HCB30

30V MOSFET H-BRIDGE

General Description

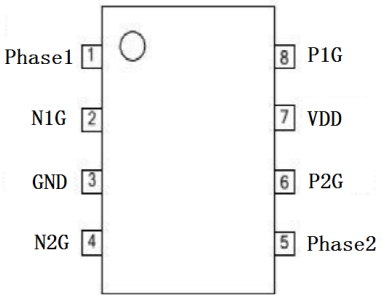
The HCB30 is a complementary enhancement mode MOSFET H-BRIDGE, it uses advanced technology to provide customers low on resistance, low gate charge and low threshold voltage.

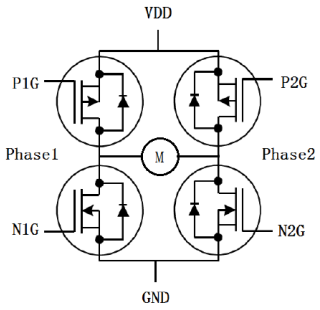
The HCB30 is universally applied in DC-AC Inverters and DC Motor control.

Features

* N-CHANNEL
- ID: 5A / VDSS: 30V
* P-CHANNEL
- ID: -5A / VDSS: -30V
* High switching speed

SOP8





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum		Units
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Drain Current-Continuous	TC=25°C	I_D	5	-5	A
	TC=100°C	I_D	3.5	3.5	A
Drain Current – Pulsed		I_{DM}	20	20	A
Maximum Power Dissipation		P_D	2.1		W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150		℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		1.1	℃ /W
Thermal Resistance unction-to-Ambient	$R_{\theta JA}$		60	℃ /W

Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=4A		21	25	mΩ
		V_{GS}=4.5V, I_D=3A		30	40	mΩ
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A		10		S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, F=1.0MHz		690		pF
C_{oss}	Output Capacitance			45		pF
C_{rss}	Reverse Transfer Capacitance			36		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=15V,I_D=1A, V_{GS}=10V, R_G=2.6Ω		2.6		nS
t_r	Turn-on Rise Time			8.5		nS
$t_{d(off)}$	Turn-Off Delay Time			18		nS
t_f	Turn-Off Fall Time			5		nS
Q_g	Total Gate Charge	V_{DS}= 5V,I_D=3A , V_{GS}=4.5V		3.7		nC
Q_{gs}	Gate-Source Charge			1.4		nC
Q_{gd}	Gate-Drain Charge			1.5		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A		0.72	1.4	V
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		1.5		Ω

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

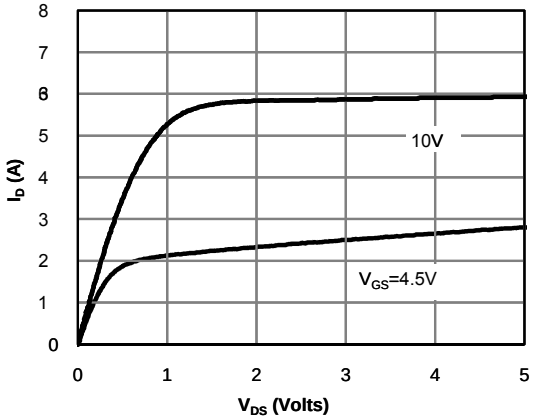


Fig 1: On-Region Characteristics

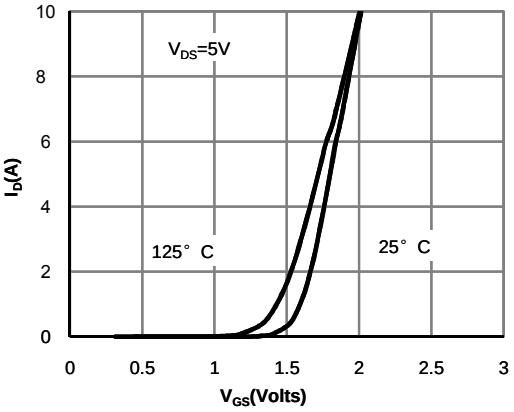


Figure 2: Transfer Characteristics

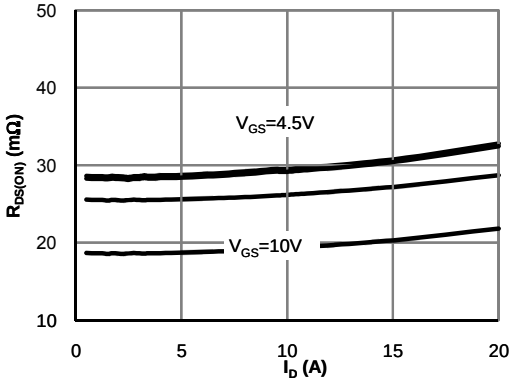


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

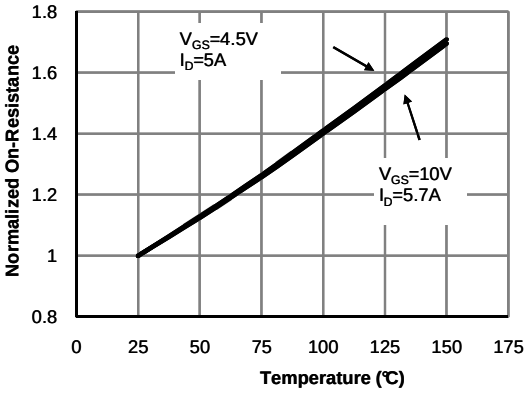


Figure 4: On-Resistance vs. Junction Temperature

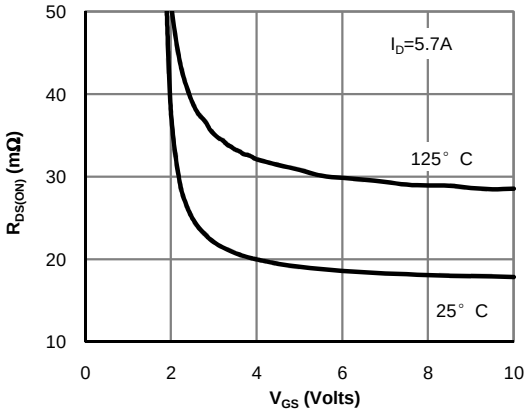


Figure 5: On-Resistance vs. Gate-Source Voltage

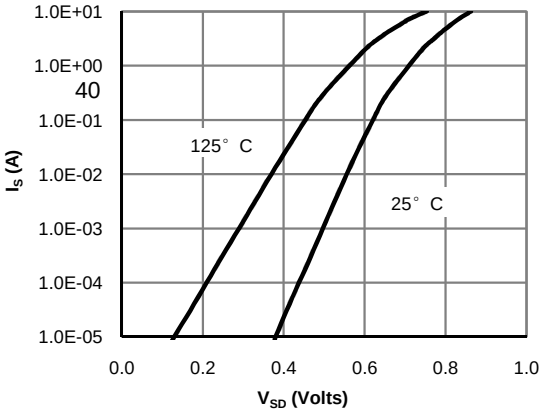


Figure 6: Body-Diode Characteristics

Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-1.0	-1.6	-2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-4.3A		40	50	mΩ
		V_{GS}=-4.5V, I_D=-3A		58	70	mΩ
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-3A		8		S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=-15V,V_{GS}=0 V, F=1.0MHz		520		pF
C_{oss}	Output Capacitance			100		pF
C_{rss}	Reverse Transfer Capacitance			65		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V,I_D=-1 A, V_{GS}=-10V, R_G=3Ω		7.5		nS
t_r	Turn-on Rise Time			5.5		nS
$t_{d(off)}$	Turn-Off Delay Time			19		nS
t_f	Turn-Off Fall Time			7		nS
Q_g	Total Gate Charge	V_{DS}=-15V,I_D=-4.3 A, V_{GS}=-10V		9.2		nC
Q_{gs}	Gate-Source Charge			4.6		nC
Q_{gd}	Gate-Drain Charge			1.6		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=-1A		0.72	1.4	V
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		5		Ω

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

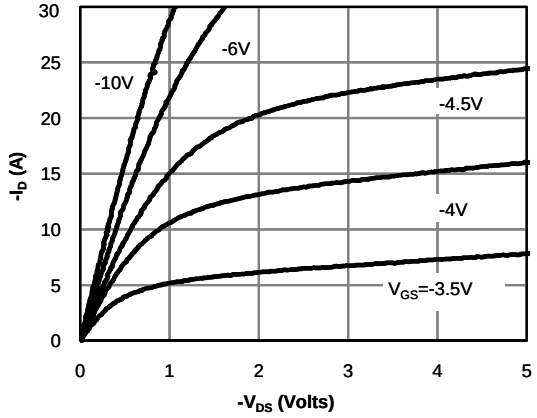


Fig 1: On-Region Characteristics

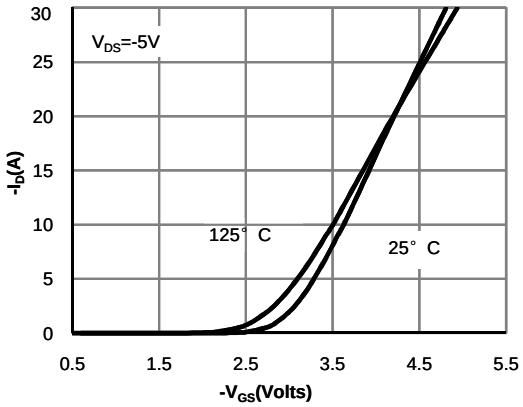


Figure 2: Transfer Characteristics

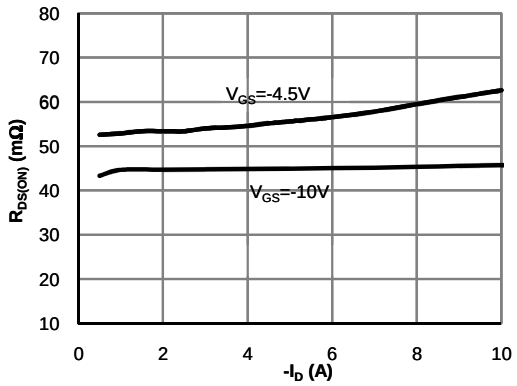


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

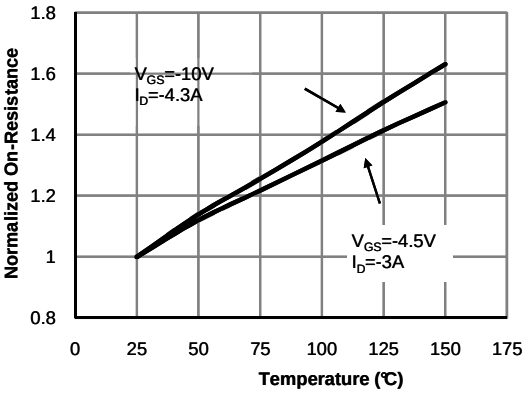


Figure 4: On-Resistance vs. Junction Temperature

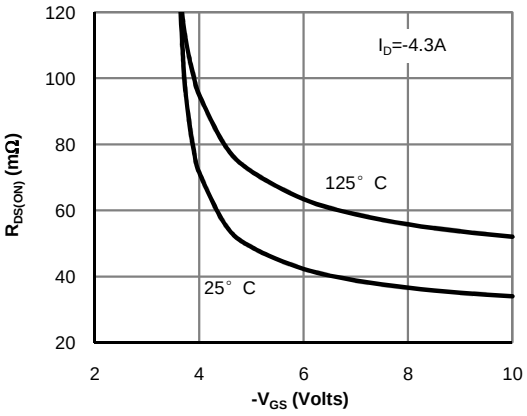


Figure 5: On-Resistance vs. Gate-Source Voltage

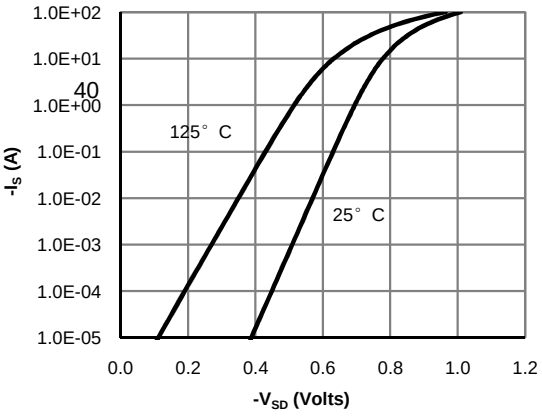
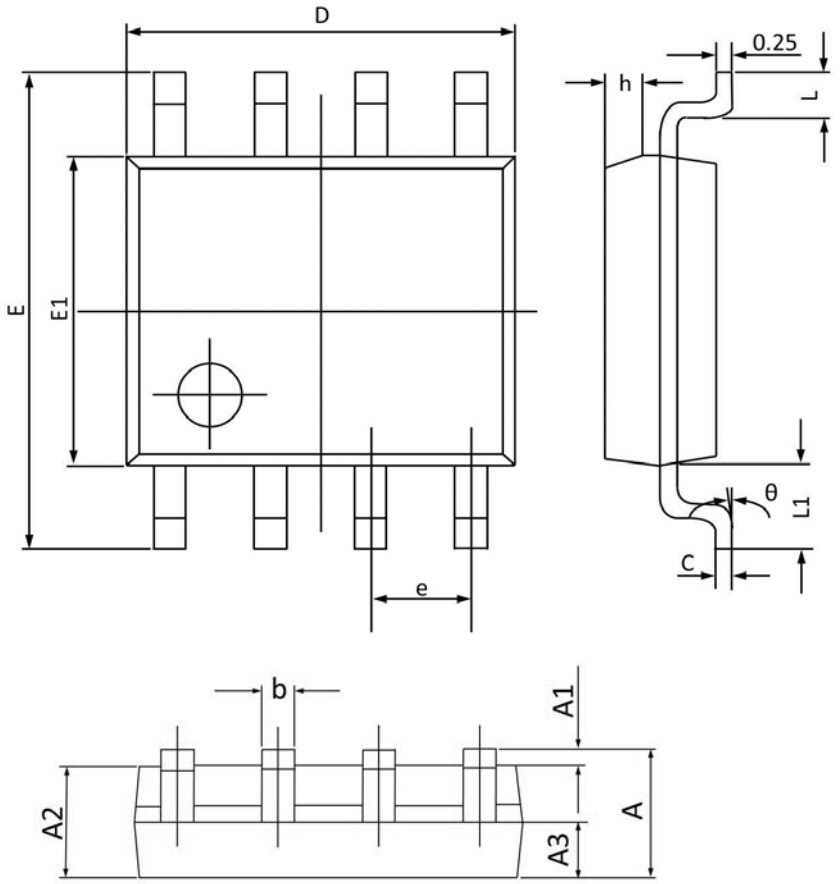


Figure 6: Body-Diode Characteristics

SOP8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°