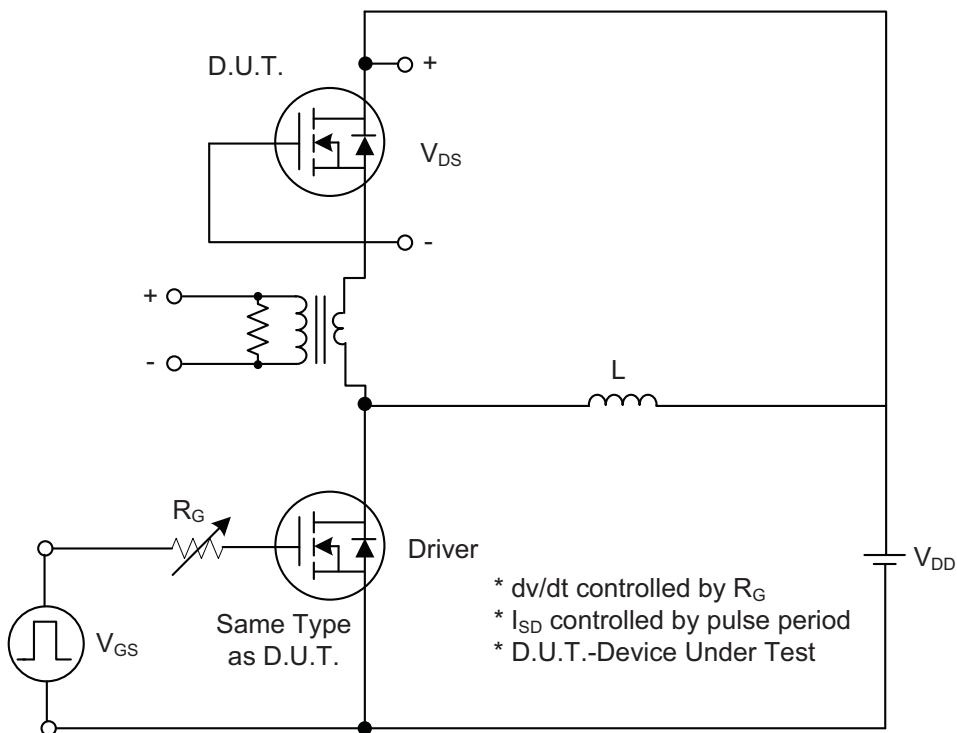
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-251, TO-252	θ_{JA}	110	°C/W
Junction to Case		θ_{JC}	2.5	

■ 电特性 Electronic Characteristics (T_C=25°C)

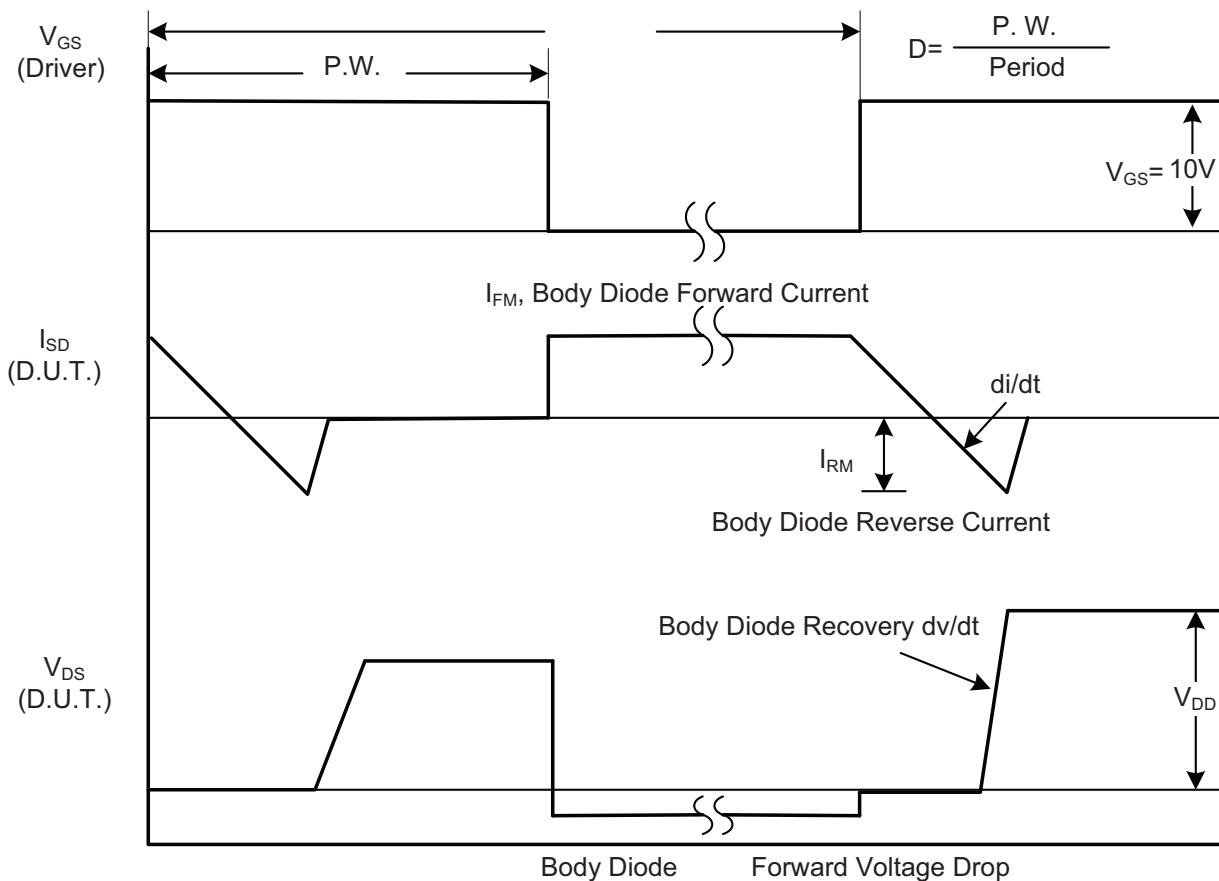
PARAMETER		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=30V, V_{DS}=0V$			100	nA
	Reverse		$V_{GS}=-30V, V_{DS}=0V$			-100	
Breakdown Voltage Temperature Coefficient		$\Delta D_{SS}/\Delta T_J$	$I_D=250\mu A$, Referenced to 25°C		0.6		V/°C
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.2A$		1.72	2.5	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V$ $f=1MHz$			670	750	pF
Output Capacitance	C_{OSS}				50	90	
Reverse Transfer Capacitance	C_{RSS}				5	11	
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=30V$ $I_D=0.5A$ $R_G=25\Omega$ (Note 1, 2)			44	60	nS
Turn-On Rise Time	t_R				50	100	
Turn-Off Delay Time	$t_{D(OFF)}$				80	130	
Turn-Off Fall Time	t_F				45	70	
Total Gate Charge	Q_G	$V_{DS}=50V, I_D=1.3A$ $V_{GS}=10V$ (Note 1, 2)			17	20	nC
Gate-Source Charge	Q_{GS}				4.9		
Gate-Drain Charge	Q_{GD}				3.7		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V_{SD}	$V_{GS}=0V, I_S=4.4A$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I_S				4.4	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				17.6	

 Notes: 1、Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$ 2、Essentially independent of operating temperature

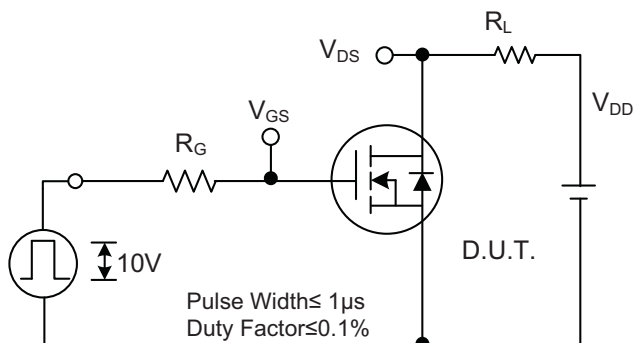
■ TEST CIRCUITS AND WAVEFORMS



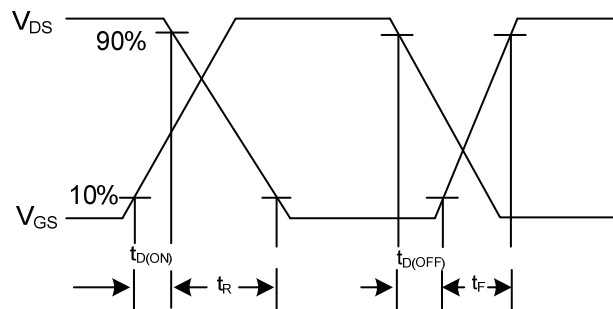
Peak Diode Recovery dv/dt Test Circuit



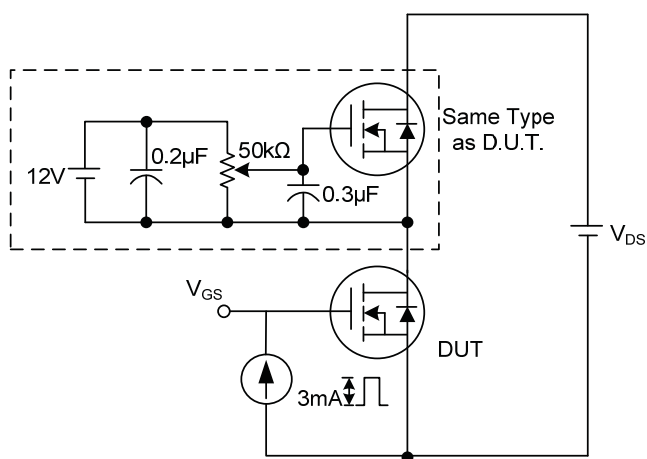
■ TEST CIRCUITS AND WAVEFORMS



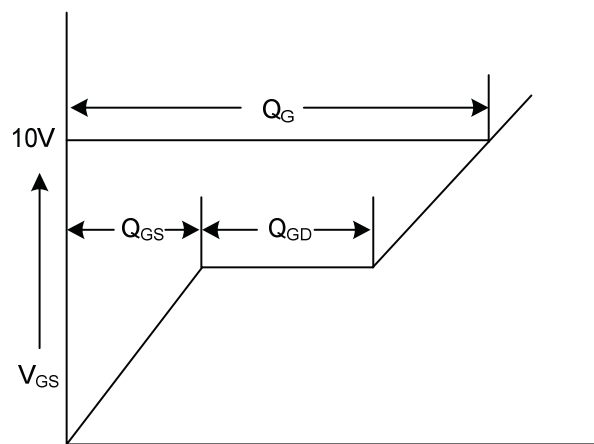
Switching Test Circuit



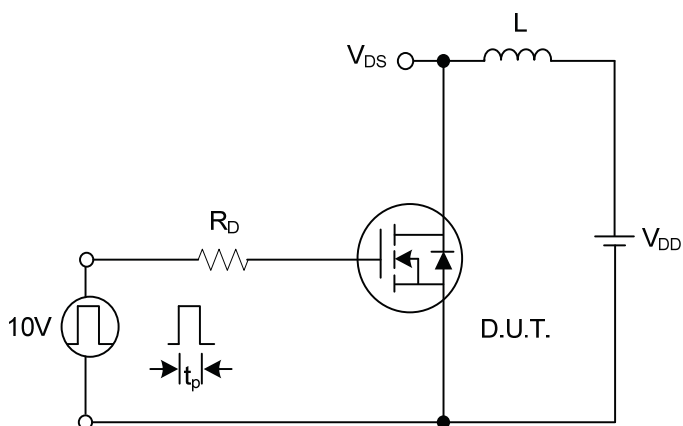
Switching Waveforms



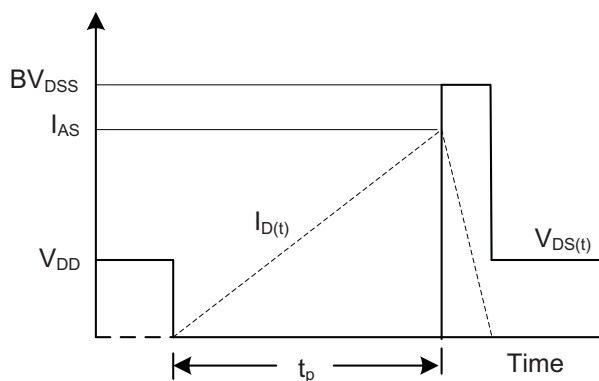
Gate Charge Test Circuit



Gate Charge Waveform

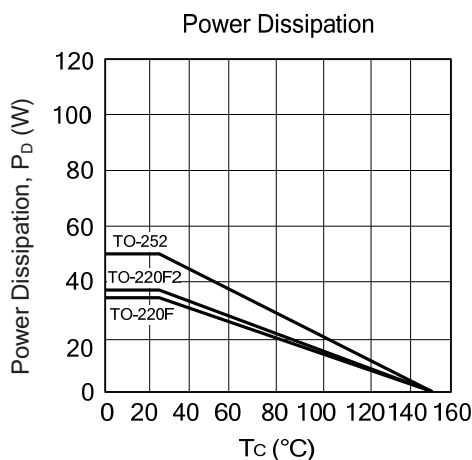
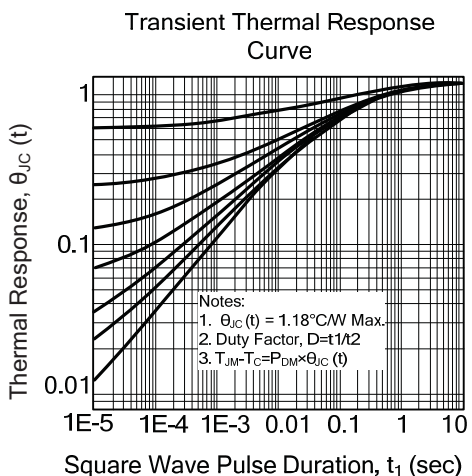
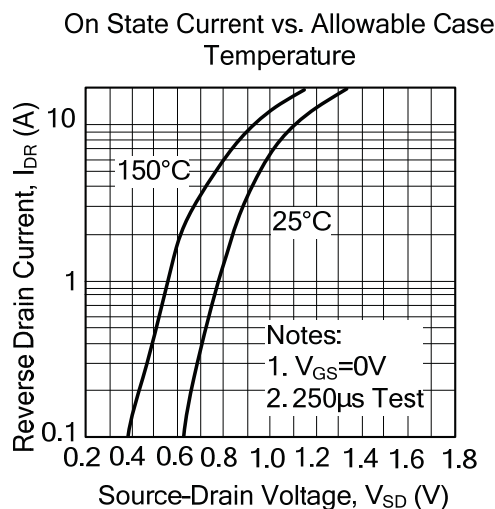
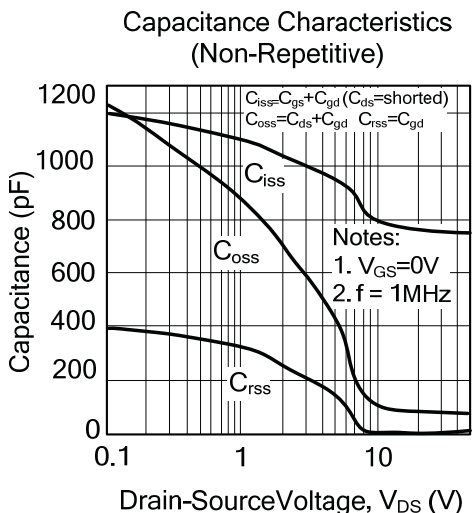
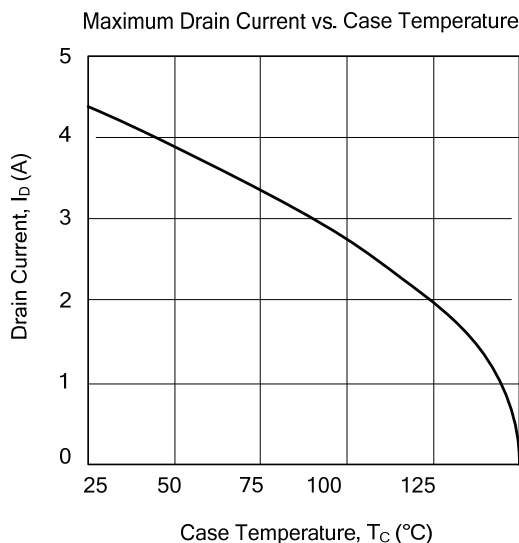
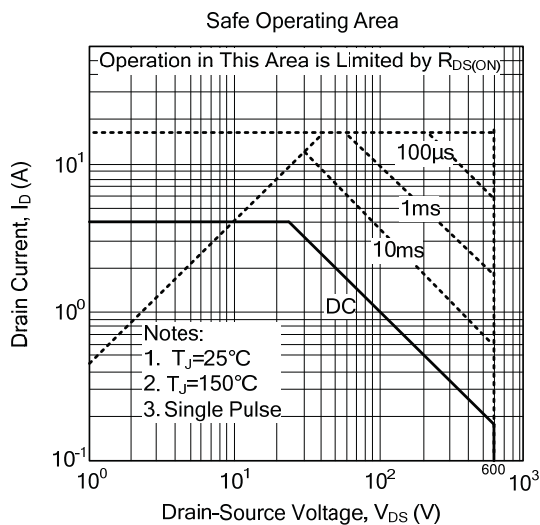


Unclamped Inductive Switching Test Circuit

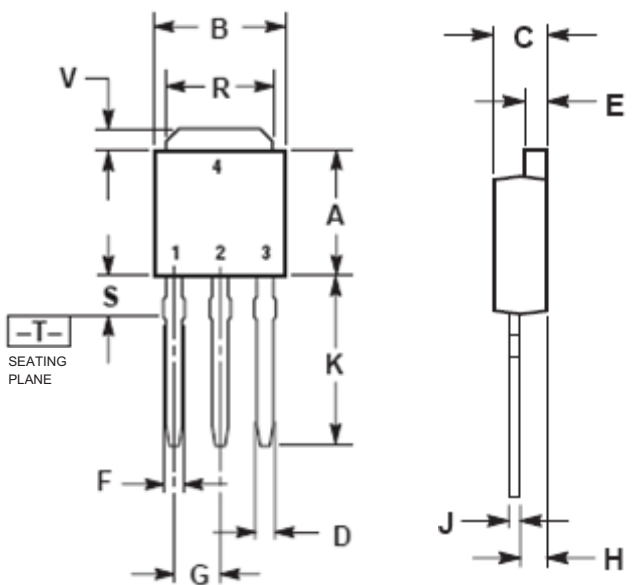
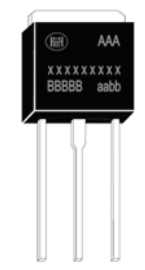


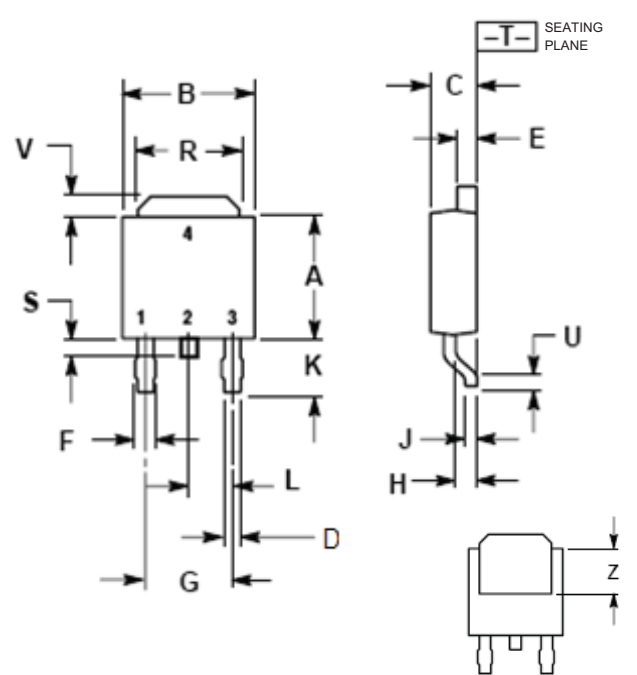

Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



PACKAGE DIMENSIONS

■ TO-251 (IPAK) Dimension (封装尺寸数据, 单位: mm)		元件打印标识	
	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	
 <p>左上角:公司LOGO AAA:芯片代码 XXXXXXXXXX: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)</p>			

■ TO-252 (DPAK) Dimension (封装尺寸数据, 单位: mm)		元件打印标识	
	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	--	
 <p>左上角:公司LOGO AAA:芯片代码 XXXXXXXXXX: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)</p>			

■ 包装规格 Packaging Specifications

TO-251	条管装, 每管80只, 每盒4000只, 每箱24000只 (80Pcs/Tube, 4Kpcs/BOX, 24Kpcs/Carton)
TO-252	条管装, 每管80只, 每盒4000只, 每箱24000只 (80Pcs/Tube, 4Kpcs/BOX, 24Kpcs/Carton)
	载带卷盘包装, 每卷盘2500只, 每盒5000只, 每箱25000只 (2.5Kpcs/Reel, 5Kpcs/BOX, 25Kpcs/Carton)



经中华人民共和国工商行政管理总局商标局批准

HAOHAI、HHE 图案、字母、均为我公司正式注册商标，仿冒、盗用均属侵权，违法必究！

WARN: Letters, patterns, are officially registered my trademark counterfeiting, theft are all violations, violators will be held liable !

深圳市浩海电子有限公司

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.

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>