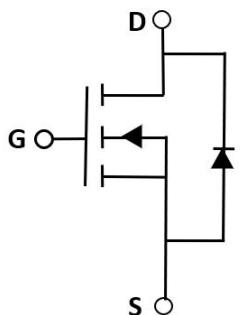
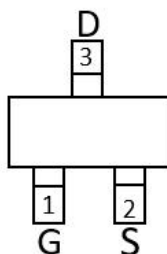


## 1. General Description

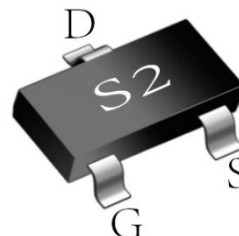
The MLN2302A uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 0.65V. This device is suitable for use as a load switch or in PWM applications.



Schematic diagram



Pin assignment



Bottom View

## 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 handling 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		EAS		mJ
Junction and Storage Temperature Range		$T_J, T_{stg}$	-55~150	$^\circ C$

## 5. Thermal Characteristics

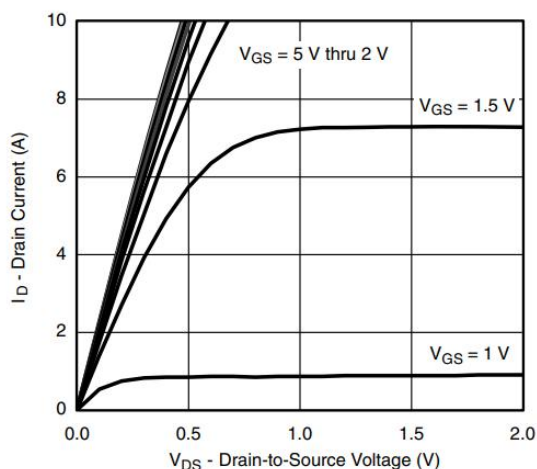
Characteristics	Symbol	Rating	Unit
Thermal Resistance,Junction-to-Ambient(1)	$R_{\theta JA}$	125	°C/W
Thermal Resistance,JunctiontoCase	$R_{\theta JC}$		

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

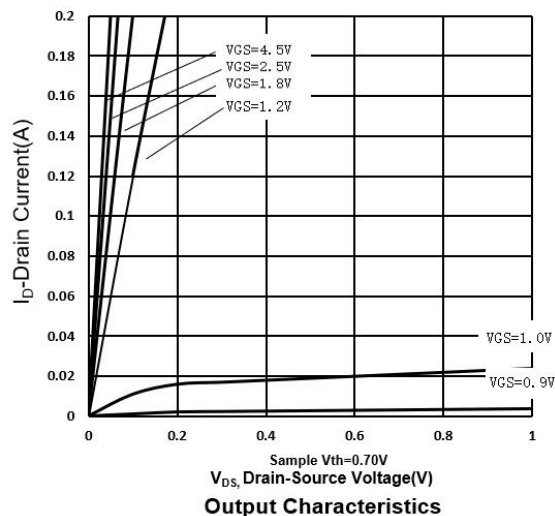
Symbol	Characteristics	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	20	22		V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	0.5	0.65	1.1	V
$I_{DSS}$	Drain CutOff Current	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$			1	$\mu\text{A}$
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$			$\pm 0.1$	$\mu\text{A}$
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = 4.5\text{V}, I_D = 1\text{A}$		40	55	m $\Omega$
		$V_{GS} = 2.5\text{V}, I_D = 1\text{A}$		48	70	
gFS	Forward Transconductance	$V_{DS} = 10\text{V}, I_D = 2\text{A}$		10		S
<b>Dynamic Characteristics</b>						
Qg	Total Gate Charge	$V_{DS} = 10\text{V},$ $I_D = 2\text{A}, V_{GS} = 10\text{V}$		4		nC
Qgs	Gate Source Charge			0.8		
Qgd	Gate Drain Charge			1.3		
Ciss	Input Capacitance	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V},$ $f = 100\text{KHz}$		480		pF
Crss	Reverse Transfer Capacitance			55		
Coss	Output Capacitance			90		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DS} = 10\text{V},$ $R_L = 2.8\Omega, R_G = 6\Omega$		10		ns
tr	Rise Time			51		
$t_{D(off)}$	Turn-Off Delay Time			16		
tf	Fall Time			10		
Rg	Gate Resistance	$f = 1\text{MHz}$		-		$\Omega$
<b>Drain-Source Body Diode Characteristics</b>						
$V_{SD}$	SourceDrain Diode Forward Voltage	$I_S = 2\text{A}, V_{GS} = 0\text{V}$		0.9	1.2	V
trr	Body Diode Reverse Recovery Time	$I_F = 2\text{A},$		-		ns
Qrr	Body Diode Reverse Recovery Charge	$dI/dt = 100\text{A}/\mu\text{S}$		-		nC

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

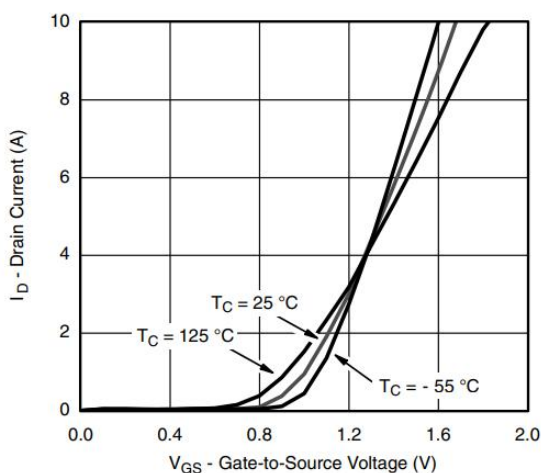
## 7. Typical Electrical and Thermal Characteristics (Curves)



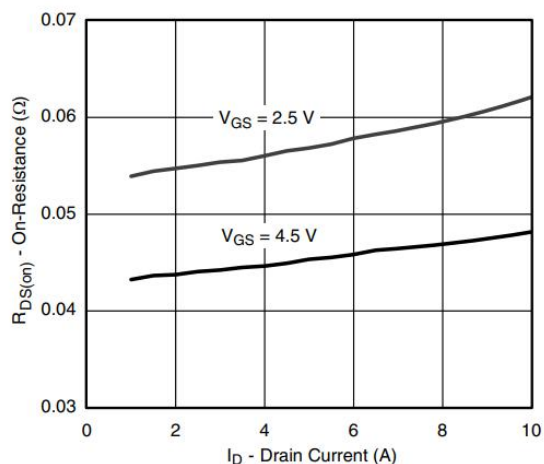
Output Characteristics



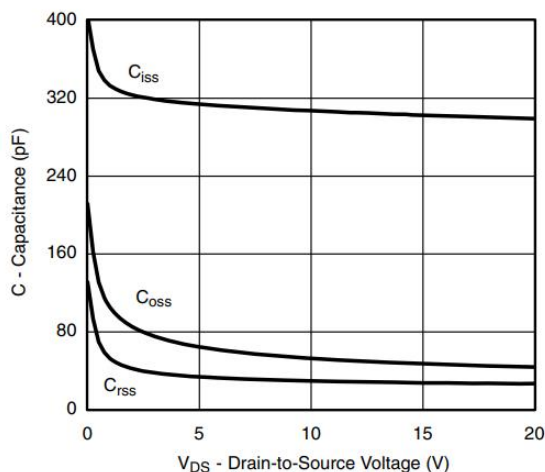
Output Characteristics



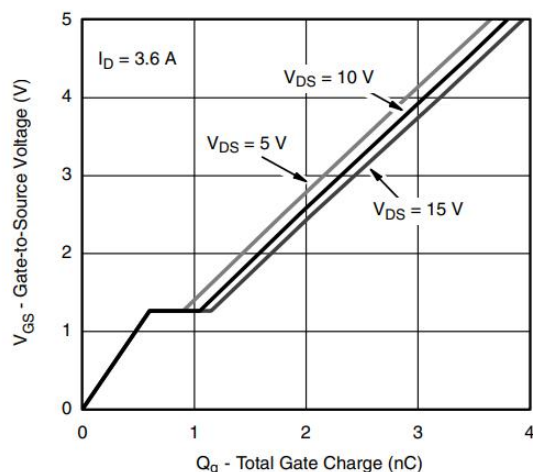
Transfer Characteristics



On-Resistance vs. Drain Current



Capacitance



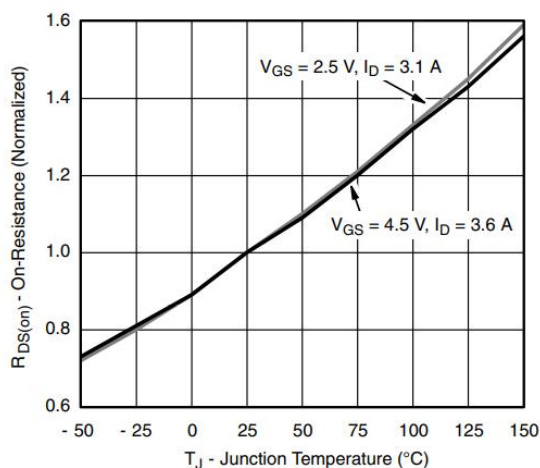
Gate Charge



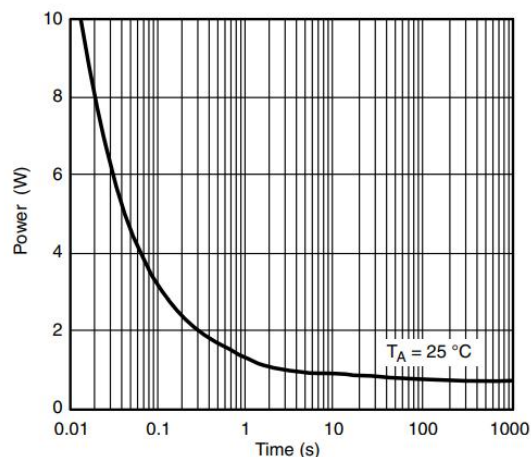
**MILLERSEMI**

# MLN2302A

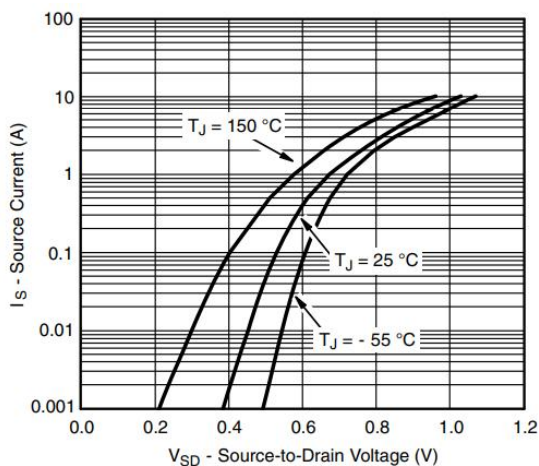
20V N-Channel Enhancement Mode MOSFET



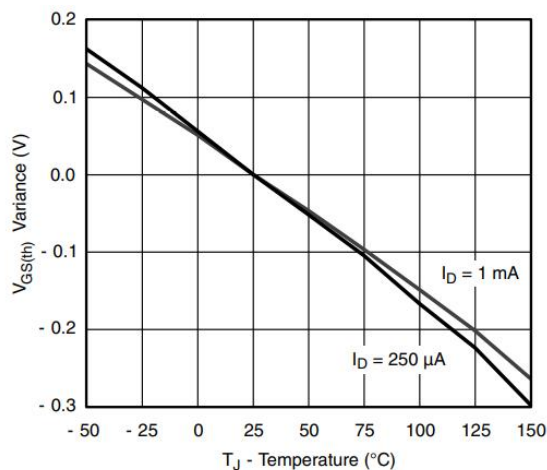
**On-Resistance vs. Junction Temperature**



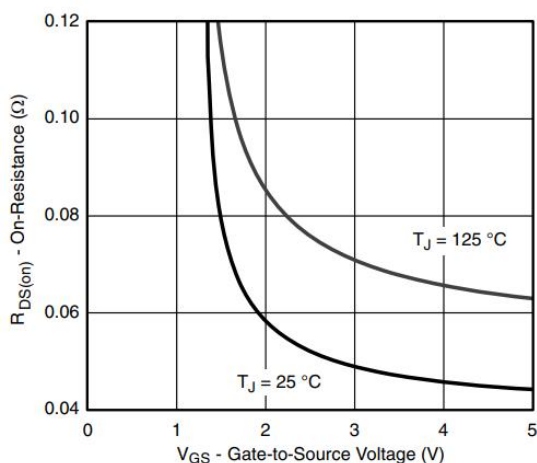
**Single Pulse Power**



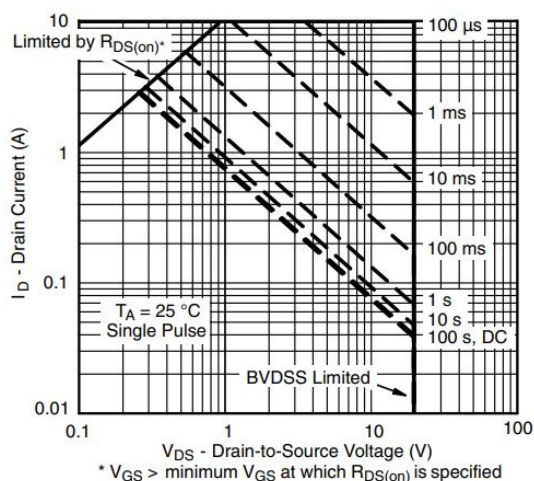
**Source-Drain Diode Forward Voltage**



**Threshold Voltage**



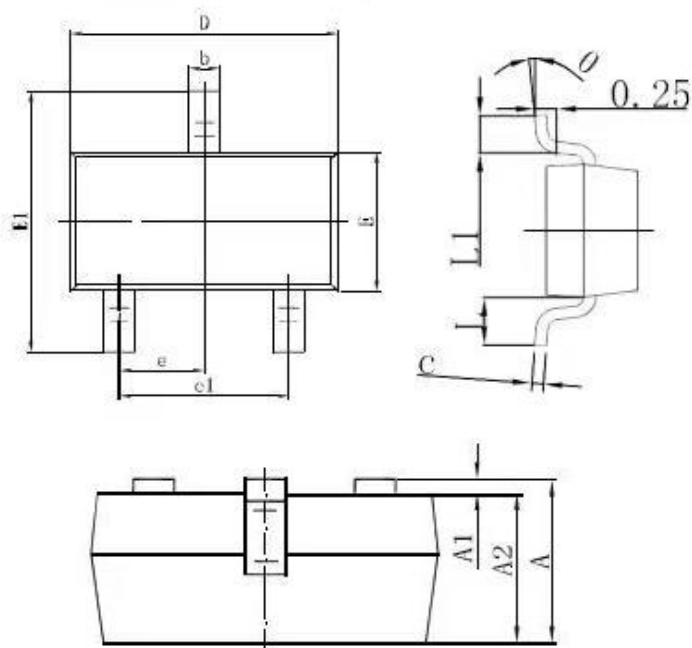
**On-Resistance vs. Gate-to-Source Voltage**



**Safe Operating Area, Junction-to-Ambient**

## 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
$\theta$	0°	8°

## 9. RESTRICTIONS ON PRODUCT USE

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