

SC120N120H7-R

Silicon Carbide MOSFET 1200V, 120mΩ, 19A



重庆平伟半导体股份有限公司

Features

- Low switching losses
- Extremely low on-resistance $R_{DS(on)}$
- Robust body diode operation under hard commutation events
- Easy to Parallel and Simple to Drive
- Qualified according to JEDEC criteria

Applications

- High Voltage DC/DC Converters
- EV Charging
- Online UPS / Industrial UPS
- String inverter
- Energy storage systems (ESS)

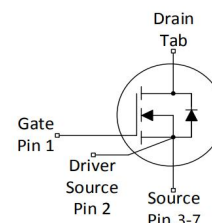
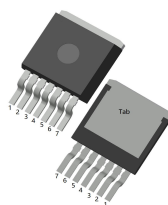


100% DVDS Tested
100% Avalanche Tested

Product Summary

V_{DS}	1200V
$R_{DS(on)}$ typ.	120mΩ
I_D	19A

TO-263-7H



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC120N120H7-R	SC120N120H7	TO-263-7H	Tape	13	24	800pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_D	19 13	A
Pulsed drain current ($T_C = 25^\circ\text{C}$)	$I_{D \text{ pulse}}$	57	A
Avalanche energy, single pulse ($L=5\text{mH}$)	E_{AS}	63	mJ
Gate-Source voltage,max.transient voltage	V_{GSmax}	-8/+22	V
Recommended operating values	V_{GSsop}	-5/+18	V
Power dissipation $T_C = 25^\circ\text{C}$	P_{tot}	50	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sold}	260	$^\circ\text{C}$

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Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	RthJC	-	-	3.0	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	40	°C/W	-

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV _{DSS}	1200	-	-	V	V _{GS} =0V, I _D =250uA
Gate threshold voltage	V _{GS(th)}	2.2	3.2	4.2	V	V _{DS} =V _{GS} , I _D =2.5mA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =1200V, V _{GS} =0V T _j =25°C
		-	-	100	μA	T _j =175°C
Gate-source leakage current	I _{GSS}	-	-	200	nA	V _{GS} =18V, V _{DS} =0V
		-	-	-100	nA	V _{GS} =-5V, V _{DS} =0V
Drain-source on-state resistance	R _{DS(on)}	-	120	160	mΩ	V _{GS} =18V, I _D =10A
Transconductance	g _{fs}	-	9	-	S	V _{DS} =20V, I _D =13A

Dynamic Characteristic

Input Capacitance	C _{iss}	-	973	-	pF	V _{GS} =0V, V _{DS} =800V, f=1MHz
Output Capacitance	C _{oss}	-	40	-		
Reverse Transfer Capacitance	C _{rss}	-	5.1	-		
Gate Total Charge	Q _G	-	45	-	nC	V _{DS} =800V, I _D =10A , V _{GS} =-5/18V
Gate-Source charge	Q _{gs}	-	20	-		
Gate-Drain charge	Q _{gd}	-	12	-		
Turn-on delay time	t _{d(on)}	-	20	-	ns	V _{GS} =-5/18V, V _{DD} =800V, R _{G_ext} =0Ω, I _D =10A Timing relative to V _{DS}
Rise time	t _r	-	45	-		
Turn-off delay time	t _{d(off)}	-	20	-		
Fall time	t _f	-	15	-		
Gate resistance	R _G	-	6.5	-	Ω	V _{GS} =0V, V _{DS} =0V, f=1MHz

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	4.0	-	V	$V_{GS}=0V, I_{SD}=10A$ $T_j=25^{\circ}C$
		-	3.6	-		$T_j=175^{\circ}C$
Body Diode Continuous Forward Current	I_S	-	-	14	A	TC = 25°C
Body Diode Pulsed Current	I_S pulse	-	-	56	A	TC = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	10	-	ns	$V_{GS}=-5V, I_{SD}=10A,$ $V_R=800V$
Body Diode Reverse Recovery Charge	Q_{rr}	-	40	-	nC	$dI/dt=1200A/\mu s$

Typical Performance Characteristics

Fig 1: Output Characteristics $T_j=25^{\circ}\text{C}$

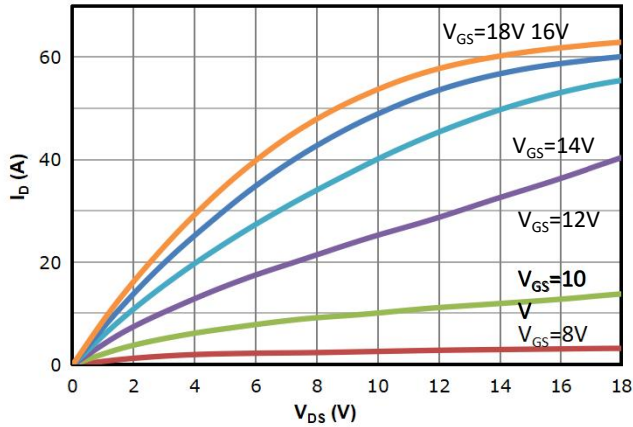


Fig 2: Output Characteristics $T_j=175^{\circ}\text{C}$

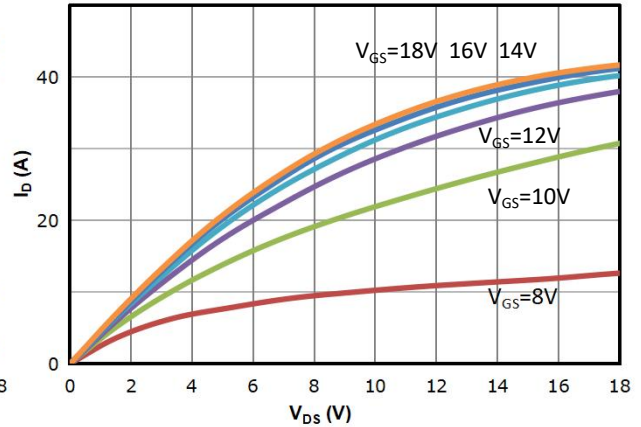


Fig 3: Transfer Characteristics

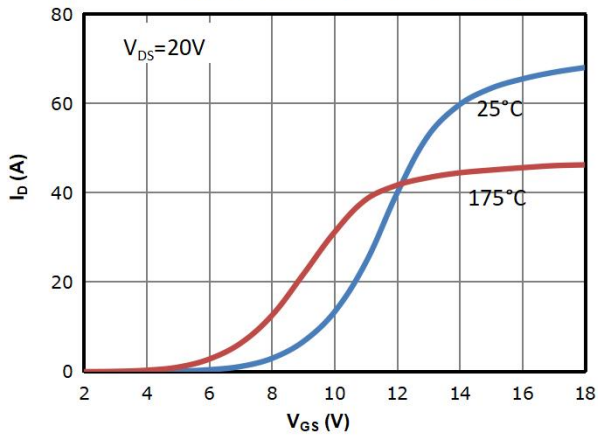


Fig 4: $R_{DS(on)}$ vs Drain Current and Gate Voltage

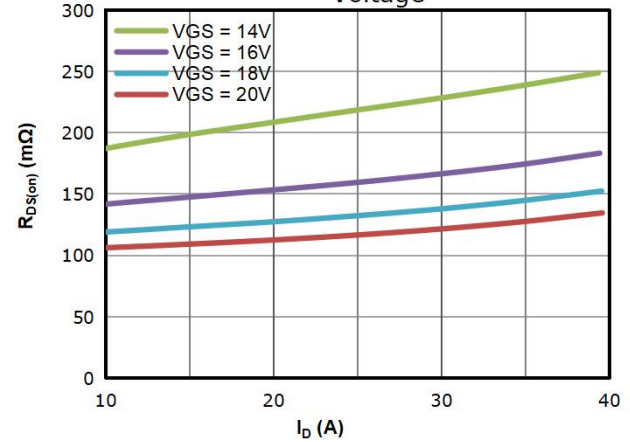


Fig 5: $R_{DS(on)}$ vs. Temperature

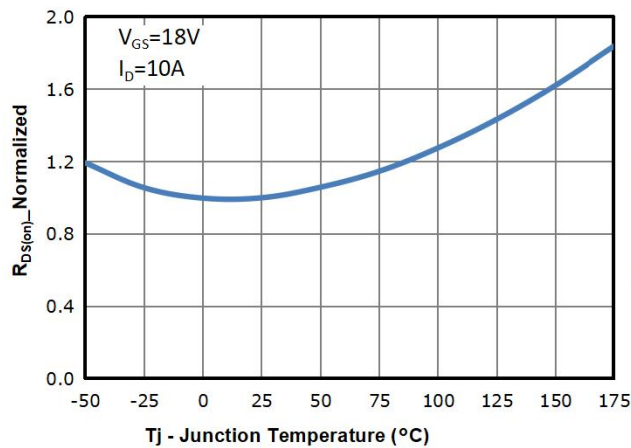


Fig 6: $V_{GS(th)}$ vs. Temperature

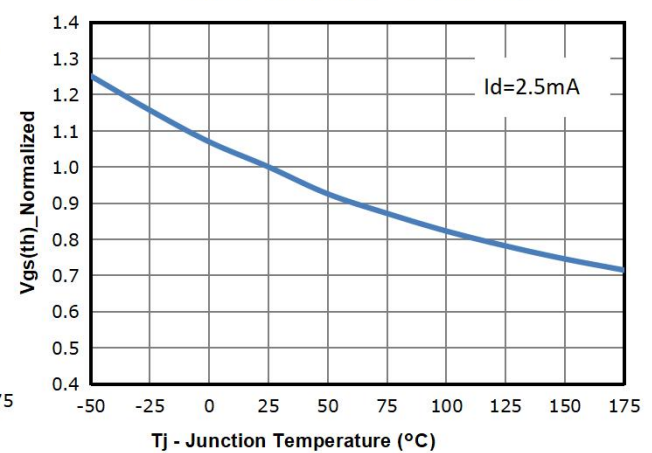


Fig 7: BVdss vs. Temperature

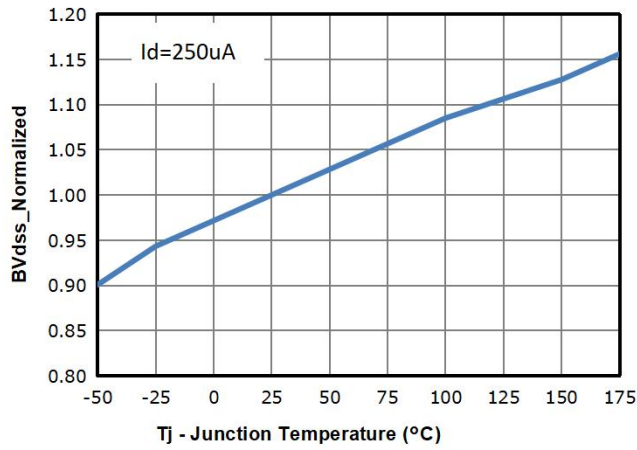


Fig 8: Capacitance Characteristics

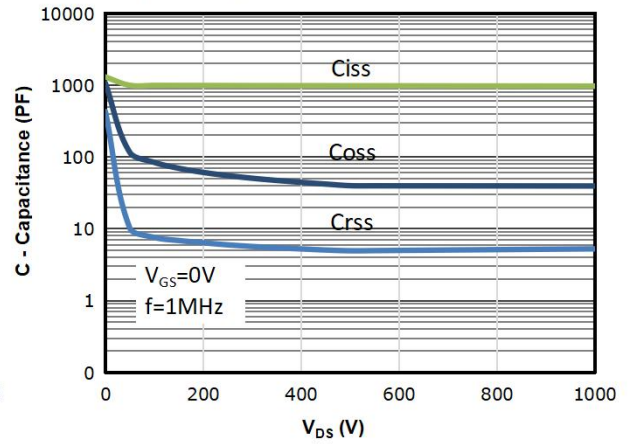


Fig 9: Gate Charge Characteristics

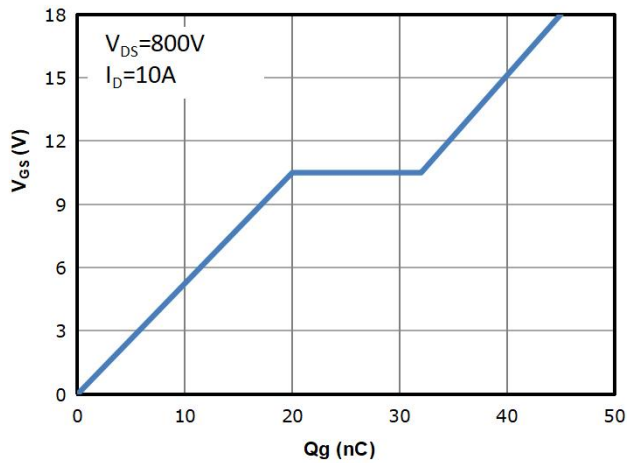


Fig 10: Body-diode Forward Characteristics

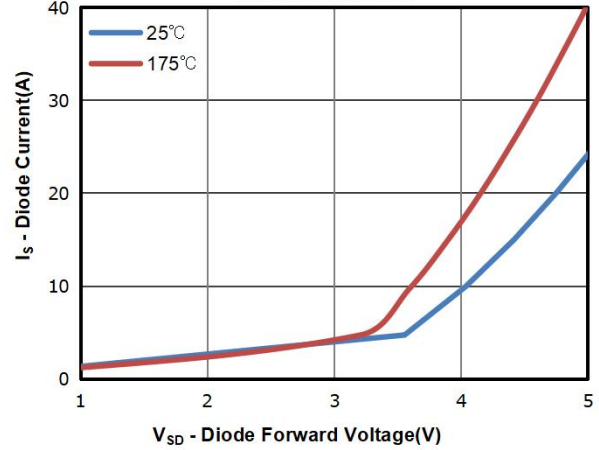


Fig 11: Power Dissipation

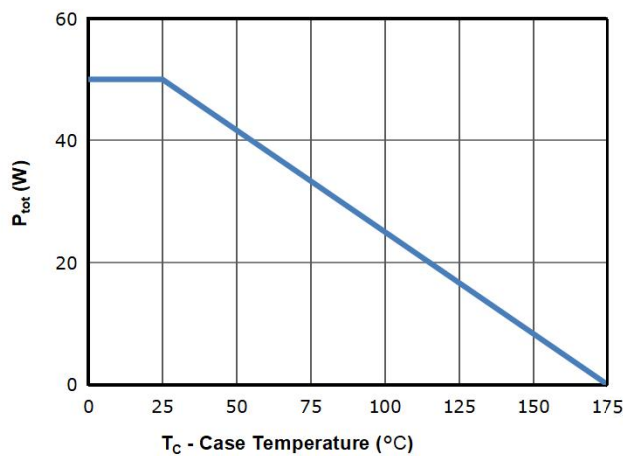
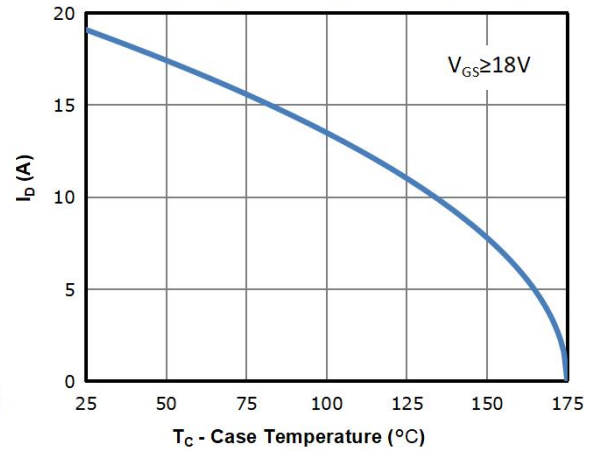


Fig 12: Drain Current Derating



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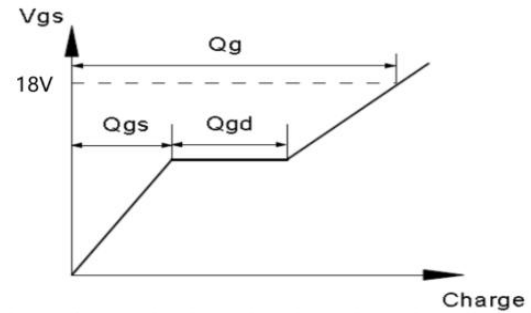
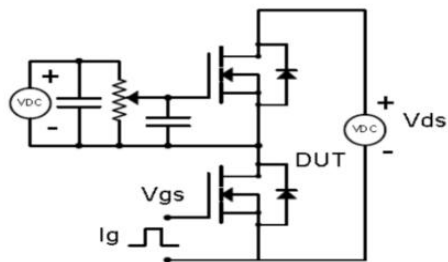
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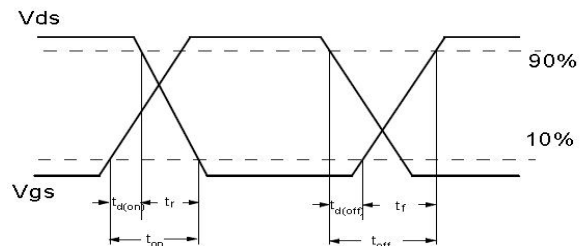
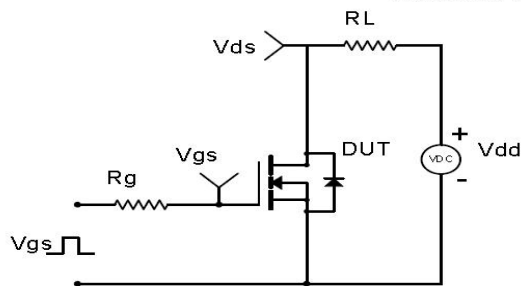
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Test Circuit & Waveform

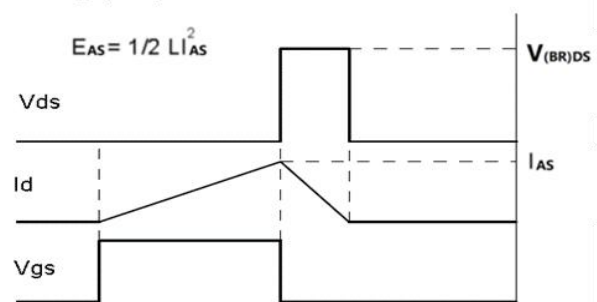
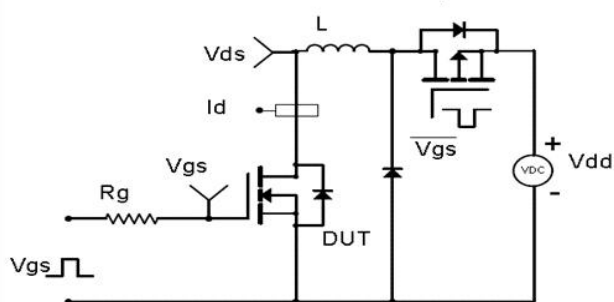
Gate Charge Test Circuit & Waveform



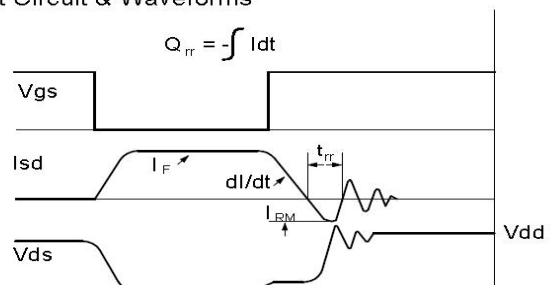
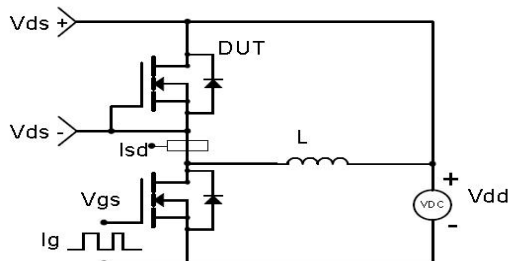
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



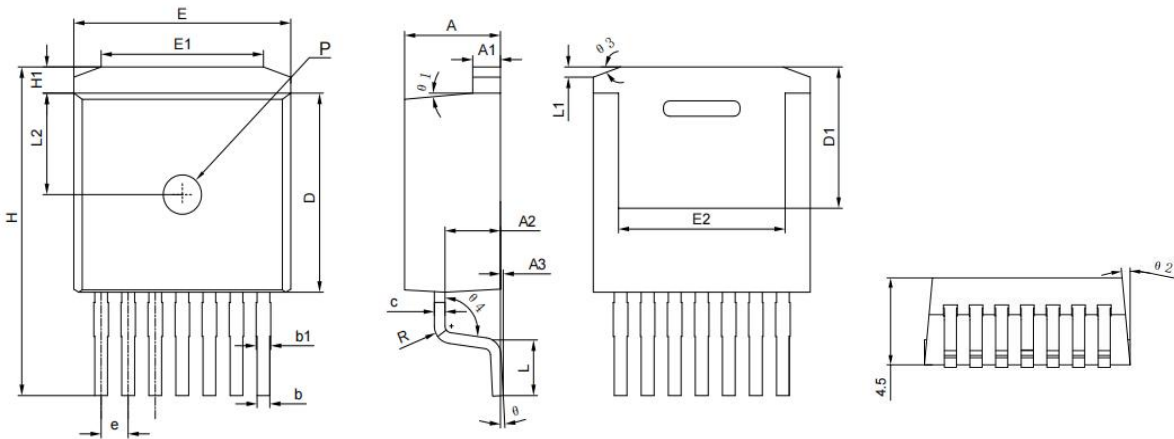
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Package Outline: TO-263-7H



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
A1	1.25	1.40	0.049	0.055
A2	2.45	2.70	0.096	0.106
A3	0.05	0.20	0.002	0.008
b	0.50	0.70	0.020	0.028
b1	0.60	0.85	0.024	0.033
c	0.45	0.60	0.018	0.024
D	8.88	9.28	0.350	0.365
D1	5.80	6.40	0.228	0.252
E	9.18	10.28	0.361	0.405
E1	6.67	7.47	0.263	0.294
E2	6.90	7.60	0.272	0.299
e	1.27		0.050	
H	14.80	15.20	0.583	0.598
H1	1.10	1.30	0.043	0.051
L	2.35	2.75	0.093	0.108
L1	0.37	0.77	0.015	0.030
L2	4.48	4.78	0.176	0.188
θ	0°	5°	0°	5°
θ1	3°	7°	3°	7°
θ2	3°	7°	3°	7°
θ3	15°	25°	15°	25°
θ4	93°	100°	93°	100°
R	0.75	0.85	0.030	0.033
p	1.70	1.90	0.067	0.075

Disclaimer

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