HBQ1KN130HV

BV_{DSS}	$R_{DS(ON),typ}$
10000 V	130mΩ

10KV N-Channel Silicon Carbide Power MOSFET

Applications

- Medium-VoltageUPSSystem
- Solid-StateTransformers
- SmartGrid/Grid-TieDistributedGeneration
- PulsedPower
- NuclearPowerGenerationforAIDataCenters

Features

- AdvancedSiCMOSFETTechnology
- $R_{DS(ON),typ}$=130mΩ@V_{GS}=18V,I_D =20A
- Extremelyhighbreakdownvoltagecapability(＞10000V)
- Easytoparallelandsimpletodrive

Absolute Maximum Ratings

T_J=25°C unlessotherwisespecified

Symbol	Parameter	Value	Unit
$V_{DS(max)}$	Drain-to-Source Voltage	10000	V
$V_{GS(max)}$	Maximum Gate-to-Source Voltage	-10/+25	

Caution: Stresses greater than those listed in the “Absolute Maximum Ratings” may cause permanent damage to the device.

HBQ1KN130HV

Electrical Characteristicson Wafer Level

OFF Characteristics

T_J=25℃ unlessotherwisespecified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	10000			V	V_{GS}=0V, I_D=100uA
I_{DSS}	Drain-to-Source Leakage Current		50	500	nA	V_{DS}=10000V, V_{GS}=0V
I_{GSS+}	Gate-to-Source Leakage Current		20		nA	V_{GS}=20V, V_{DS}=0V
I_{GSS+}	Gate-to-Source Leakage Current		20		nA	V_{GS}=20V, V_{DS}=0V, T_{VJ}=175℃
I_{GSS-}	Gate-to-Source Leakage Current		-20		nA	V_{GS}=-5V, V_{DS}=0V
I_{GSS-}	Gate-to-Source Leakage Current		-20		nA	V_{GS}=-5V, V_{DS}=0V, T_{VJ}=175℃

ON Characteristics

T_J =25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	130	150	mΩ	V_{GS}=15V, I_D=20A
		-	460	500	mΩ	V_{GS}=15V, I_D=20A, T_{VJ}=175℃
		-	130	150	mΩ	V_{GS}=18V, I_D=20A
		-	460	500	mΩ	V_{GS}=18V, I_D=20A, T_{VJ}=175℃
$V_{GS(TH)}$	Gate Threshold Voltage	3.0	4.0	5.0	V	V_{DS} = V_{GS}, I_D=10mA
			2.5		V	V_{DS} = V_{GS}, I_D=10mA, T_{VJ}=175℃
V_{SD}	Body Diode Forward Voltage		4.2		V	I_S=10A, V_{GS}=-3V

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance		18000		pF	V_{GS}=0V,V_{DS}=3000V, f=100KHz
C_{rss}	Reverse Transfer Capacitance		15			
C_{oss}	Output Capacitance		212			

HBQ1KN130HV

Electrical characteristics diagram

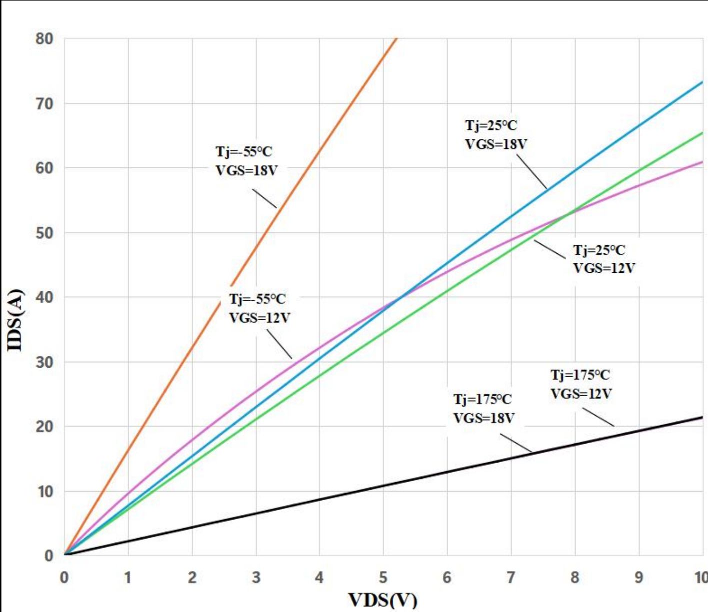
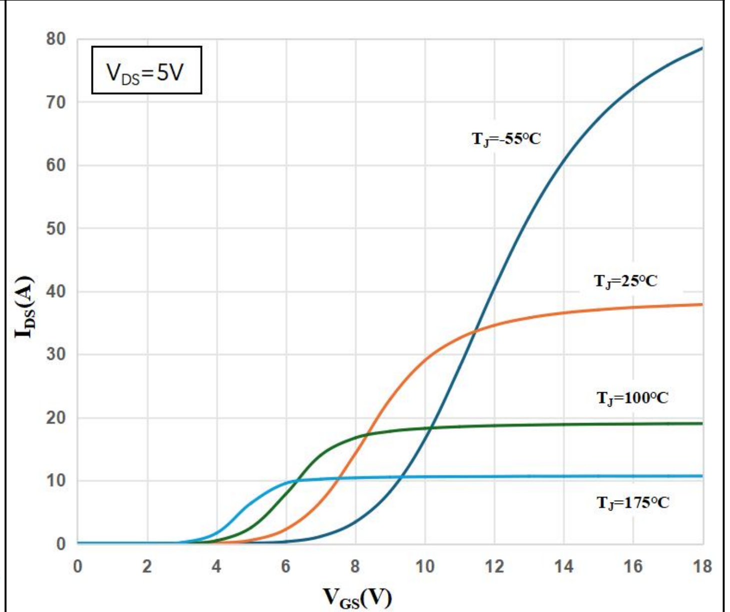
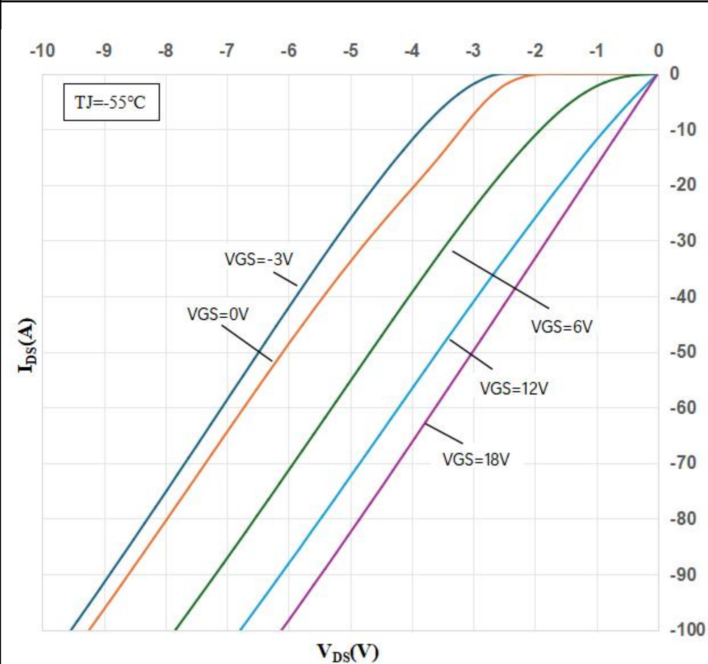
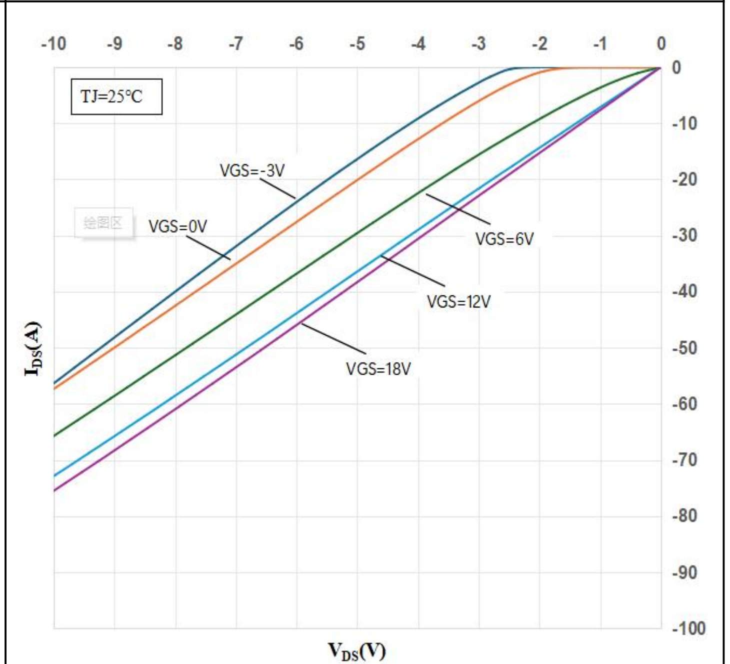
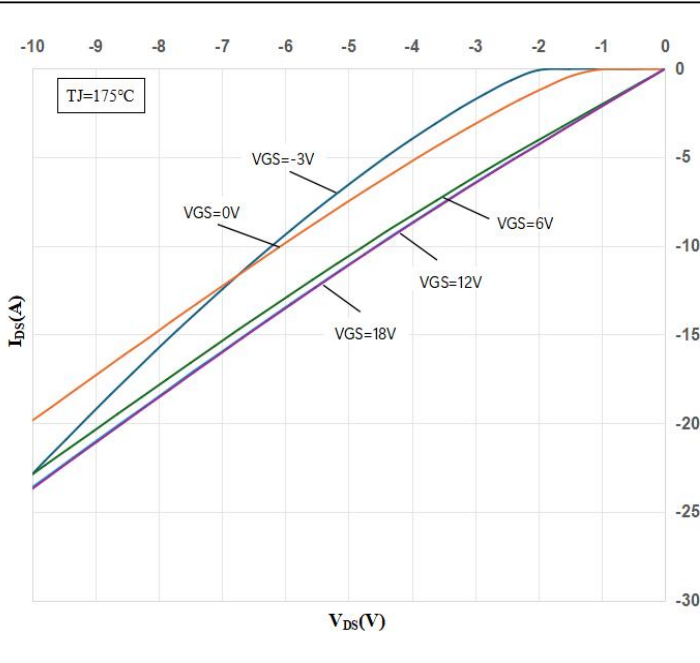
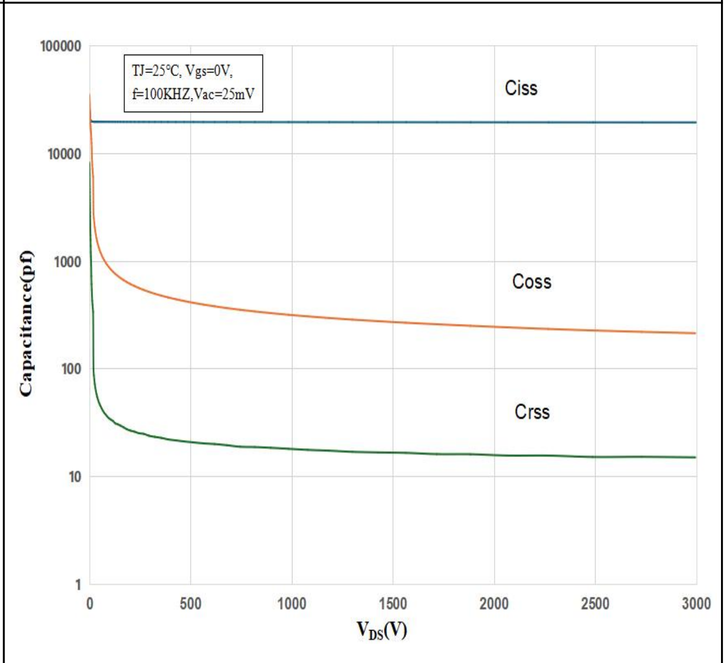
Diagram 1: Typ. output characteristics	Diagram 2: Typ. transfer characteristics
	
I_D=f(V_{DS});T_j=-55°C,25°C,175°C; parameter: V_{GS}; VGS=12,18V	I_D=f(V_{GS}); V_{DS} =5V; parameter: T_j

Diagram 3: Typical Body Diode Characteristics at Tj=-55C	Diagram 4: Typical Body Diode Characteristics at Tj=25C
	
I_{SD}=f(V_{SD});T_j=-55°C	I_{SD}=f(V_{SD});T_j=25°C

HBQ1KN130HV

<table>
<tr><th>Diagram 5: Typical Body Diode Characteristics at Tj=175C</th><th>Diagram 6: Typ. Capacitance as a function of drain-source</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>I_{SD}=f(V_{SD});T_j=175°C</td><td>C=f(V_{DS});V_{GS}=0V; f=100KHz</td></tr>
</table>

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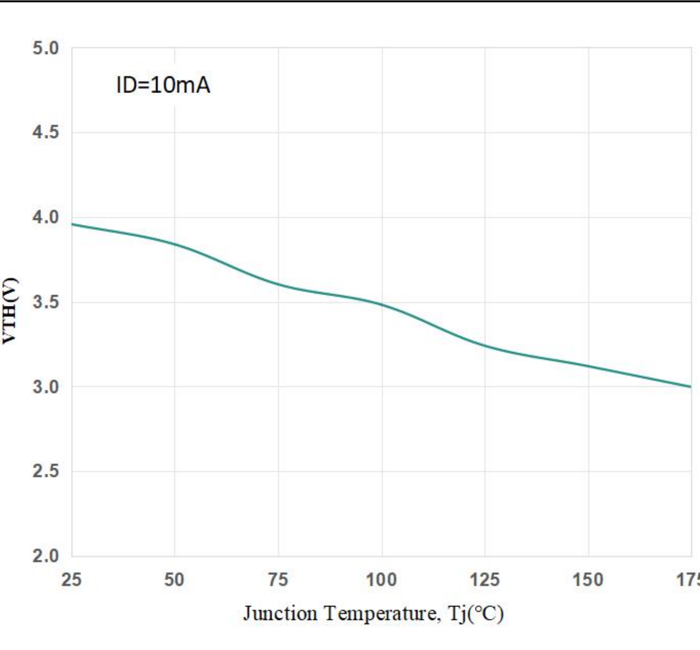
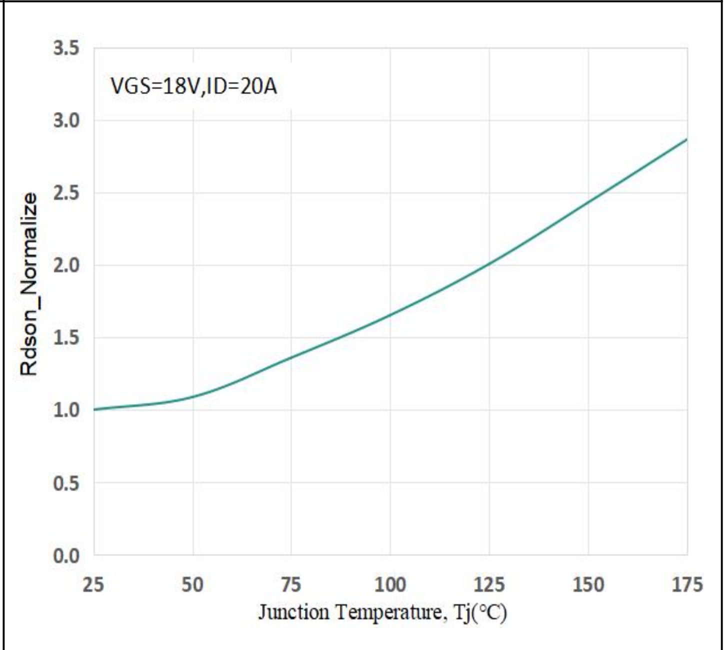
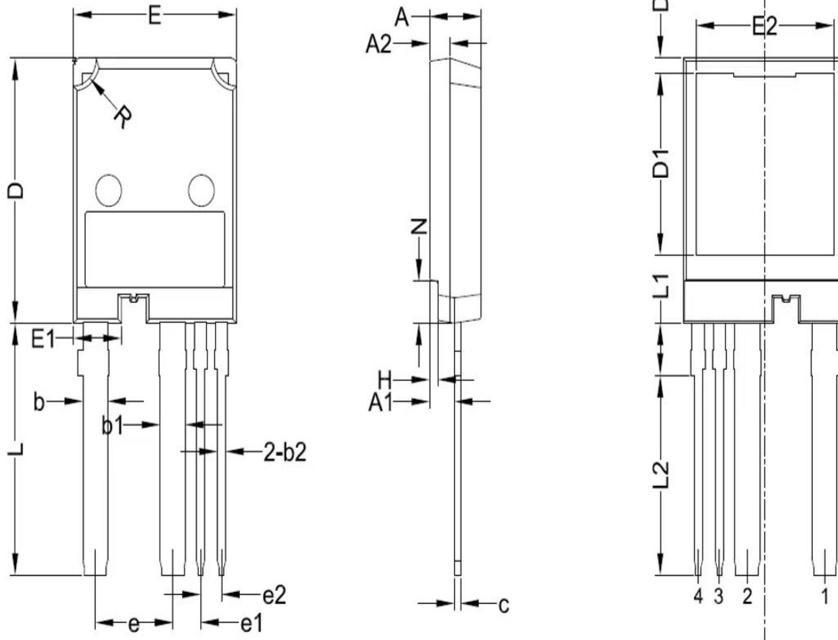
<tr><th>Diagram 7: Typical gate-source threshold voltage as a function of junction temperature</th><th>Diagram 8: Normalized on-resistance vs. junction temperature</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>$V_{GS(th)}$=f(T_j); I_{DS}=10mA; V_{GS}=V_{DS}</td><td>$R_{DS(ON)}$=f(T_j); Vgs=18V; I_{DS}=20A</td></tr>
</table>

HBQ1KN130HV



DIMENSION	MILLIMETERS		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.90	2.00	2.10
b	2.25	2.40	2.55
b1	2.35	2.50	2.65
b2	0.65	0.80	0.95
c	0.50	0.60	0.70
D	20.70	21.00	21.30
D1	14.24	14.44	14.64
D2	0.98	1.18	1.38
E	15.50	15.80	16.10
E1	4.43	4.63	4.83
E2	13.17	13.37	13.57
e	7.32	7.52	7.72
e1	2.49	2.69	2.89
e2	1.84	2.04	2.24
H	0.70	0.80	0.90
L	19.70	20.00	20.30
L1	4.04	4.14	4.24
L2	15.56	15.86	16.16
N	3.22	3.32	3.42
R	2.10	2.20	2.30