



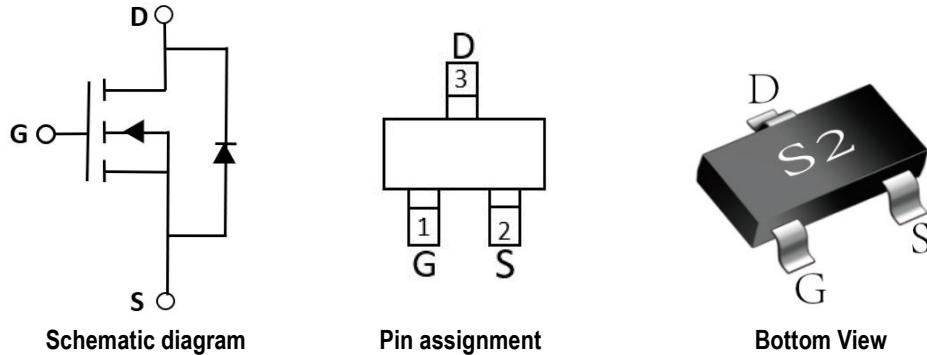
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**MLN2302A**

20V N-Channel Enhancement Mode MOSFET

## 1. General Description

The MLN2302A uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 0.65V. This device is suitable for use as a load switch or in PWM applications.



## 2. Specification Features

- $V_{DS} = 20V, I_D = 2A$
- $R_{DS(ON)} < 55m\Omega$  @  $V_{GS} = 4.5V$  (TYPE:40 m $\Omega$ )
- $R_{DS(ON)} < 70m\Omega$  @  $V_{GS} = 2.5V$  (TYPE:48 m $\Omega$ )
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

## 3. Application

- PWM applications
- Load switch
- Power management

## 4. Absolute Maximum Ratings ( $T_J = 25^\circ C$ )

Characteristics		Symbol	Rating	Unit
DrainSource Voltage		$V_{DSS}$	20	V
GateSource Voltage		$V_{GSS}$	$\pm 12$	V
Continuous Drain Current		$I_D$	2	A
Pulsed Drain Current		$I_{DM}$	2.8	
Power Dissipation	$T_c = 25^\circ C$	$P_D$	430	mW
	$T_c = 100^\circ C$		280	
Single Pulse Avalanche Energy		$E_{AS}$		mJ
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~150	°C



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## 5. Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient(1)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$		

## 6. Electrical Characteristics ( $T_J = 25^\circ C$ )

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\mu A, V_{GS}=0V$	20	22		V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.65	1.1	V
$I_{DSS}$	Drain CutOff Current	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$			$\pm 0.1$	$\mu A$
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=1A$		40	55	$m\Omega$
		$V_{GS}=2.5V, I_D=1A$		48	70	
$g_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=2A$		10		S
<b>Dynamic Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS}=10V, I_D=2A, V_{GS}=10V$		4		nc
$Q_{gs}$	Gate Source Charge			0.8		
$Q_{gd}$	Gate Drain Charge			1.3		
$C_{iss}$	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=100KHz$		480		pF
$C_{rss}$	Reverse Transfer Capacitance			55		
$C_{oss}$	Output Capacitance			90		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10V, V_{DS}=10V, R_L=2.8\Omega, R_G=6\Omega$		10		ns
$t_r$	Rise Time			51		
$t_{D(off)}$	Turn-Off Delay Time			16		
$t_f$	Fall Time			10		
$R_g$	Gate Resistance	$f=1MHz$		-		$\Omega$
<b>Drain-Source Body Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage	$I_S=2A, V_{GS}=0V$		0.9	1.2	V
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=2A, dI/dt=100A/\mu S$		-		ns
$Q_{rr}$	Body Diode Reverse Recovery Charge			-		nc

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

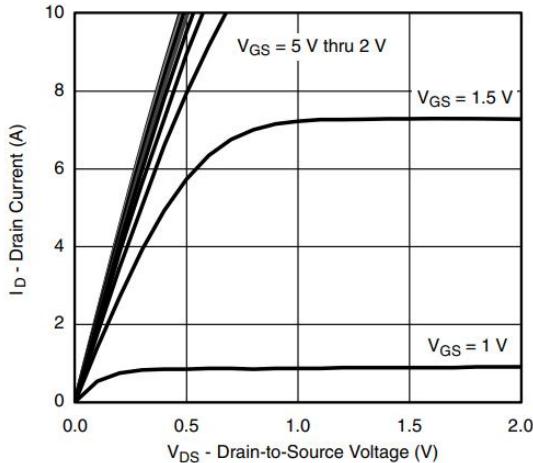


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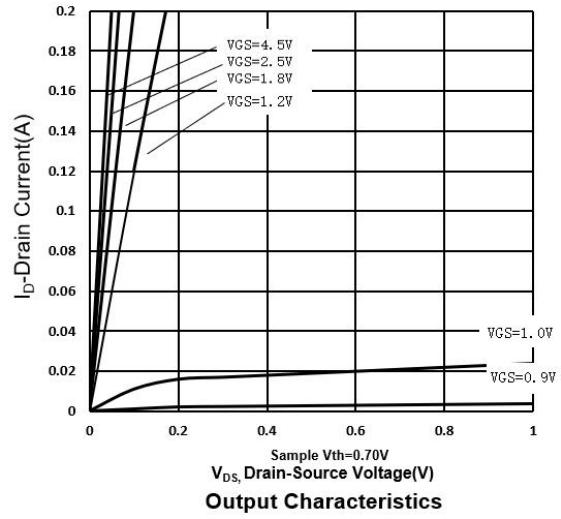
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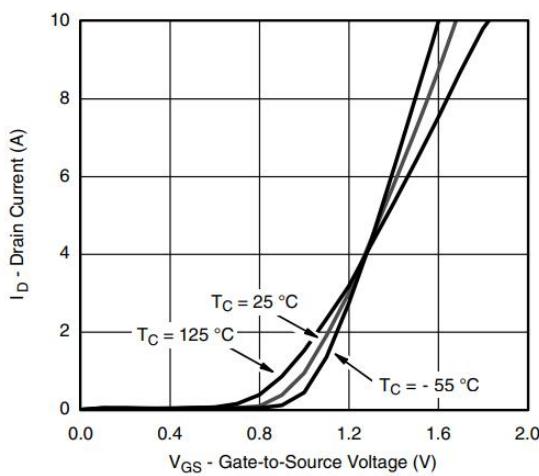
## 7. Typical Electrical and Thermal Characteristics (Curves)



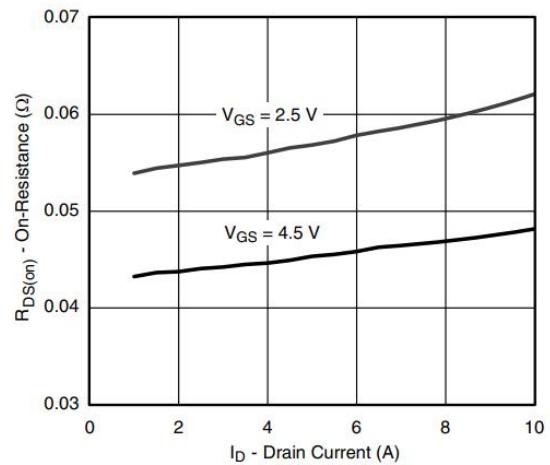
Output Characteristics



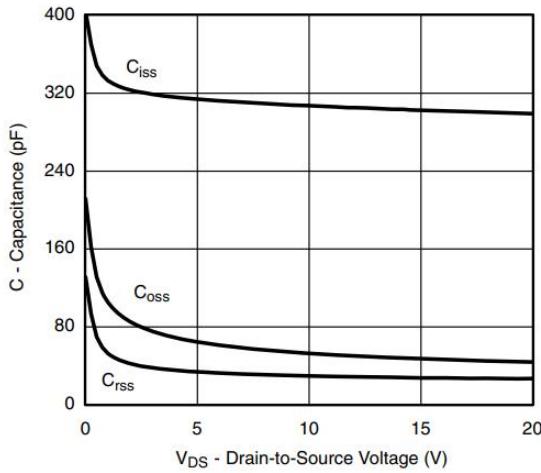
Output Characteristics



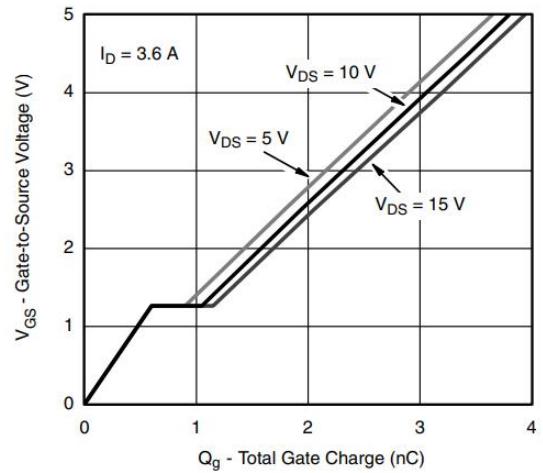
Transfer Characteristics



On-Resistance vs. Drain Current



Capacitance



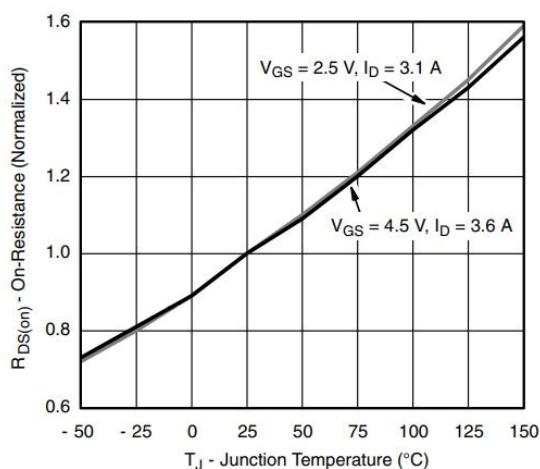
Gate Charge



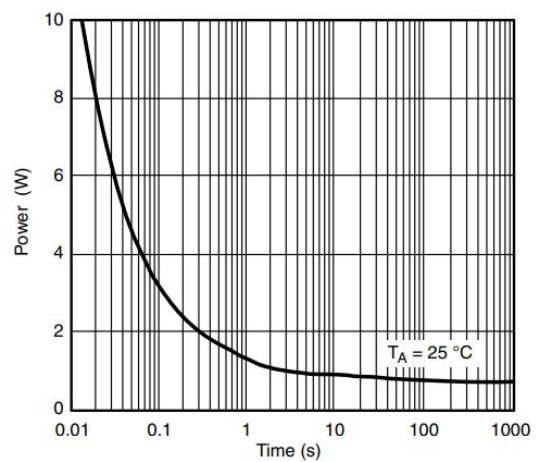
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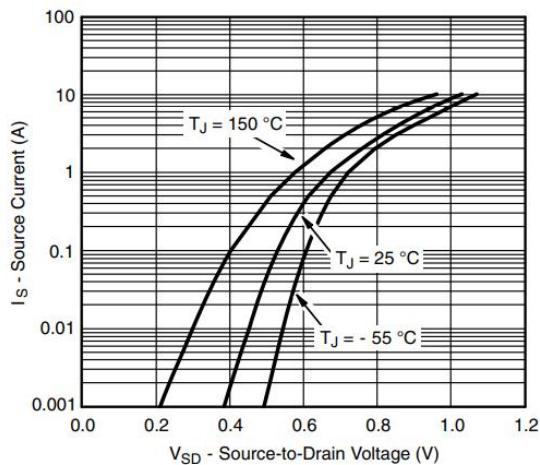
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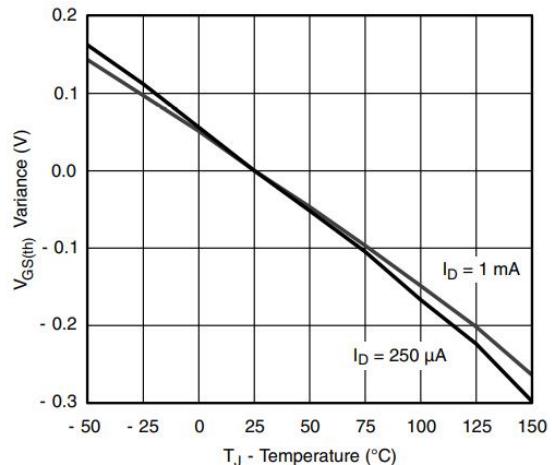
On-Resistance vs. Junction Temperature



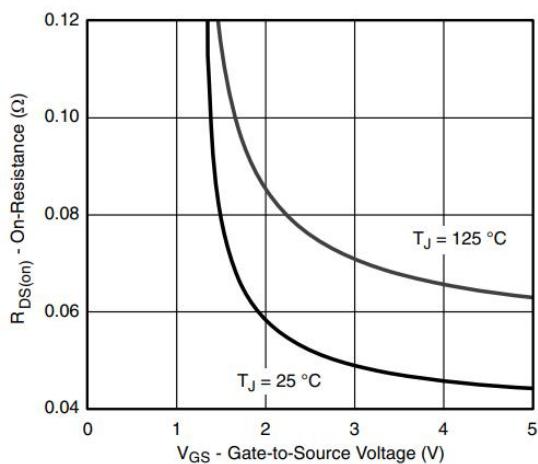
Single Pulse Power



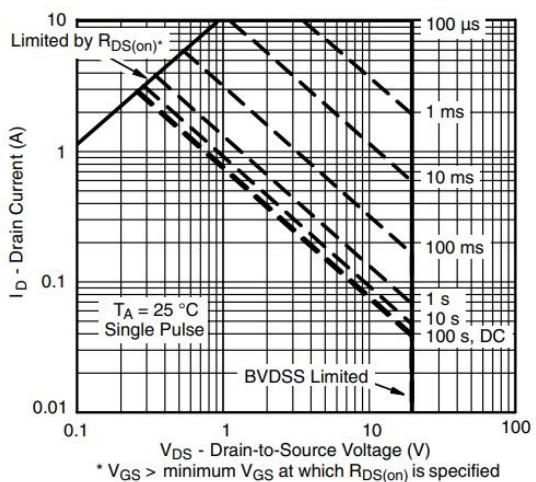
Source-Drain Diode Forward Voltage



Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



Safe Operating Area, Junction-to-Ambient



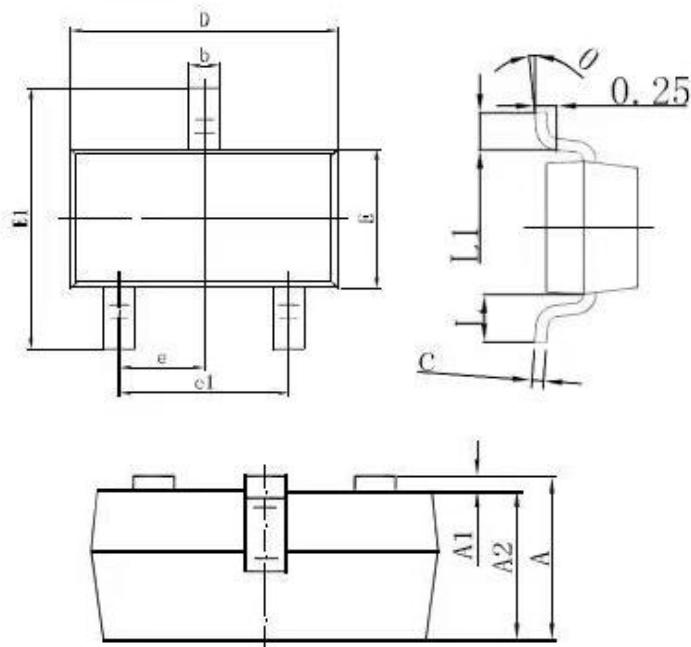
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## 8. Package Outline Dimensions

Device Marking	Device	Package	Reel size	Tape width	Quantity
S2	MLN2302A	SOT-23	7inch	8mm	3000



Symbol	Millimeters	
	Min	Max
A	0.90	1.15
A1	0.00	0.10
A2	0.90	1.05
b	0.30	0.50
c	0.08	0.15
D	2.80	3.00
E	1.20	1.40
E1	2.25	2.55
e	0.950TYP	
e1	1.80	2.00
L	0.550REF	
L1	0.30	0.50
θ	0°	8°



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