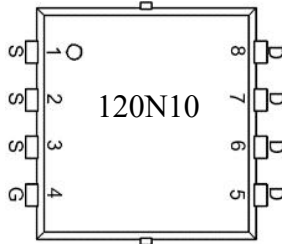
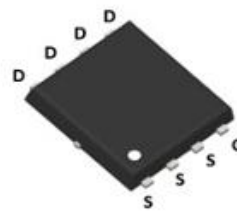


Features	B_{vds}	$R_{ds(on)}$	I_D
➤ Split Gate Trench MOSFET technology ➤ Excellent package for heat dissipation ➤ High density cell design for low $R_{DS(ON)}$	100V	3.6mΩ	120A
	Application ➤ DC-DC Converters ➤ Power management functions ➤ Synchronous-rectification applications		

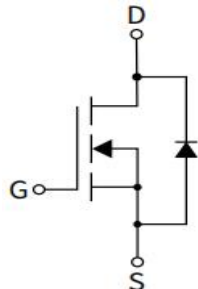
Package



Marking and pin assignment



PDFN5x6-8L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
120N10	HLS120N10F	PDFN5x6-8L	5000

Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current, $V_{GS}@10V^1$	$T_C=25^\circ C$	I_D	120	A
	$T_C=100^\circ C$		81	
Pulsed Drain Current ²		I_{DM}	512	A
Single Pulsed Avalanche Energy ³		EAS	486	mJ
Avalanche Current		I_{AS}	67	A
Total Power Dissipation ⁴		P_D	178	W
Junction Temperature		T_J	-55 ~ 150	$^\circ C$
Storage Temperature		T_{STG}	-55 ~ 150	$^\circ C$

Thermal Resistance Ratings

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance,Junction-to-Case ¹	R _{θJC}	-	0.8	°C/W
Thermal Resistance,Junction-to-Ambient ¹	R _{θJA}	-	56	°C/W



Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLS120N10F	PDFN5x6-8L	4	5,6,7,8	1,2,3	Tape Reel

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$	-	-	1	μA
Gate to Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Static Drain-Source on-Resistance ²	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	3.6	4.4	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	-	-	m Ω
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=20A$	-	35	-	S
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	-	1.6	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	4102	-	pF
Output Capacitance	C_{oss}		-	592	-	
Reverse Transfer Capacitance	C_{rss}		-	19.8	-	
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=20A,$ $V_{GS}=10V$	-	69	-	nC
Gate-Source Charge	Q_{gs}		-	24	-	
Gate-Drain("Miller") Charge	Q_{gd}		-	18.5	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=20A,$ $R_G=3\Omega, V_{GS}=10V$	-	18	-	nS
Turn-on Rise Time	t_r		-	23	-	
Turn-Off Delay Time	$t_{d(off)}$		-	37	-	
Turn-Off Fall Time	t_f		-	15.7	-	
Continuous Source Current ^{1,5}	I_S	$V_G=V_D=0V, \text{Force Current}$	-	-	120	A
Diode Forward Voltage ²	V_{SD}	$V_{GS}=0V, I_S=1A$	-	-	1.2	V

Notes:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 3.The EAS data shows Max. rating . The test condition is $T_J=25^{\circ}\text{C}$, $L=3\text{mH}$, $I_{AS} = 18A$, $V_{GS}=10V$, $V_{DD}=50V$,
100% test at $L=0.1\text{mH}$, $I_{AS}=67A$.
- 4.The power dissipation is limited by 150°C junction temperature.
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Performance Characteristics

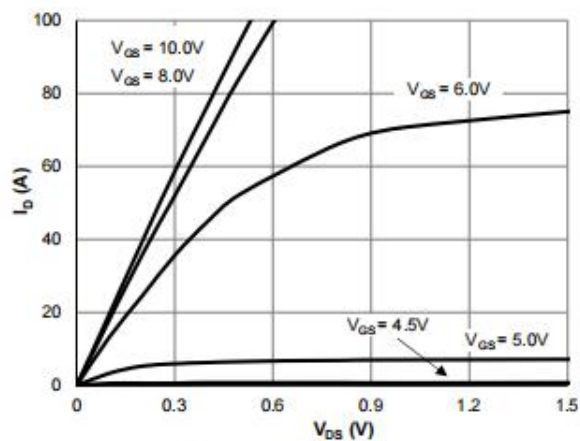


Figure 1: Saturation Characteristics

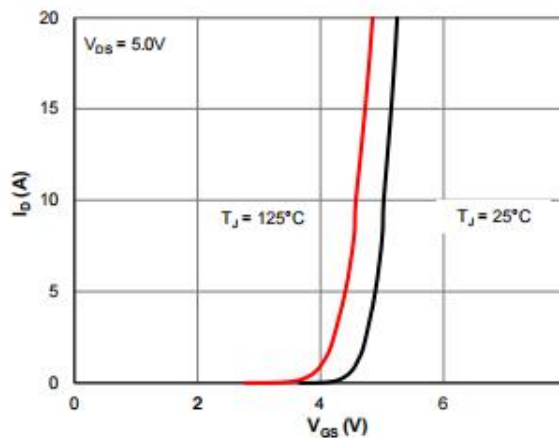
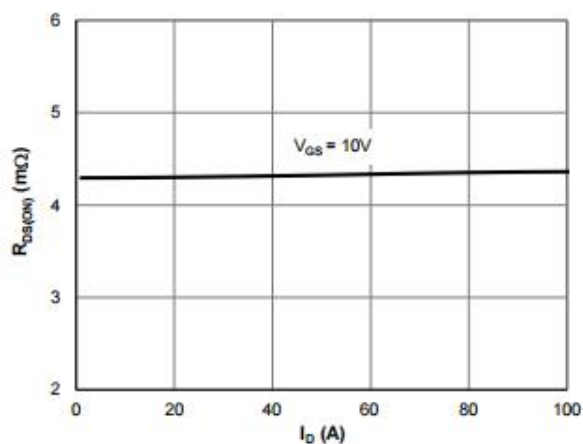
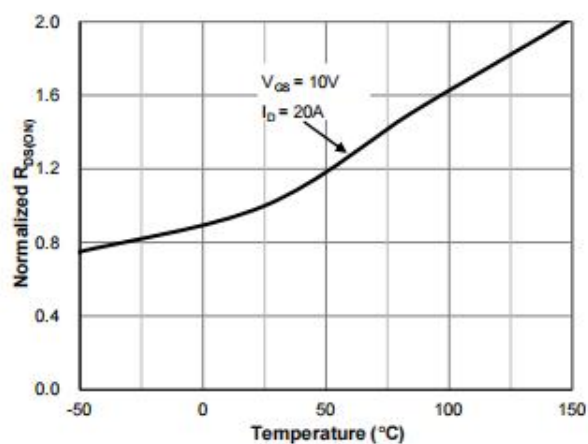
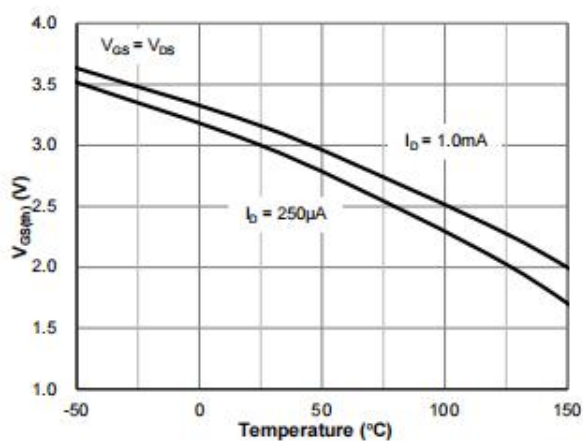
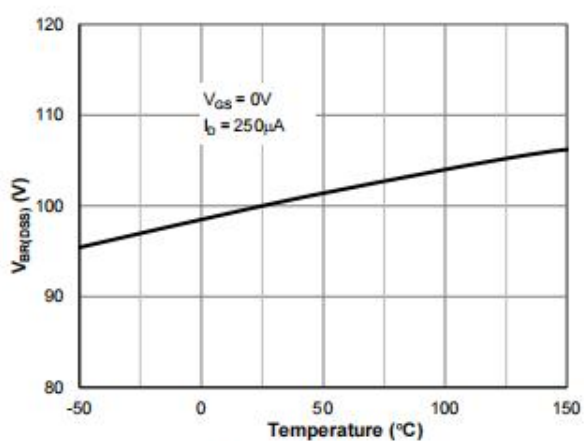


Figure 2: Transfer Characteristics

Figure 3: $R_{DS(on)}$ vs. Drain CurrentFigure 4: $R_{DS(on)}$ vs. Junction TemperatureFigure 5: $V_{GS(th)}$ vs. Junction TemperatureFigure 6: $V_{BR(DSS)}$ vs. Junction Temperature

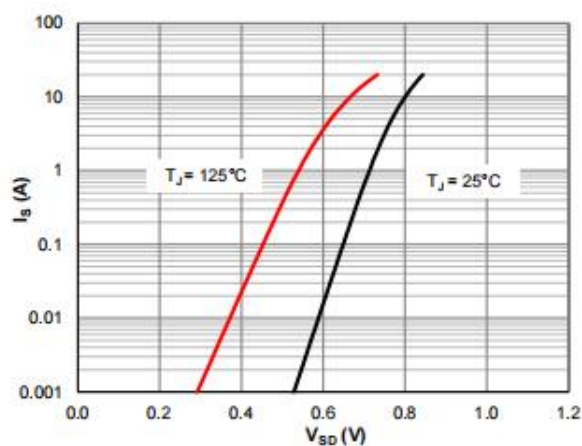


Figure 7: Body-Diode Characteristics

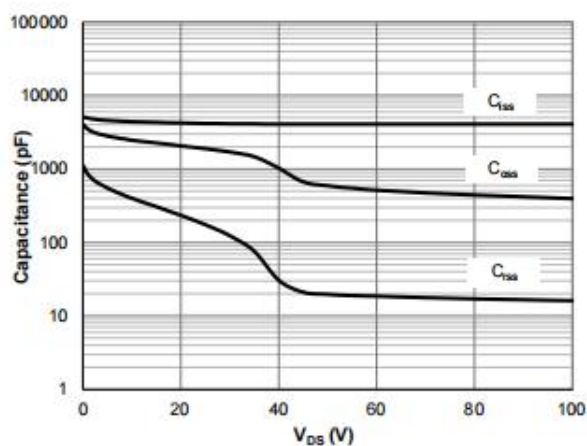


Figure 8: Capacitance Characteristics

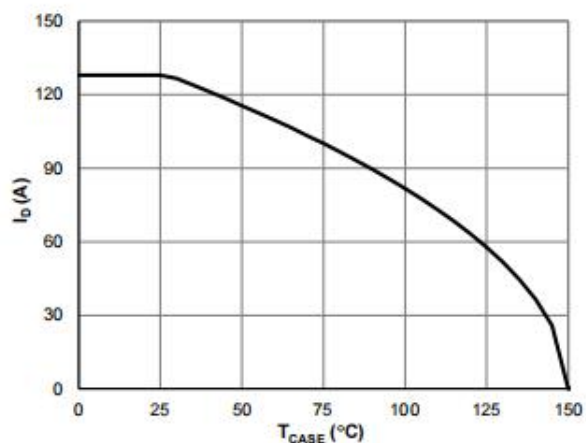


Figure 9: Current De-rating

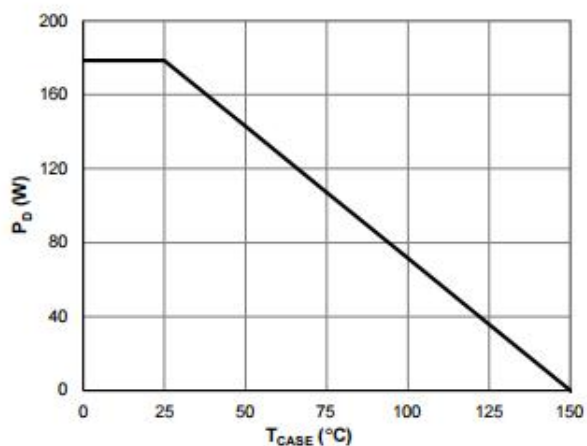


Figure 10: Power De-rating

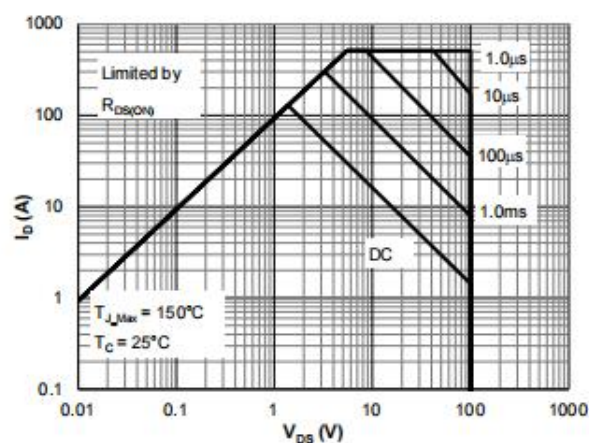


Figure 11: Maximum Safe Operating Area

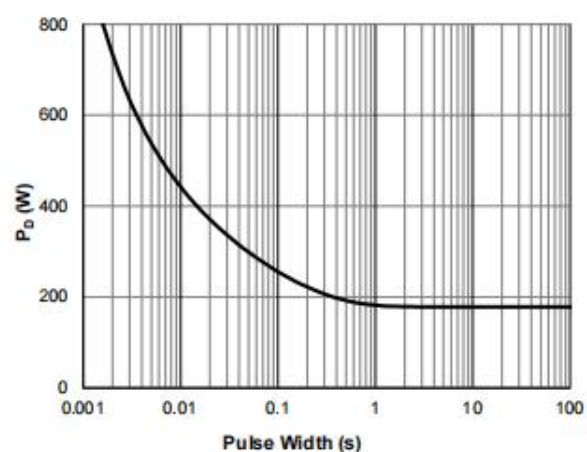


Figure 12: Single Pulse Power Rating, Junction-to-Case

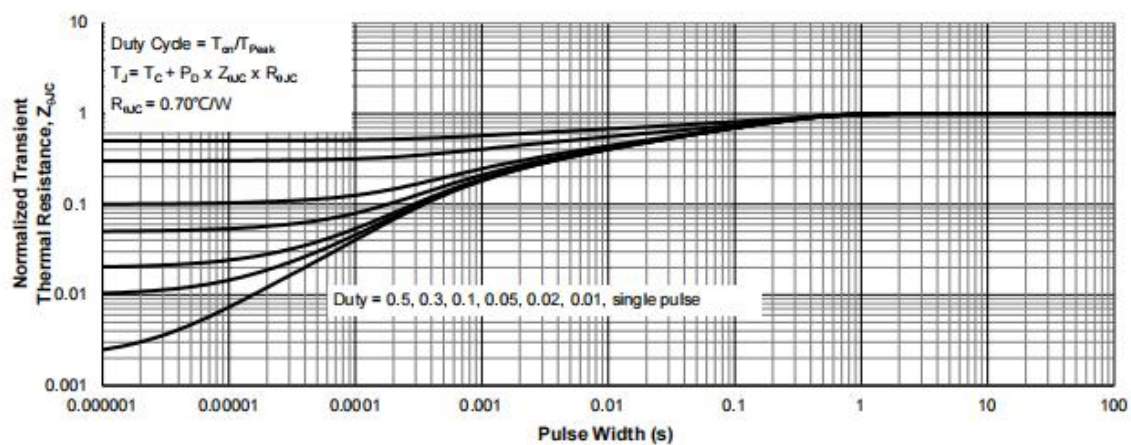
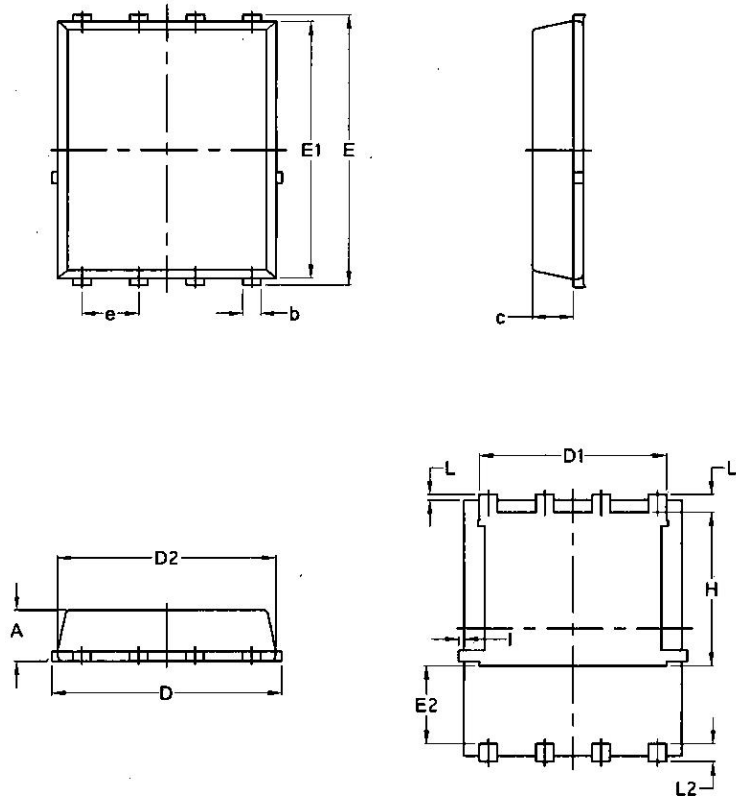


Figure 13: Normalized Maximum Transient Thermal Impedance



Package Dimensions PDFN5x6-8L



Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070



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