Features

- Super Low Gate Charge
- Green Device Available
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology

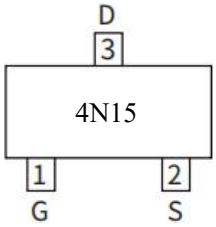
Bvdss	Rdson	ID
150V	245mΩ	4A

Application

- Battery protection
- Load Switch
- Uninterruptible power supply

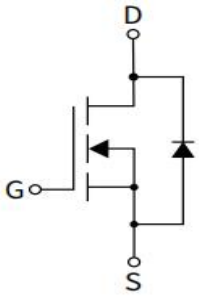
RoHS

Package



Marking and pin assignment

SOT23-3L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
4N15	4N15L	SOT23-3L	3000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	ID@T_C=25℃	4	A
	ID@T_C=100℃	2	A
Pulsed Drain Current[2]	I_{DM}	15	A
Single Pulse Avalanche Energy[2]	EAS	1.25	mJ
Total Power Dissipation	PD@T_C=25℃	3	W
Storage Temperature Range	T_{STG}	-55 ~ 150	℃
Operating Junction Temperature Range	T_J	-55 ~ 150	℃

Thermal Resistance Ratings

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction-ambient[3]	$R_{\theta JA}$	--	85	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	--	--	℃/W

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	S	D	
HL4N15L	SOT23-3L	1	2	3	Tape Reel

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	V_{GS}=0V,I_D=250μA	150	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=150V,V_{GS}=0V	-	-	1	μA
Gate- Source Forward Leakage	I_{GSS}	V_{DS}=0V,V_{GS}=±20V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.5	2	2.5	V
Drain-Source On-State Resistance[4]	$R_{DS(ON)}$	V_{GS}=10V, I_D=4A	-	245	300	mΩ
Forward Transconductance[4]	gfs	V_{DS}=10V,I_D=4A	-	25	-	S
Input Capacitance	C_{iss}	V_{DS}=75V,V_{GS}=0V, f=1MHz	-	450	-	pF
Output Capacitance	C_{oss}		-	23	-	
Reverse Transfer Capacitance	C_{rss}		-	14	-	
Gate Resistance	R_g	f=1MHz	-	1.5	-	Ω
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=75V,I_D=1A, R_G=6Ω,V_{GS}=10V	-	8.2	-	nS
Turn-on Rise Time	t_r		-	10.2	-	
Turn-Off Delay Time	$t_{d(off)}$		-	20.5	-	
Turn-Off Fall Time	t_f		-	15.3	-	
Total Gate Charge	Q_g	V_{DS}=75V,I_D=1.5A, V_{GS}=10V	-	8.2	-	nC
Gate-Source Charge	Q_{gs}		-	1.5	-	
Gate-Drain Charge	Q_{gd}		-	2.2	-	
Diode Forward Voltage[4]	V_{SD}	V_{GS}=0V,I_S=1A	-	-	1.2	V
Continuous Source Current	I_S	T_C=25℃	-	-	4	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150℃.
2. The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=5A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

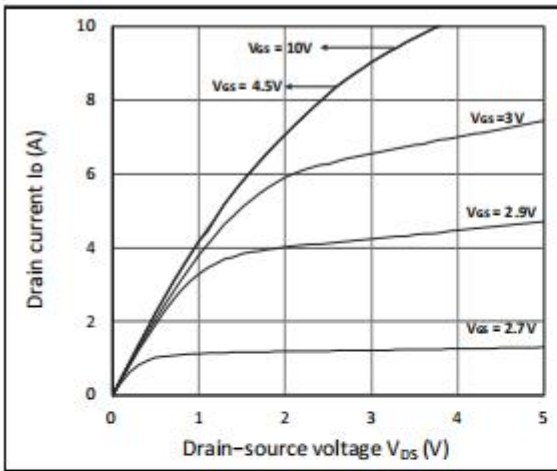


Figure 1. Output Characteristics

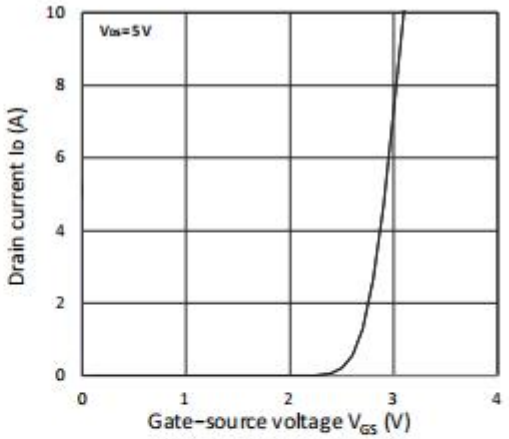


Figure 2. Transfer Characteristics

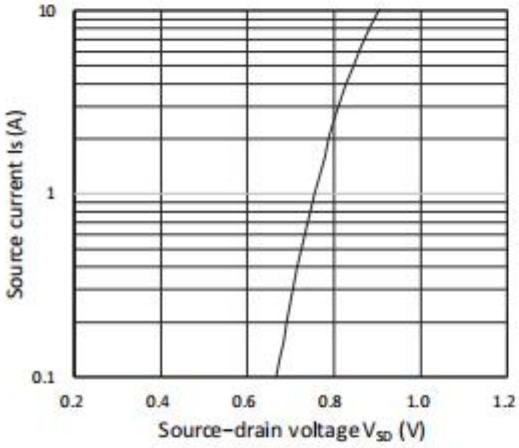


Figure 3. Forward Characteristics of Reverse

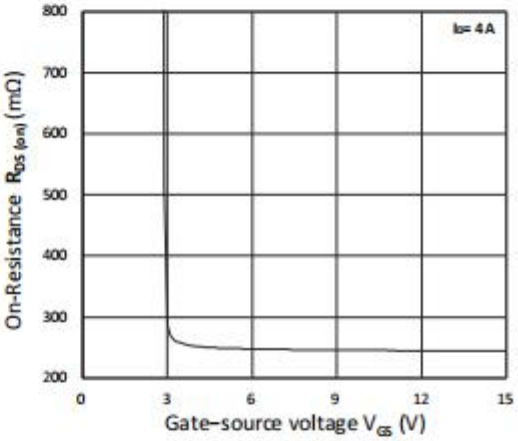


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

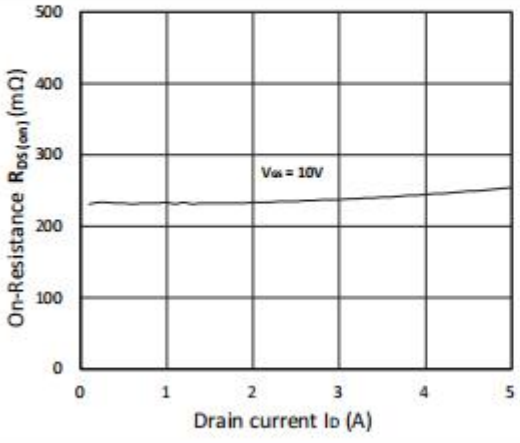


Figure 5. $R_{DS(ON)}$ vs. I_D

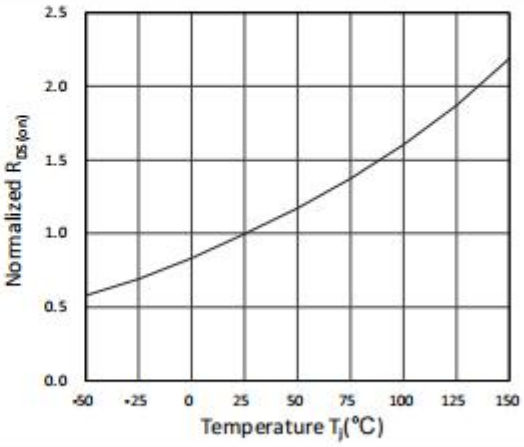


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

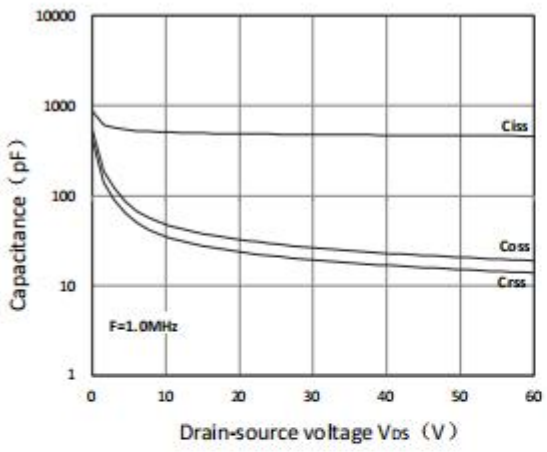


Figure 7. Capacitance Characteristics

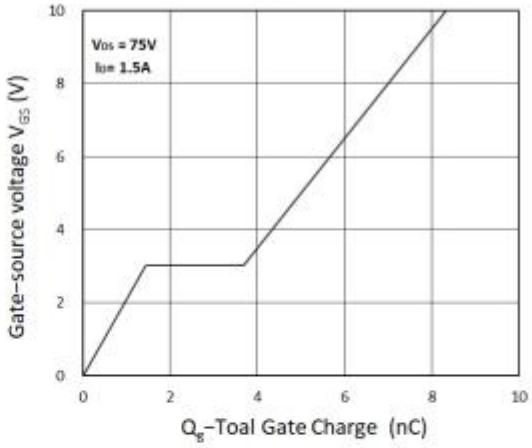


Figure 8. Gate Charge Characteristics

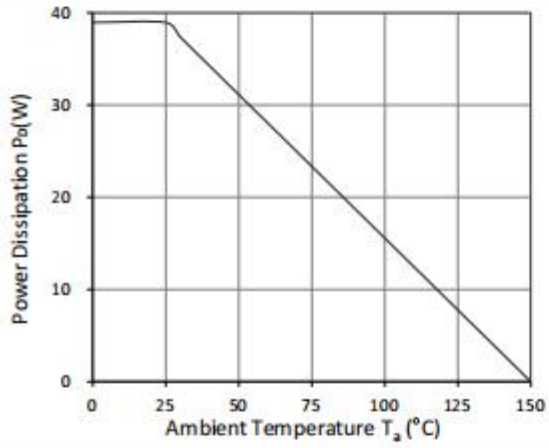


Figure 9. Power Dissipation

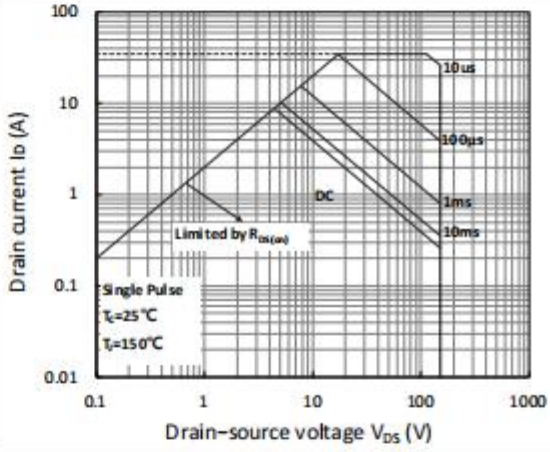


Figure10. Safe Operating Area

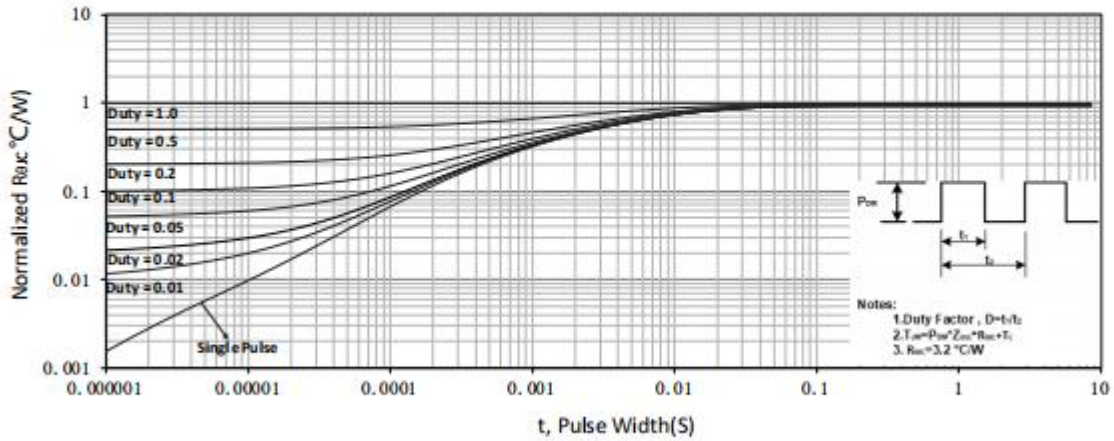


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

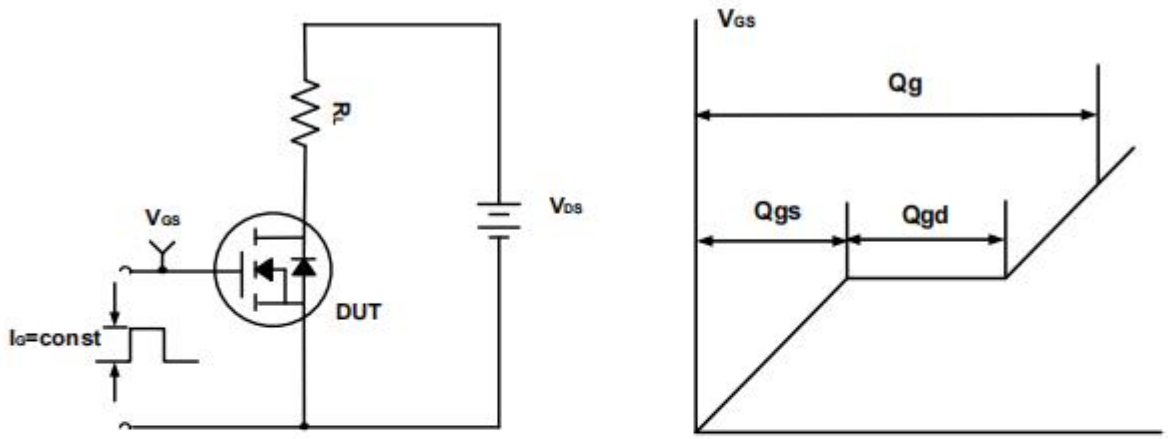


Figure A. Gate Charge Test Circuit & Waveforms

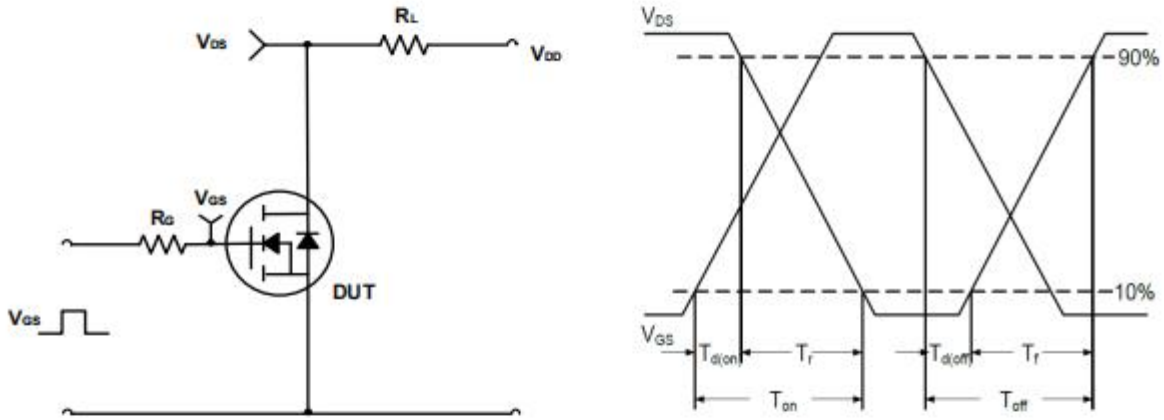


Figure B. Switching Test Circuit & Waveforms

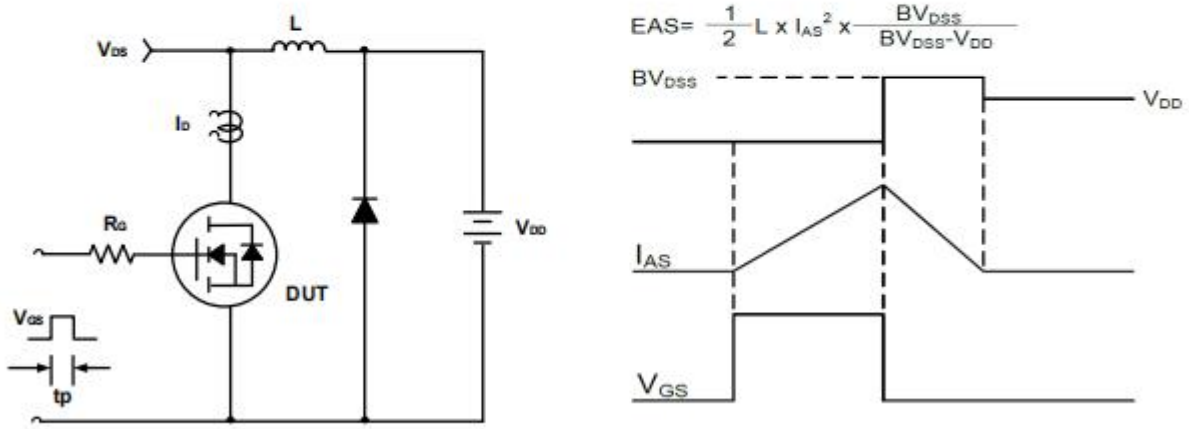
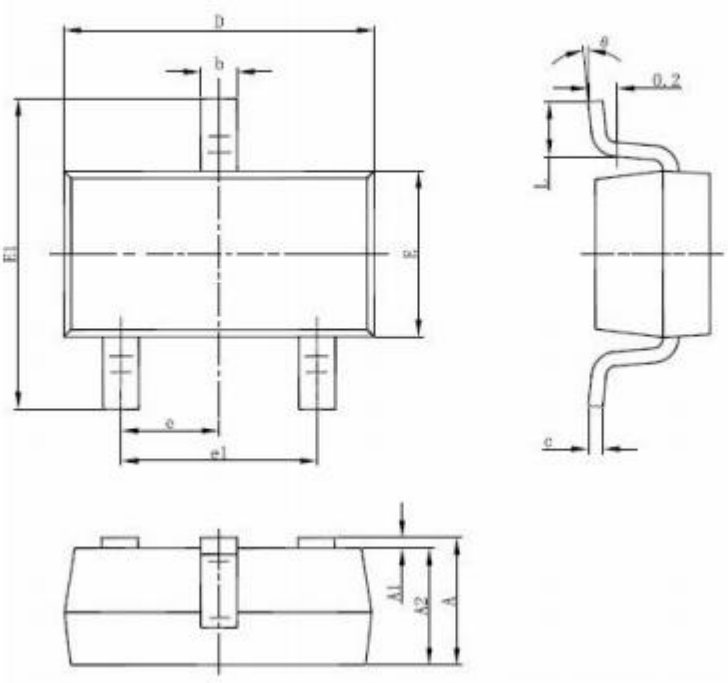


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Package Dimensions SOT23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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.