Features

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

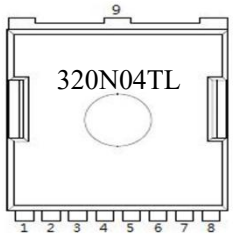
Bvdss	Rdson	ID
40V	0.75mΩ	320A

Application

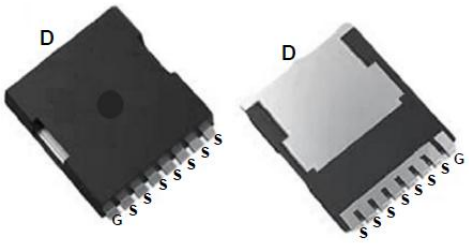
RoHS

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

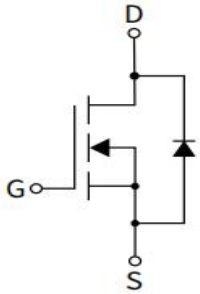
Package



Marking and pin assignment



TOLL-8L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
320N04TL	S320N04TL	TOLL-8L	2000

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{Gs}	±20	V
Continuous Drain Current,V_{GS}@10V[1]	T_C=25℃	I_D	320	A
	T_C=100℃	I_D	160	A
Pulsed Drain Current[2]		I_{DM}	720	A
Single Pulse Avalanche Energy[3]		EAS	450	mJ
Total Power Dissipation[4]	T_C=25℃	P_D	114	W
Operating Junction Temperature Range		T_J	-55 ~ 150	℃
Storage Temperature Range		T_{STG}	-55 ~ 150	℃

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient[1]	$R_{\theta JA}$	55	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	1.1	℃/W

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLS320N04TL	TOLL-8	1	9	2,3,4,5,6,7,8	Tape Reel

Electrical Characteristics (T_J=25℃unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	40	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V,T_J=25℃	-	-	1	μA
	I_{DSS}	V_{DS}=40V,V_{GS}=0V,T_J= 100℃	-	-	100	μA
Gate-body Leakage current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V	-	-	±100	nA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.3	1.7	2.3	V
Drain-Source On-Resistance[2]	$R_{DS(on)}$	V_{GS}=10V,I_D=50A	-	0.75	1.1	mΩ
		V_{GS}=4.5V,I_D=25A	-	1.4	2	mΩ
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V, f=1MHz	-	5500	-	pF
Output Capacitance	C_{oss}		-	1850	-	
Reverse Transfer Capacitance	C_{rss}		-	65	-	
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V, f=1MHz	-	3.5	-	Ω
Total Gate Charge	Q_g	V_{DS}=20V,V_{GS}=10V, I_D=50A	-	87	-	nC
Gate-Source Charge	Q_{gs}		-	18	-	
Gate-Drain Charge	Q_{gd}		-	15	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=20V,I_D=50A, R_G=3Ω,V_{GS}=10V	-	14	-	ns
Rise Time	t_r		-	15	-	
Turn-Off Delay Time	$t_{d(off)}$		-	84	-	
Fall Time	t_f		-	44	-	
Continuous Source Current[1,4]	I_S	V_G=V_D=0V,Force Current	-	-	320	A
Pulsed Source Current[2,4]	I_{SM}		-	-	720	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V,I_S=-1A,T_J=25℃	-	-	1.2	V
Reverse Recovery time	t_{rr}	IF=50A,dI/dt=100A/μs, T_J=25℃	-	55	-	ns
Reverse Recovery Charge	Q_{rr}		-	53	-	nC

Notes:

1.The data tested by surface mounted on a1 inch^2 FR-4 board with 20Z copper.

2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.

3.The EAS data shows Max.rating . The test condition is T_J= 25°C,V_{DD}=25V,V_{GS}=10V, L=0.5mH.

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 Characteristics

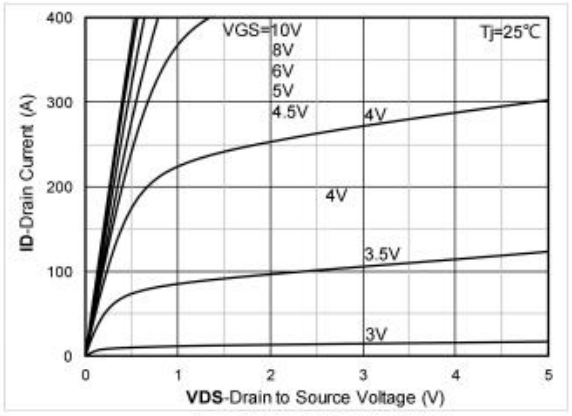


Figure 1. Output Characteristics

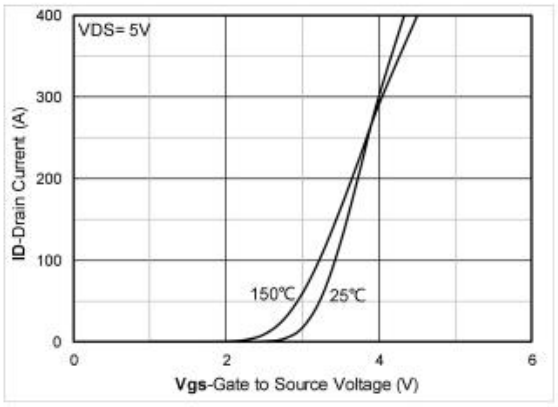


Figure 2. Transfer Characteristics

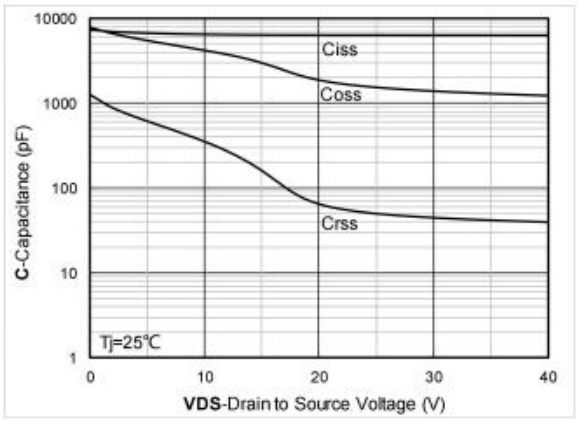


Figure 3. Capacitance Characteristics

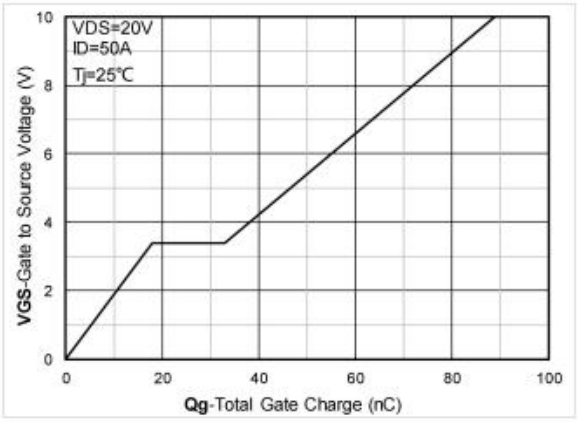


Figure 4. Gate Charge

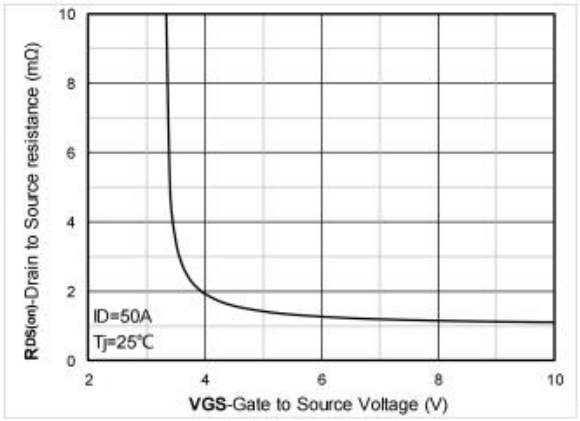


Figure 5. On-Resistance vs Gate to Source Voltage

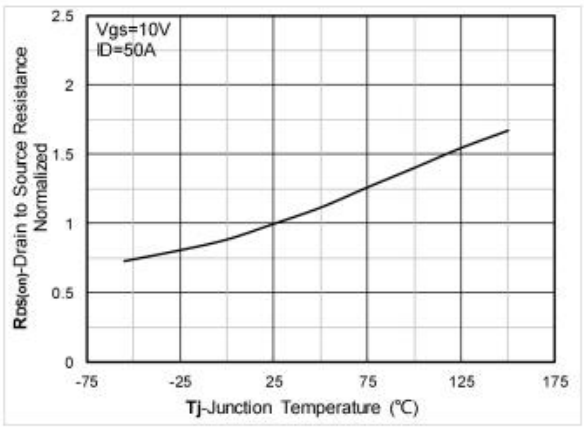


Figure 6. Normalized On-Resistance

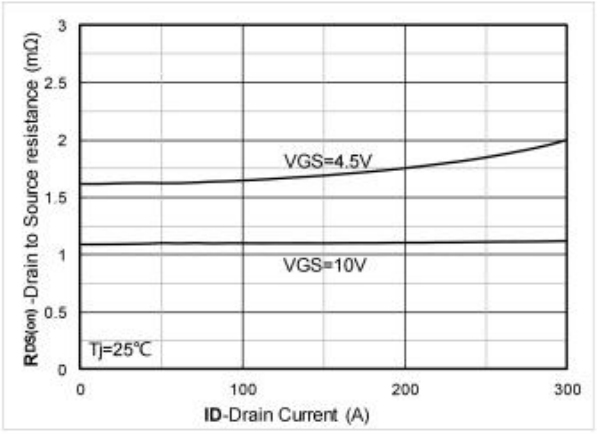


Figure 7. $R_{DS(on)}$ VS Drain Current

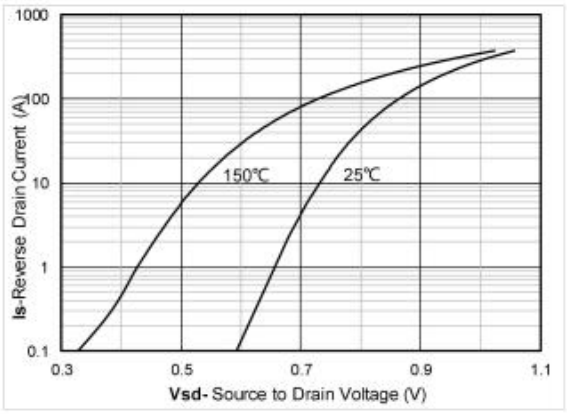


Figure 8. Forward characteristics of reverse diode

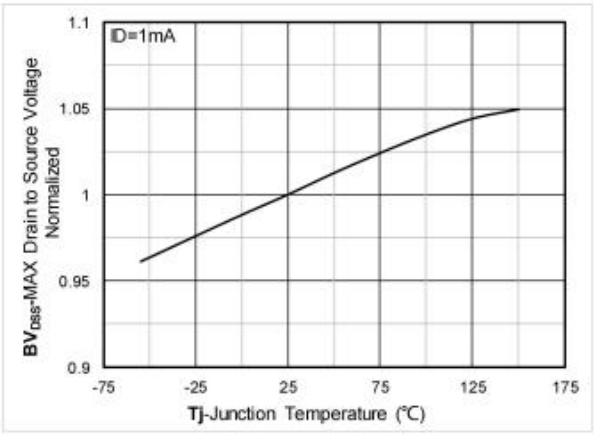


Figure 9. Normalized breakdown voltage

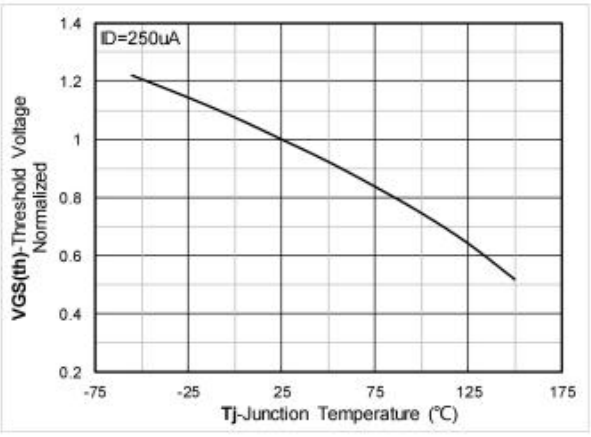


Figure 10. Normalized Threshold voltage

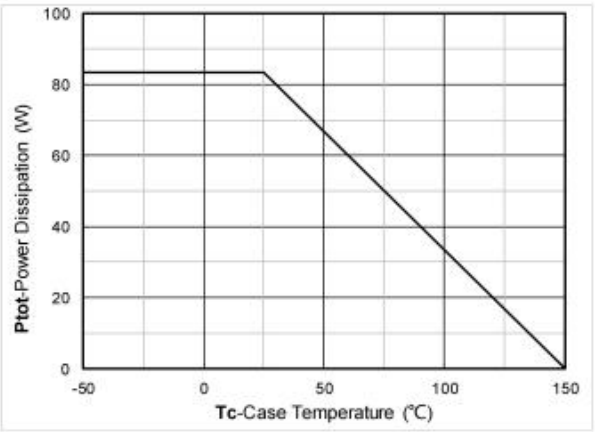


Figure 11. Power dissipation

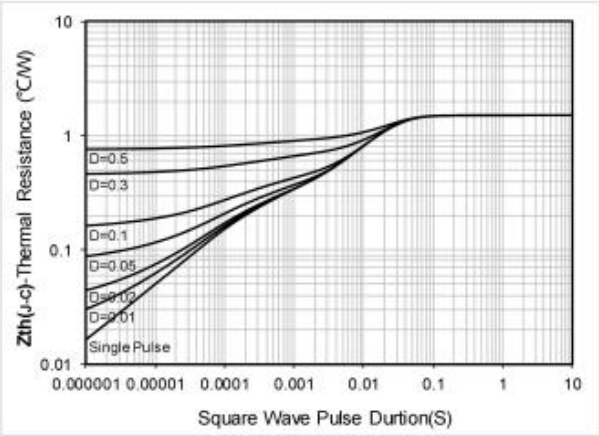


Figure 12. Maximum Transient Thermal Impedance

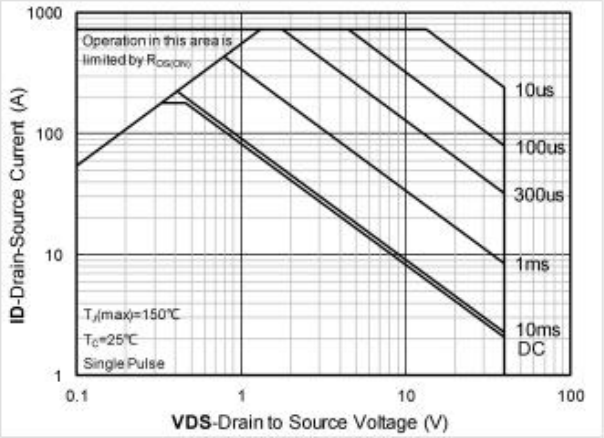
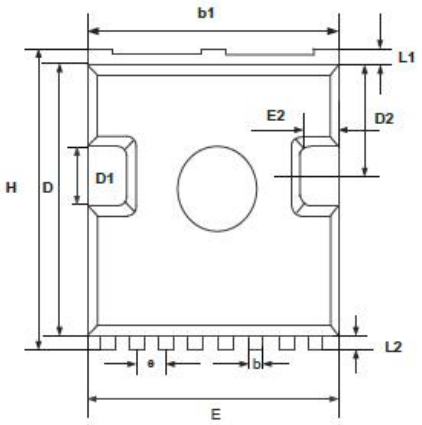
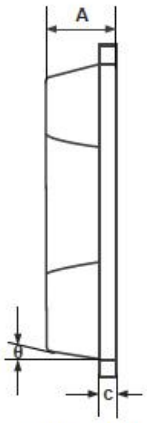


Figure 13. Safe Operation Area

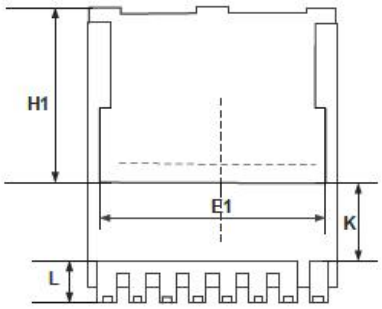
Package Dimensions TOLL-8L



TOP VIEW



SIDE VIEW



BOTTTOM VIEW

COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	2.20	2.40
b	0.60	0.90
b1	9.70	9.90
c	0.40	0.60
D	10.20	10.60
D1	3.10	3.50
D2	4.45	4.75
E	9.70	10.10
E1	7.80BSC	
E2	0.50	0.70
e	1.200 BSC	
H	11.45	11.90
H1	6.75 BSC	
K	3.10 REF	
L	1.70	2.10
L1	0.60	0.80
L2	0.50	0.70
θ	10° REF	

Important Notice and Disclaimer

HL Microelectronics reserves the right to make changes to this document and its products and specifications at any time without notice.
Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

HL Microelectronics makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, not does HL Microelectronics assume any liability for application assistance or customer product design.

HL Microelectronics does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of HL Microelectronics.

HL Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of HL Microelectronics.