Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $RDS_{(ON)}$

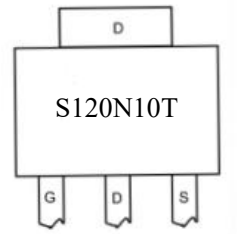
Bvdss	Rdson	ID
100V	4.1mΩ	120A

Application

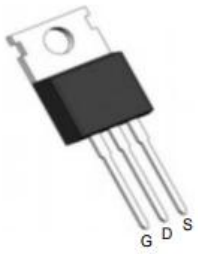
- DC-DC Converters
- Power management function
- Synchronous-rectification applications

RoHS

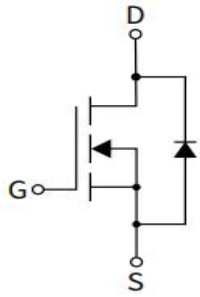
Package



1.Marking and pin assignment



2. TO-220 top view



3.Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
120N10T	S120N10T	TO220	50

Absolute Maximum Ratings (T_C=25℃unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{Gs}	±20	V
Continuous Drain Current (1)	T_C = 25℃	I_D	120	A
	T_C = 100℃	I_D	81	A
Pulsed Drain Current (2)		I_{DM}	512	A
Single Pulsed Avalanche Energy (3)		E_{As}	486	mJ
Power Dissipation(4)	T_C = 25℃	P_d	178	W
	T_C = 100℃		71	W
Junction Temperature		T_J	-55~+150	℃
Storage Temperature		T_{STG}	-55~+150	℃

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient	$R_{\theta JA}$	46	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.7	℃/W

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLS120N10T	TO220	1	2	3	Tube

Electrical Characteristics (T_j=25℃unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain to Source Breakdown Voltage	V(br)dss	I_d= 250μA, V_{gs} = 0V	100	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V	-	-	1.0	μA
		V_{DS} = 80V, V_{GS} = 0V T_J = 55°C	-	-	5.0	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	2	3	4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	-	4.1	5	mΩ
Forward Transconductance	gfs	V_{DS} = 5V, I_D = 20A	-	35	-	S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V	-	0.66	1.0	V
Diode Continuous Current	I_S	T_C = 25°C	-	--	120	A
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz	-	4102	-	pF
Output Capacitance	Coss		-	592	-	pF
Reverse Transfer Capacitance	Crss		-	19.8	-	pF
Gate Resistance	Rg	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz	-	1.6	-	Ω
Turn-ON Delay Time	td(on)	V_{GS} = 10V, V_{DS}= 50V R_L = 2.5, R_{GEN} = 3Ω	-	69	-	ns
Rise Time	tr		-	44	-	ns
Turn-OFF Delay Time	td(off)		-	24	-	ns
Fall Time	tf		-	18.5	-	ns
Total Gate Charge (@ VGS = 10V)	Qg	V_{GS} = 0 to 10V V_{DS}= 50V, I_D = 20A	-	69	-	nC
Total Gate Charge (@ VGS = 6.0V)	Qg		-	44	-	nC
Gate Source Charge	Qgs		-	24	-	nC
Gate Drain Charge	Qgd		-	18.5	-	nC
Body Diode Reverse Recovery Time	Trr	IF = 20A, dIF/dt = 100A/s	-	64	-	ns
Body Diode Reverse Recovery Charge	Qrr		-	126	-	nC

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 150°C.
3. E_{AS} of 486 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = 18A, V_{GS} = 10V, V_{DD} = 50V; 100% test at L = 0.1mH, I_{AS} = 67A.
4. The power dissipation P_D is based on T_{J_Max} = 150°C.

Typical Characteristics

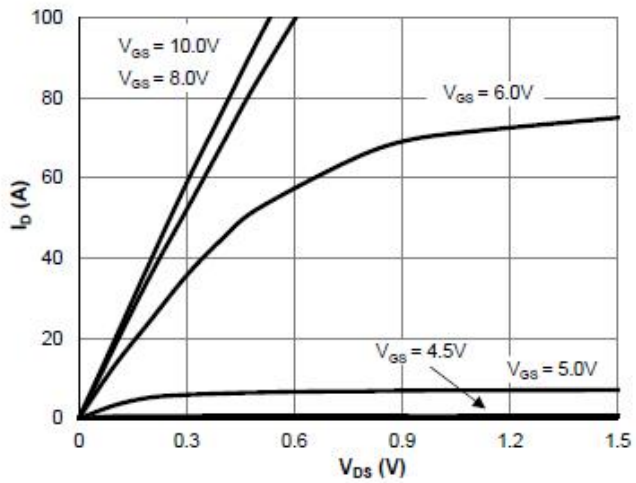


Figure 1: Saturation Characteristics

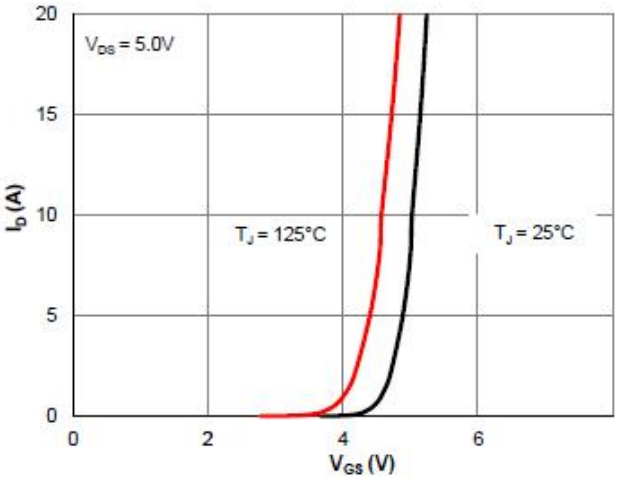


Figure 2: Transfer Characteristics

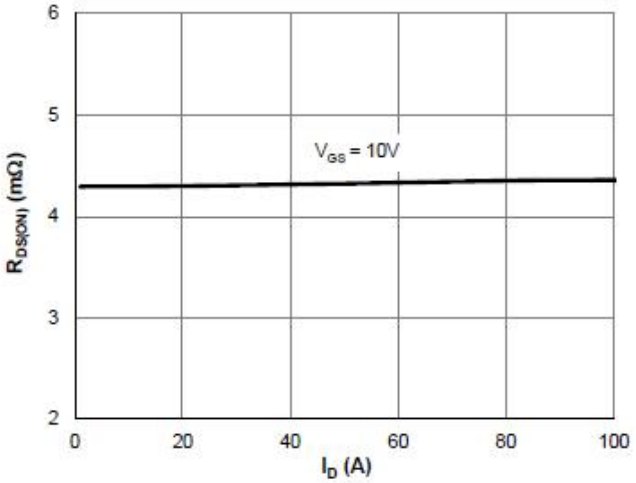


Figure 3: $R_{DS(ON)}$ vs. Drain Current

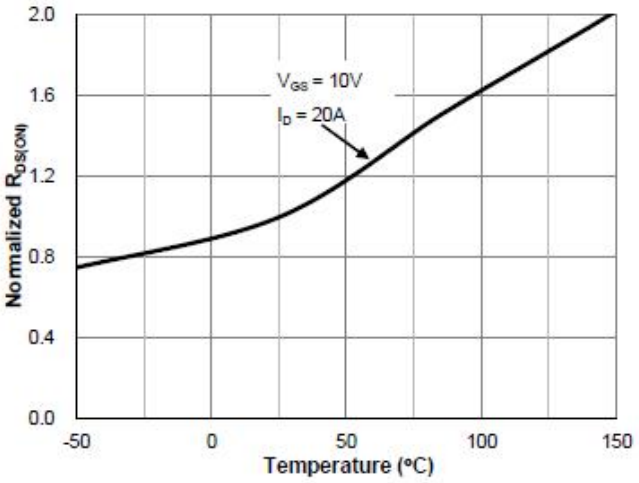


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

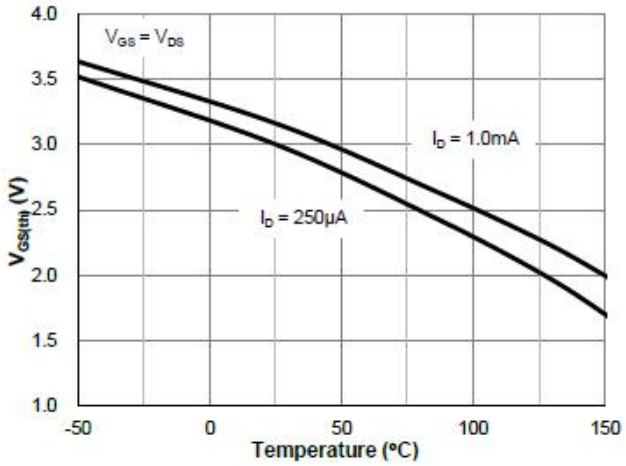


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

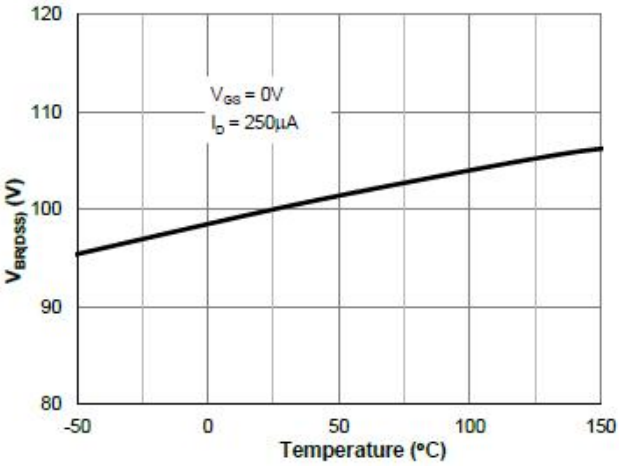


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

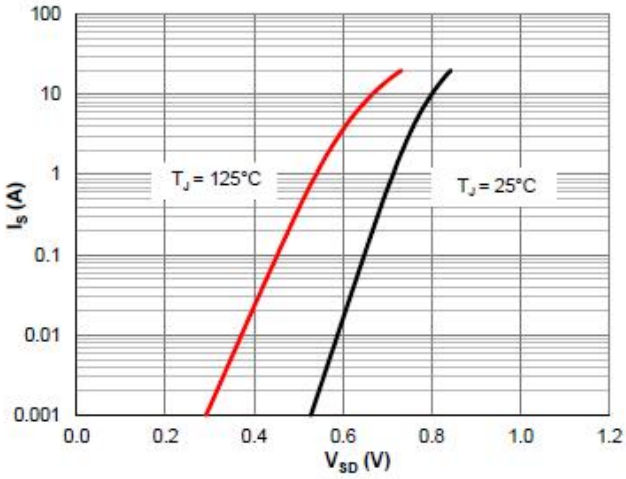


Figure 7: Body-Diode Characteristics

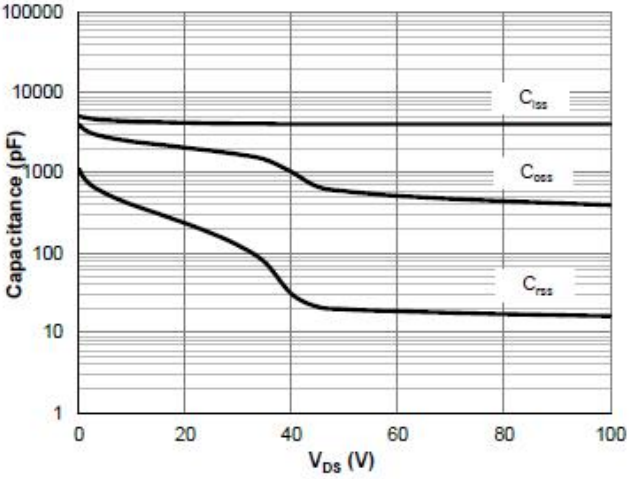


Figure 8: Capacitance Characteristics

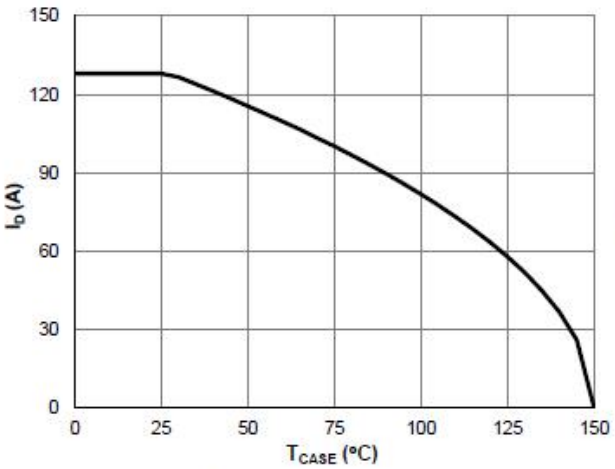


Figure 9: Current De-rating

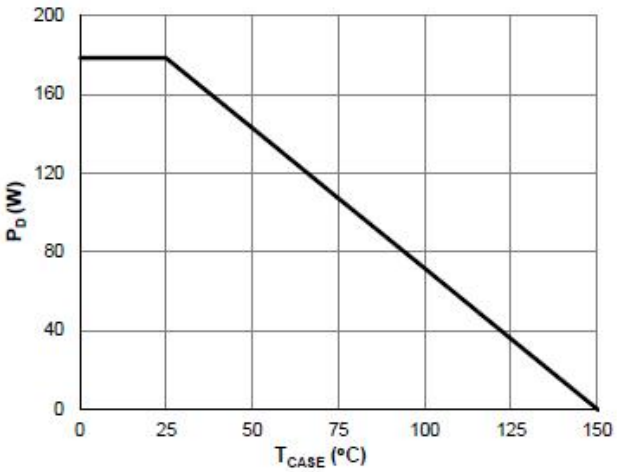


Figure 10: Power De-rating

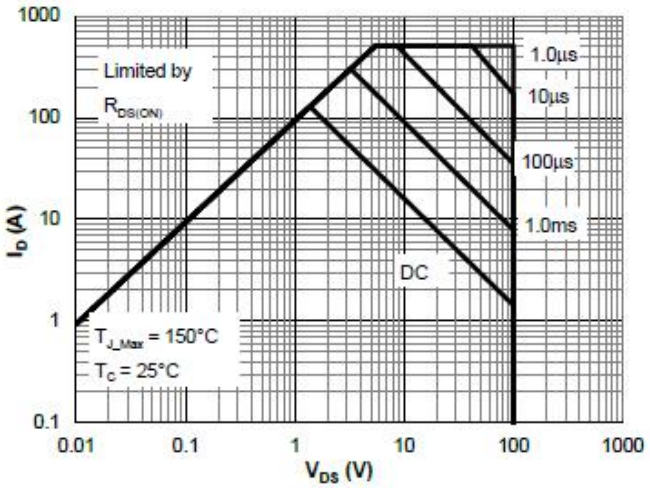


Figure 11: Maximum Safe Operating Area

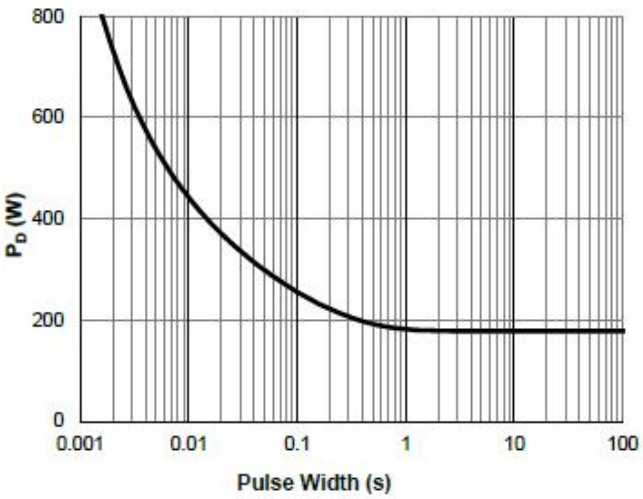


Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Electrical & Thermal Characteristics

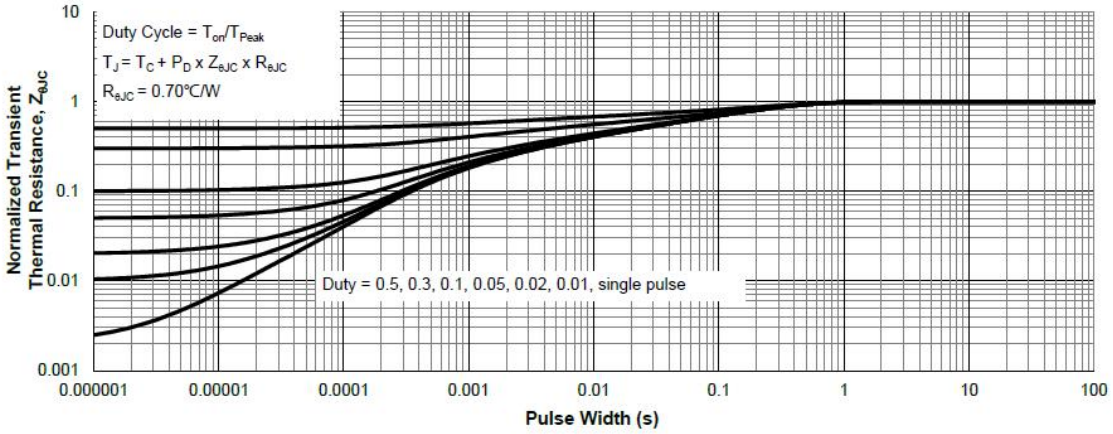
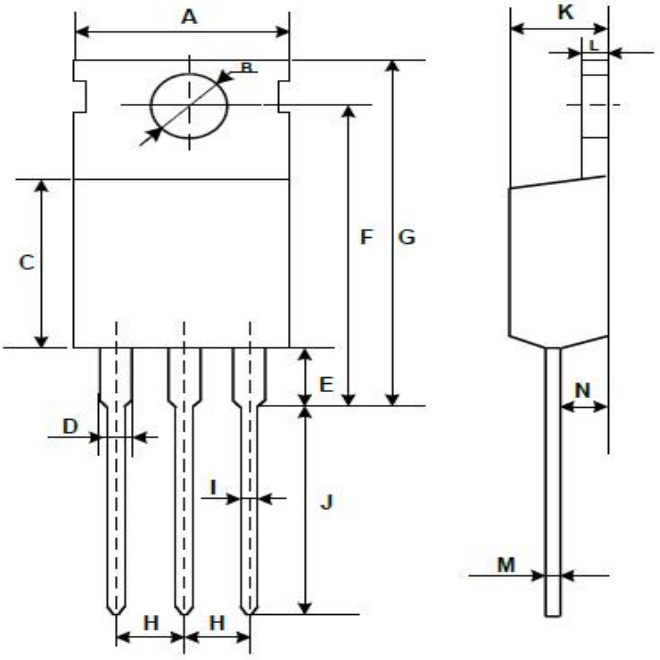


Figure 13: Normalized Maximum Transient Thermal Impedance

Package Dimensions TO-220



OMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.50
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60

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