HMB**150N04**

Silicon N-Channel Power MOSFET

V$_{DSS}$	40	V
I$_D$	150	A
P$_D$	130	W
R$_{DS(ON)type}$	3.0	mΩ

General Description：

The HMB150N04 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is TO-220AB, which accords with the RoHS standard.

Features：

● Fast Switching

● Low Gate Charge and Rdson

● Low Reverse transfer capacitances

● 100% Single Pulse avalanche energy Test

Applications：

● Power switching application

● Hard switched and high frequency circuits

● Uninterruptible power supply

TO-220

Inner Equivalent Principium Chart

Absolute （Tc= 25℃ unless otherwise specified）：

Symbol	Parameter	Rating	Units
V$_{DSS}$	Drain-to-Source Voltage	40	V
I$_D$	Continuous Drain Current	150	A
	Continuous Drain Current T$_C$ = 100 °C	90	A
I$_{DM}$	Pulsed Drain Current	400	A
V$_{GS}$	Gate-to-Source Voltage	±20	V
E$_{AS}$ [a2]	Single Pulse Avalanche Energy	1100	mJ
E$_{AR}$ [a1]	Avalanche Energy ,Repetitive	110	mJ
I$_{AR}$ [a1]	Avalanche Current	50	A
dv/dt [a3]	Peak Diode Recovery dv/dt	5.0	V/ns
P$_D$	Power Dissipation	130	W
T$_J$, T$_{stg}$	Operating Junction and Storage Temperature Range	175，−55 to 175	℃
T$_L$	Maximum Temperature for Soldering	300	℃

HMB150N04

Electrical Characteristics （Tc=25℃ unless otherwise specified）:

OFF Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	40	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	BVdss Temperature Coefficient	$I_D=250uA$,Reference25℃	--	0.1	--	V/℃
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=40V,V_{GS}=0V,T_a=25℃$	--	--	1	μA
		$V_{DS}=32V,V_{GS}=0V,T_a=125℃$	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-1	μA

ON Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V,I_D=40A$	--	3.0	4.0	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS},I_D=250\mu A$	2	--	4	V

Pulse width tp≤380μs,δ≤2%

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
g_{fs}	Forward Transconductance	$V_{DS}=10V,I_D=20A$	25	--	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V,V_{DS}=20V$ f=1.0MHz	--	5400	--	pF
C_{oss}	Output Capacitance		--	970	--	
C_{rss}	Reverse Transfer Capacitance		--	380	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(ON)}$	Turn-on Delay Time	$I_D=20A,V_{DD}=20V$ $V_{GS}=10V,R_G=2.5\Omega$	--	23	--	ns
t_r	Rise Time		--	25	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	70	--	
t_f	Fall Time		--	30	--	
Q_g	Total Gate Charge	$I_D=20A,V_{DD}=20V$ $V_{GS}=10V$	--	80	--	nC
Q_{gs}	Gate to Source Charge		--	11	--	
Q_{gd}	Gate to Drain（"Miller"）Charge		--	18	--	
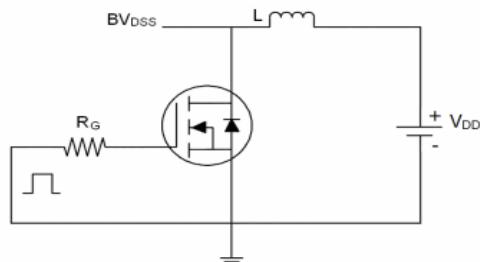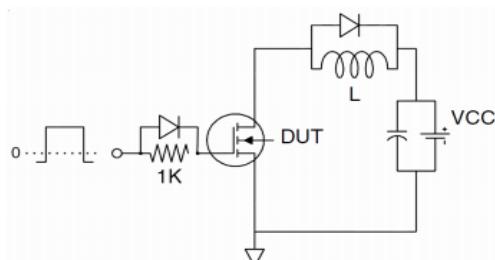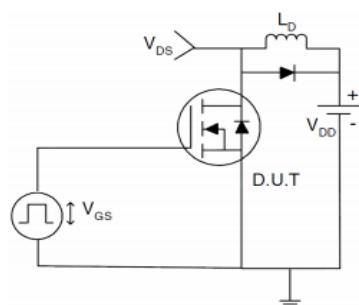
Source-Drain Diode Characteristics
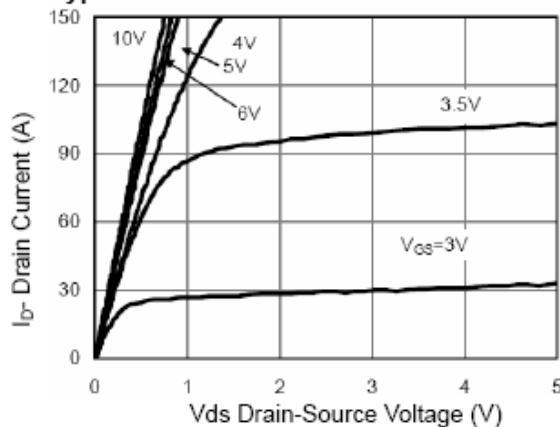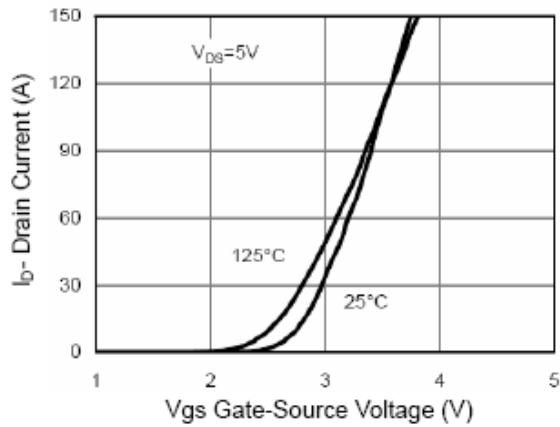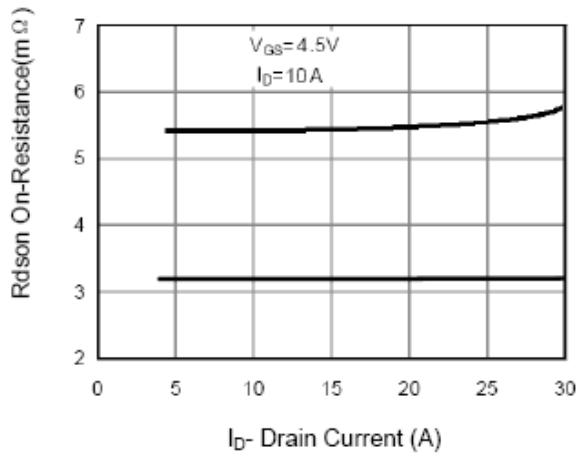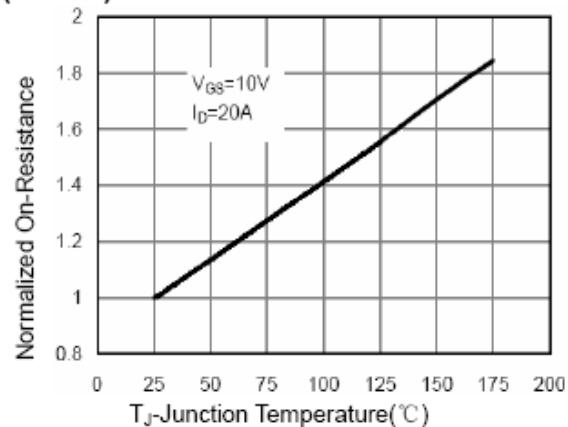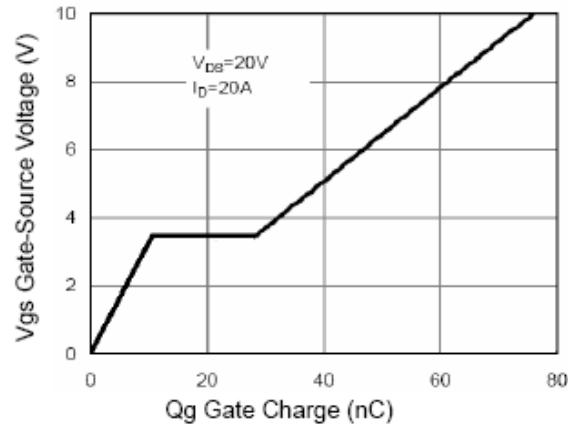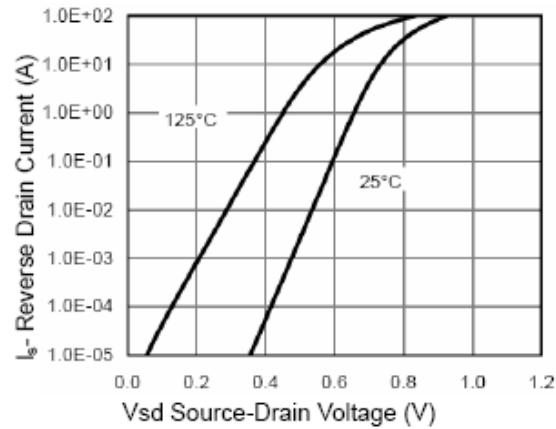
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	150	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	400	A
V_{SD}	Diode Forward Voltage	$I_S=40A,V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=40A,T_j = 25°C$	--	40	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/us,V_{GS}=0V$	--	48	--	nC
Pulse width tp≤380µs,δ≤2%						
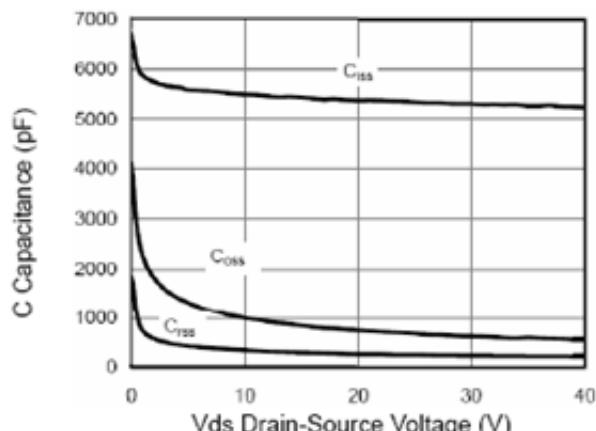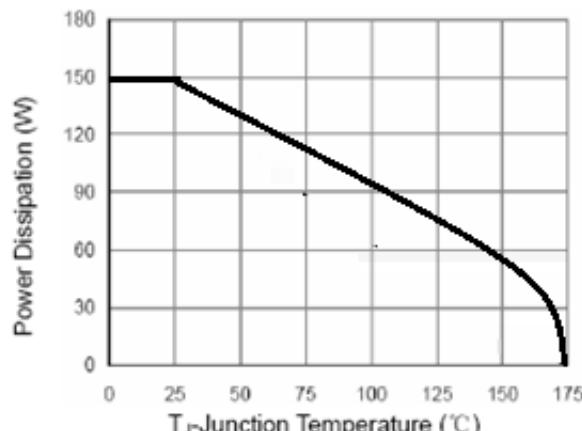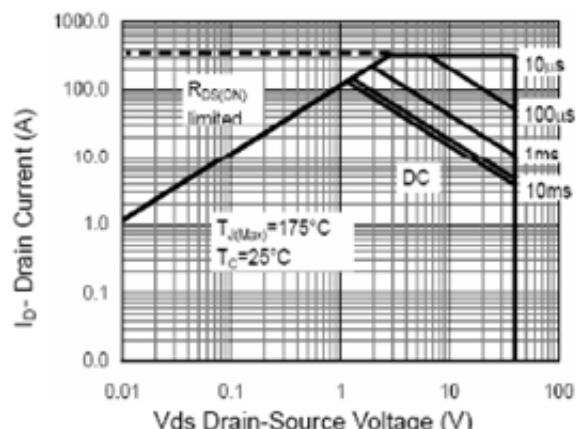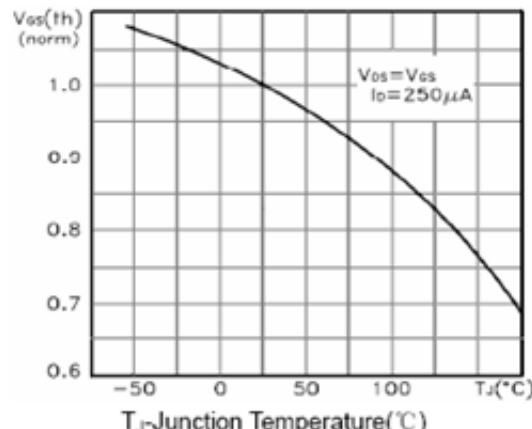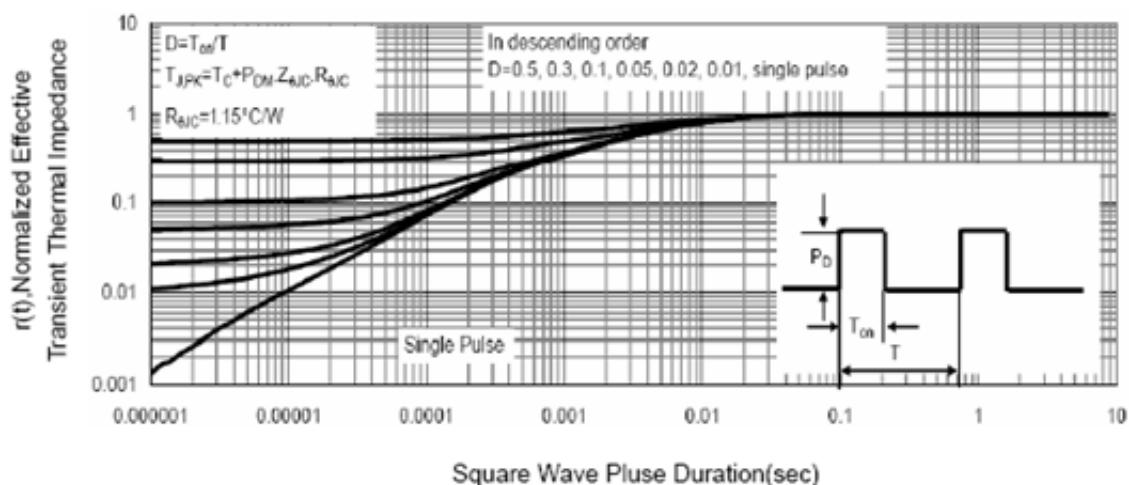
Symbol	Parameter	Typ.	Units
$R_{\theta Jc}$	Junction-to-Case	1.15	°C/W

a1：Repetitive rating; pulse width limited by maximum junction temperature

a2：E_{AS} condition : Tj=25℃,V_{DD}= 30V,V_G=10V,L=0.5mH,R_g=25Ω

a3：I_{SD} =150A,di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Test circuit

1) E_{AS} test Circuits

2) Gate charge test Circuit:

3) Switch Time Test Circuit：

Typical Electrical and Thermal Characteristics (Curves)


Figure 1 Output Characteristics

Figure 2 Transfer Characteristics

Figure 3 Rdson- Drain Current

Figure 4 Rdson-JunctionTemperature

**Figure 5 Gate Charge**

**Figure 6 Source- Drain Diode Forward**

Figure 7 Capacitance vs Vds

Figure 9 Power De-rating

Figure 8 Safe Operation Area

**Figure 10 V$_{GS(th)}$ vs Junction Temperature**

Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance