

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

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)

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

■ 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

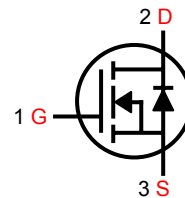


3-Lead Plastic TO-251
 Package Code: U
 Pin 1: Gate
 Pin 2: Drain
 Pin 3: Source



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

Series Symbol:



■ Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current—Continuous ($T_C=25^\circ C$)	1.8	A
	Drain Current—Continuous ($T_C=100^\circ C$)	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 ($T_A=25^\circ C$) *	2.5	W
	Power Dissipation ($T_C=25^\circ C$)	42	
	Power Dissipation - Derate above $25^\circ C$	0.34	W/ $^\circ C$
T_J, T_{STG}	Operating and Storage Temperature Range	-50 ~ +150	$^\circ C$
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	$^\circ C/W$
$R_{\theta JA}$	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°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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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
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, Referenced to 25°C	--	0.6	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600V, V _{GS} =0V	--	--	1	μA
		V _{DS} =480V, T _C =25°C	--	--	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 °C
3. I_{SD} ≤ 1.8A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J=25 °C
4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

Typical Performance Characteristics

Fig-1. On Region Characteristics

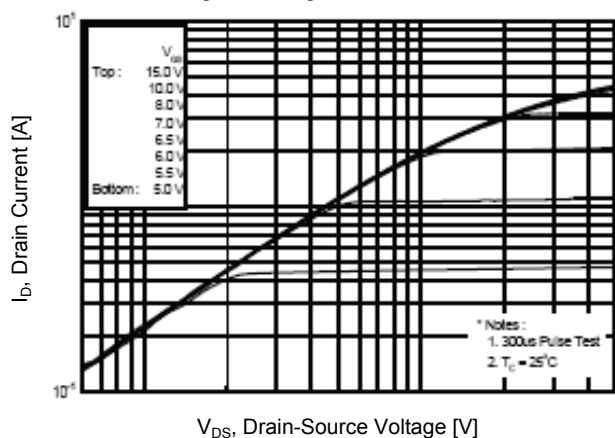


Fig-2. Transfer Characteristics

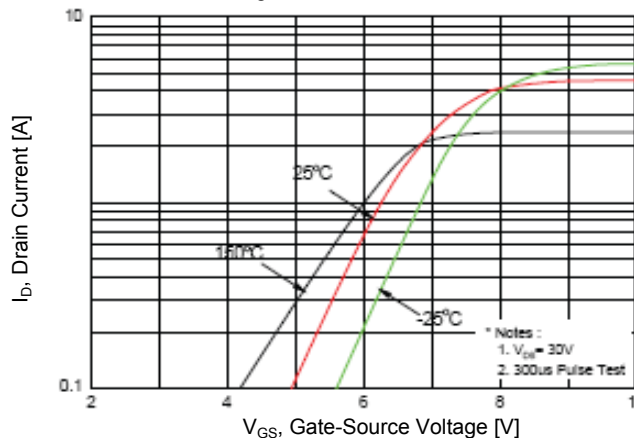


Fig-3. On Resistance Variation vs Drain Current and Gate Voltage

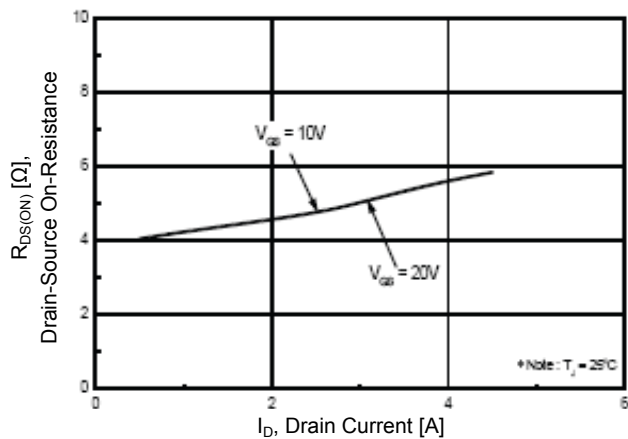


Fig-4. Body Diode Forward Voltage Variation with Source Current and Temperature

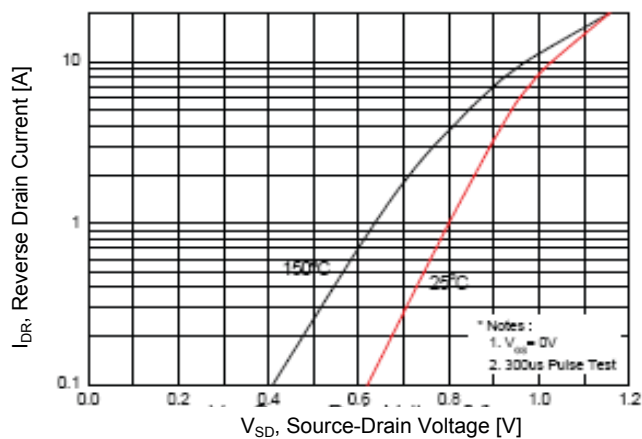


Fig-5. Capacitance Characteristics

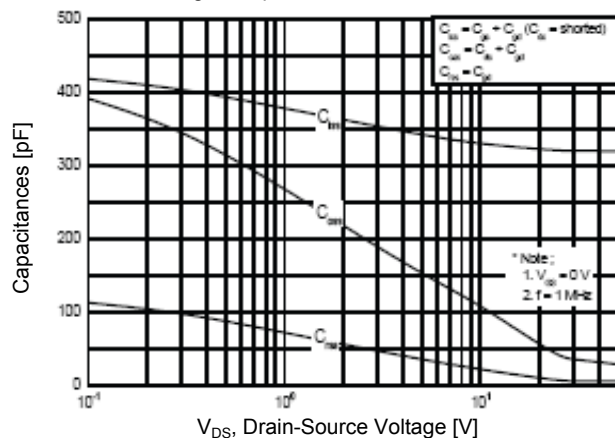
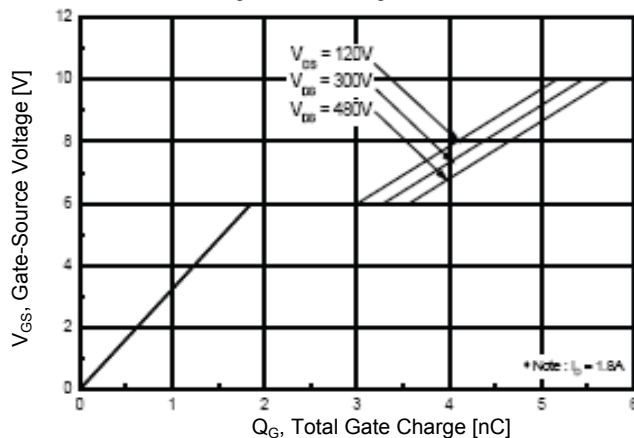


Fig-6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Fig-7. Breakdown Voltage Variation vs Temperature

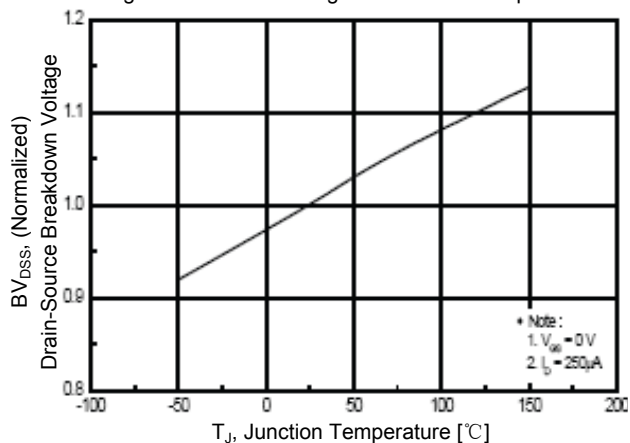


Fig-8. On-Resistance Variation vs Temperature

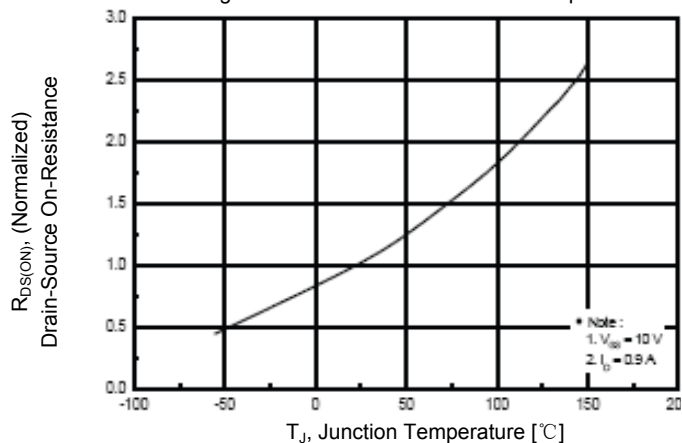


Fig-9. Maximum Safe Operating Area

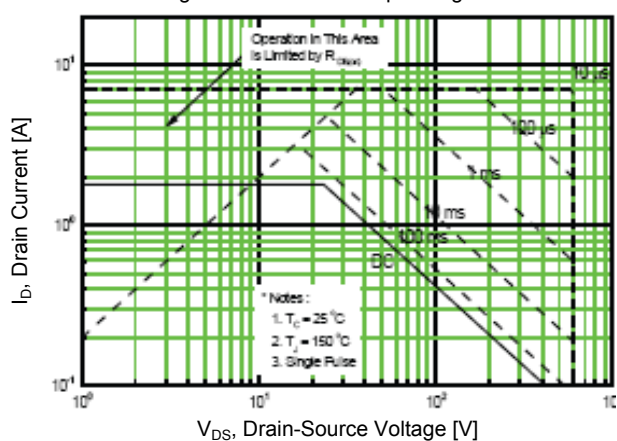


Fig-10. Maximum Drain Current vs Case Temperature

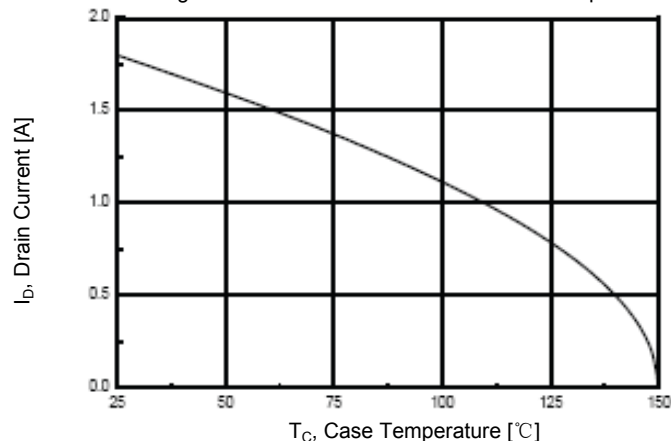


Fig-11. Transient Thermal Response Curve

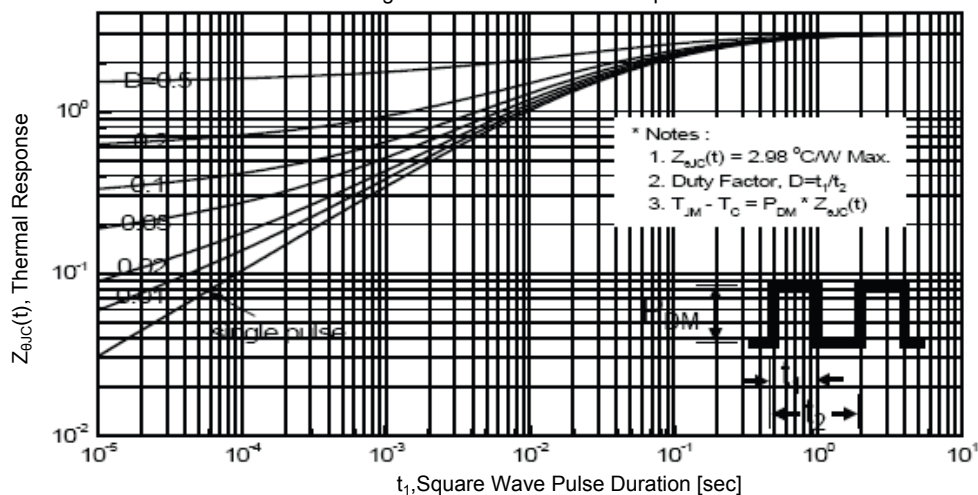


Fig-12. Gate Charge Test Circuit & Waveform

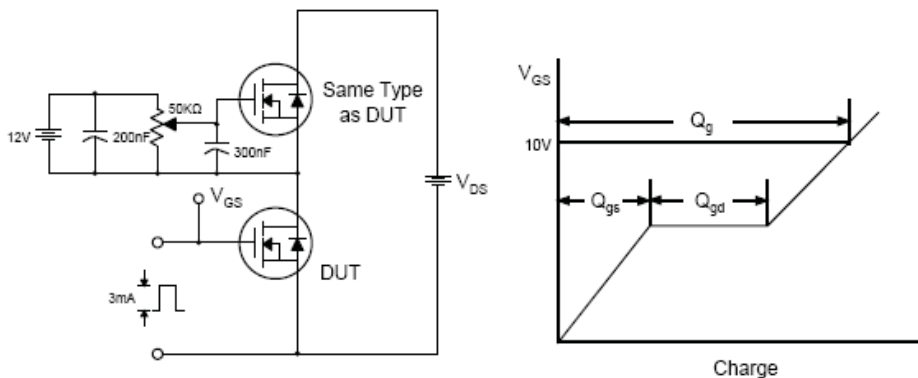


Fig-13. Resistive Switching Test Circuit & Waveforms

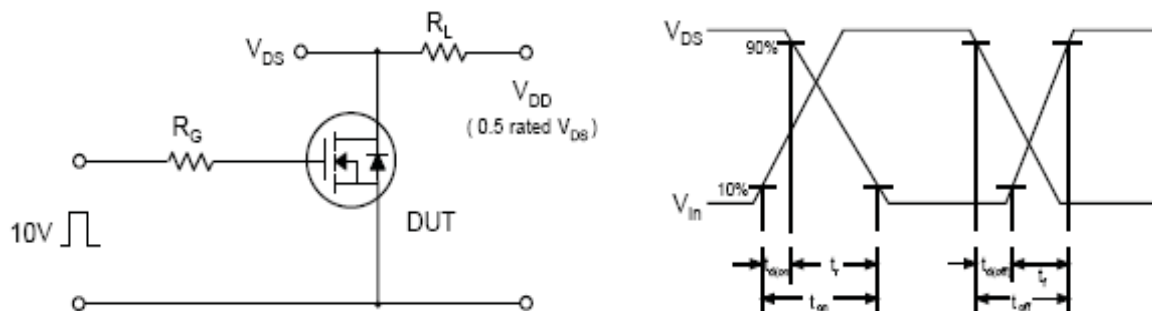


Fig-14. Unclamped Inductive Switching Test Circuit & Waveforms

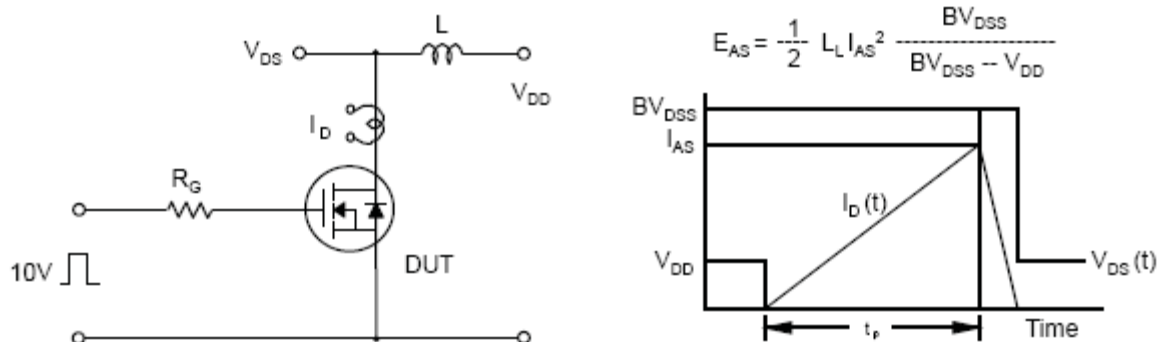
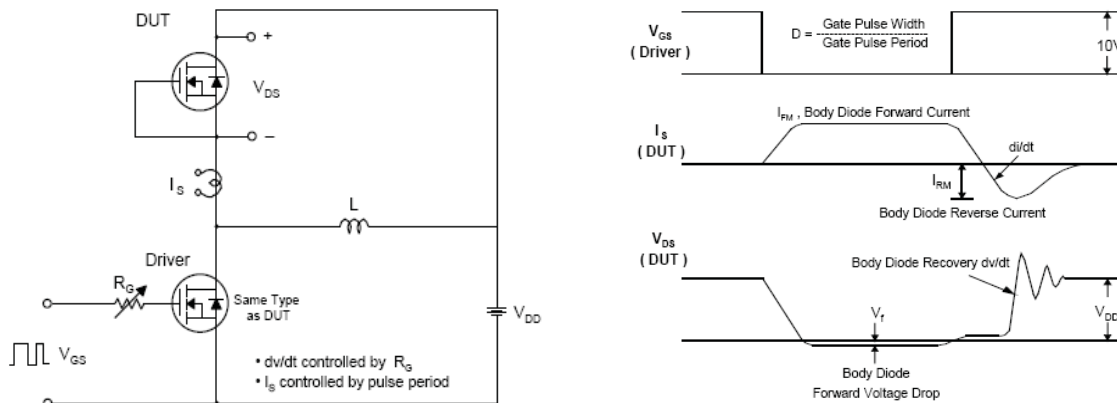


Fig-15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

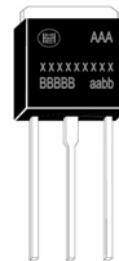


PACKAGE DIMENSIONS

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

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



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)

■ 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	--



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)

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



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