



# 100V 29mΩ N-Ch Power MOSFET

## Features

- Low Gate Charge
- Low Input Capacitance
- 100% UIS Tested, 100% Rg Tested
- Excepcional  $R_{DS(ON)}$  in Low-profile DFN2020-6L
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

## Applications

- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC Sub-systems
- Power/Load Switching in End Systems of Small Enclosure

## Product Summary

Parameter	Value	Unit
$V_{DS}$	100	V
$V_{GS(th)}_{Typ}$	1.9	V
$I_D$ (@ $V_{GS} = 10V$ ) <sup>(1)</sup>	4.7	A
$R_{DS(ON)}_{Typ}$ (@ $V_{GS} = 10V$ )	29	mΩ
$R_{DS(ON)}_{Typ}$ (@ $V_{GS} = 4.5V$ )	37	mΩ

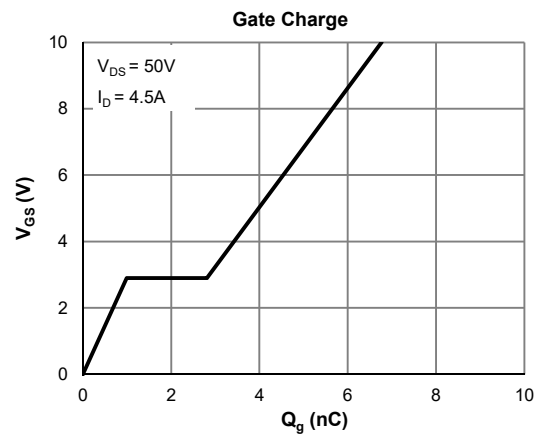
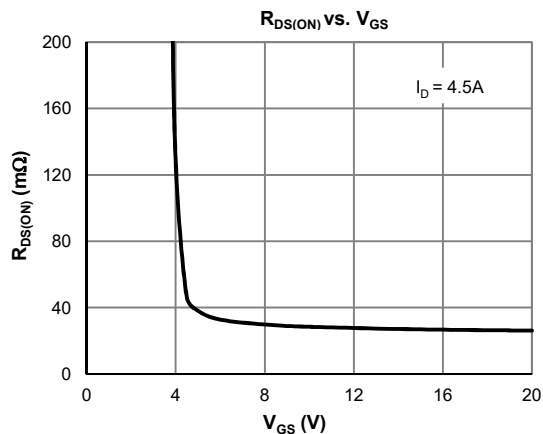


## Ordering Information

Device	Package	# of Pins	Marking	MSL	$T_J$ (°C)	Media	Quantity (pcs)
JMSL1040AV-7	U-DFN2020-6L	6	BK	1	-55 to 150	7-inch Reel	3000

## Absolute Maximum Ratings (@ $T_A = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DS}$	100	V
Gate-to-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	$T_A = 25^\circ C$	4.7
		$T_A = 70^\circ C$	3.8
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	18.8	A
Avalanche Current <sup>(3)</sup>	$I_{AS}$	16.0	A
Avalanche Energy <sup>(3)</sup>	$E_{AS}$	12.8	mJ
Power Dissipation <sup>(4)</sup>	$P_D$	$T_A = 25^\circ C$	1.5
		$T_A = 70^\circ C$	0.94
Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C



**Electrical Characteristics** (@  $T_J = 25^\circ\text{C}$  unless otherwise specified)

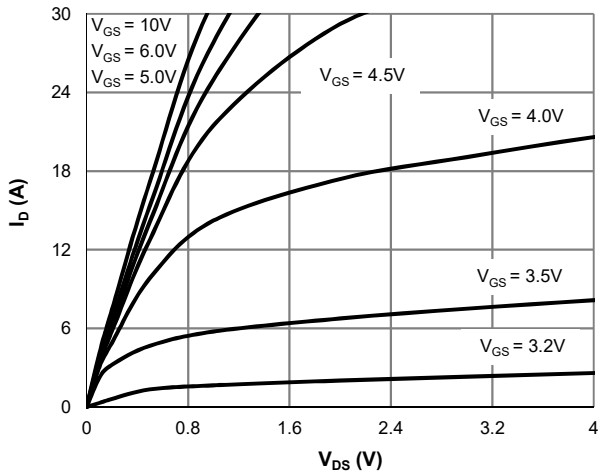
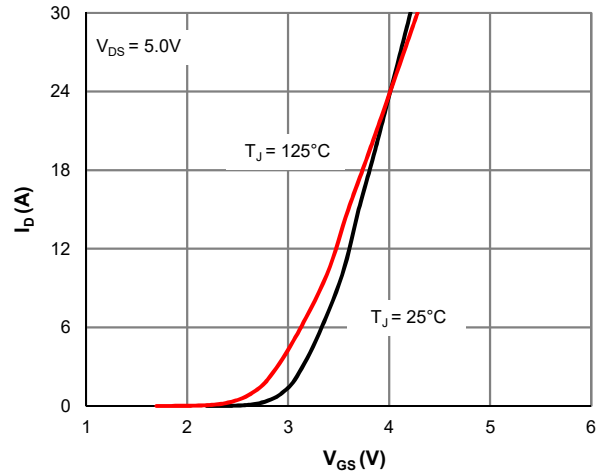
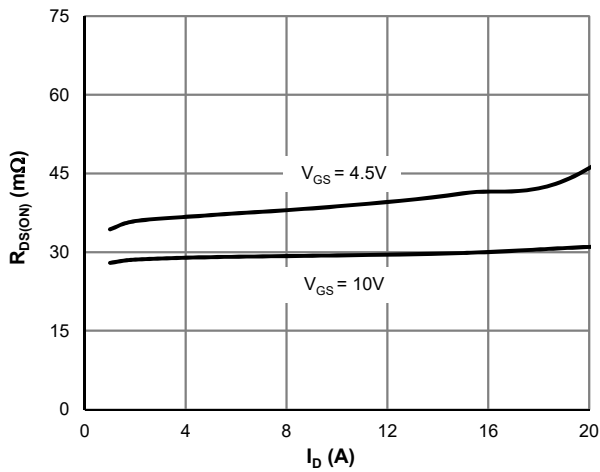
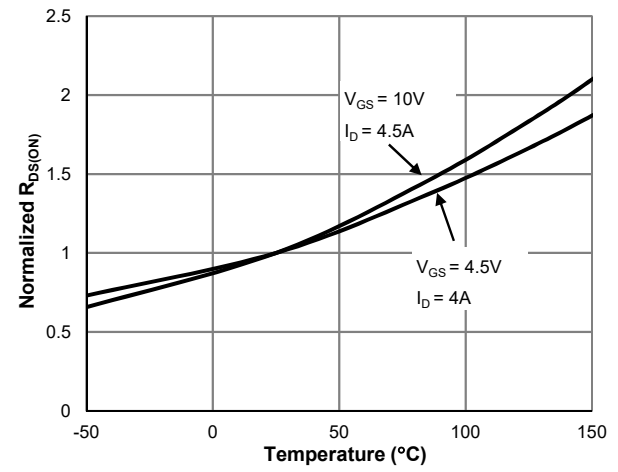
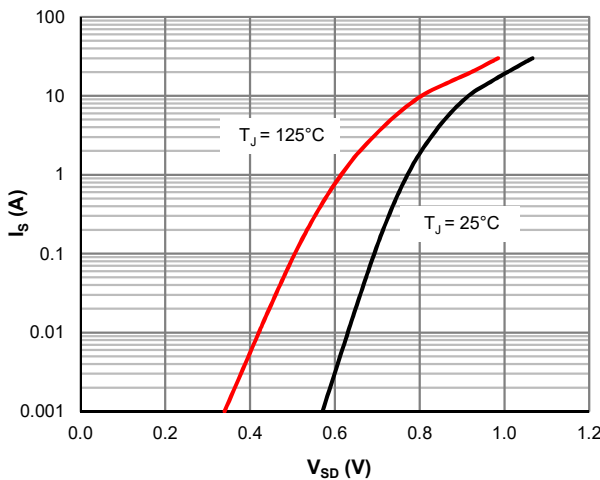
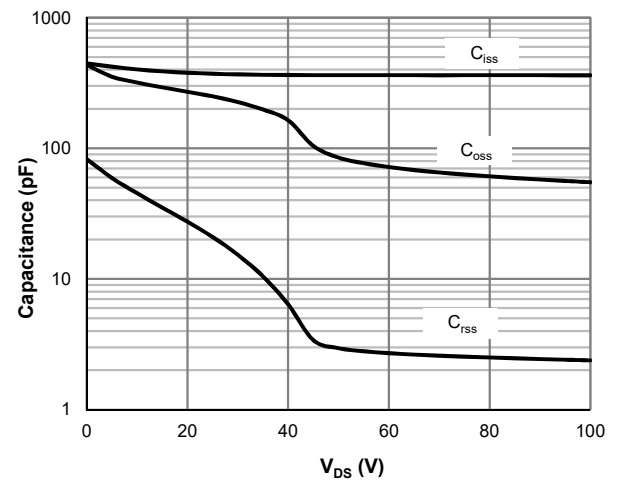
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	100			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1.0 5.0	$\mu\text{A}$
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2	1.9	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 4.5\text{A}$		29	36	m $\Omega$
		$V_{GS} = 4.5\text{V}, I_D = 4\text{A}$		37	48	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 5\text{V}, I_D = 4.5\text{A}$		14		S
Diode Forward Voltage	$V_{SD}$	$I_S = 1\text{A}, V_{GS} = 0\text{V}$		0.69	1.0	V
Diode Continuous Current	$I_S$	$T_C = 25^\circ\text{C}$			1	A
<b>DYNAMIC PARAMETERS</b> <sup>(5)</sup>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$		363		pF
Output Capacitance	$C_{oss}$			85		pF
Reverse Transfer Capacitance	$C_{rss}$			3.0		pF
Gate Resistance	$R_g$	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		1.7		$\Omega$
<b>SWITCHING PARAMETERS</b> <sup>(5)</sup>						
Total Gate Charge (@ $V_{GS} = 10\text{V}$ )	$Q_g$	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 50\text{V}, I_D = 4.5\text{A}$		6.8		nC
Total Gate Charge (@ $V_{GS} = 4.5\text{V}$ )	$Q_g$			3.7		nC
Gate Source Charge	$Q_{gs}$			1.0		nC
Gate Drain Charge	$Q_{gd}$			1.8		nC
Turn-On Delay Time	$t_{D(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 50\text{V}$ $R_L = 11\Omega, R_{GEN} = 6\Omega$		4.9		ns
Turn-On Rise Time	$t_r$			16.6		ns
Turn-Off Delay Time	$t_{D(off)}$			11.2		ns
Turn-Off Fall Time	$t_f$			4.9		ns
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 4.5\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		33		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F = 4.5\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		45		nC

**Thermal Performance**

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	70	85	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	18.0	24	$^\circ\text{C}/\text{W}$

**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  $T_{J\_Max} = 150^\circ\text{C}$ .
3. This single-pulse measurement was taken under the following condition [ $L = 100\mu\text{H}, V_{GS} = 10\text{V}, V_{DS} = 50\text{V}$ ] while its value is limited by  $T_{J\_Max} = 150^\circ\text{C}$ .
4. The power dissipation  $P_D$  is based on  $T_{J\_Max} = 150^\circ\text{C}$ .
5. This value is guaranteed by design hence it is not included in the production test.

**Typical Electrical & Thermal 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: Body-Diode Characteristics**

**Figure 6: Capacitance Characteristics**

Typical Electrical & Thermal Characteristics

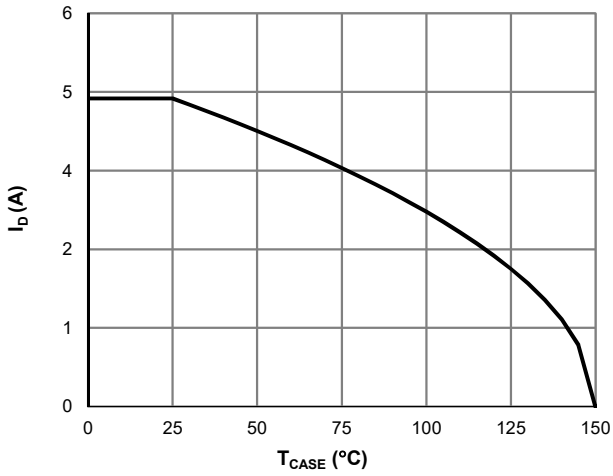


Figure 7: Current De-rating

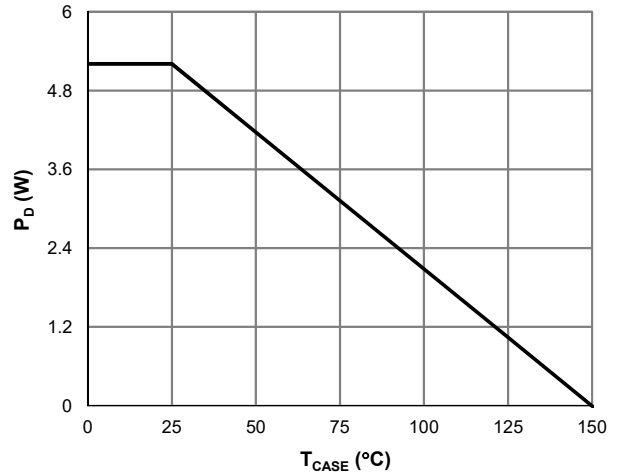


Figure 8: Power De-rating

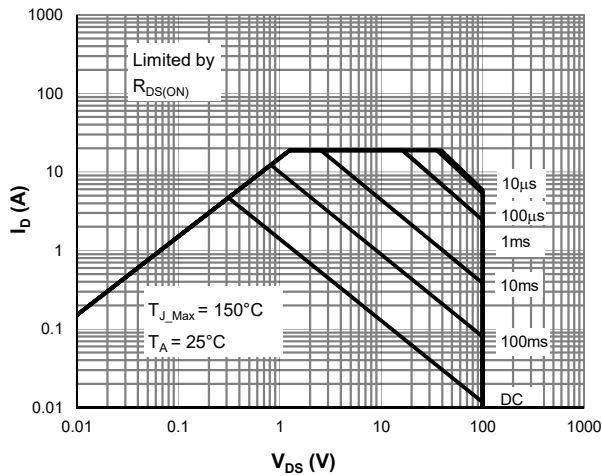


Figure 9: Maximum Safe Operating Area

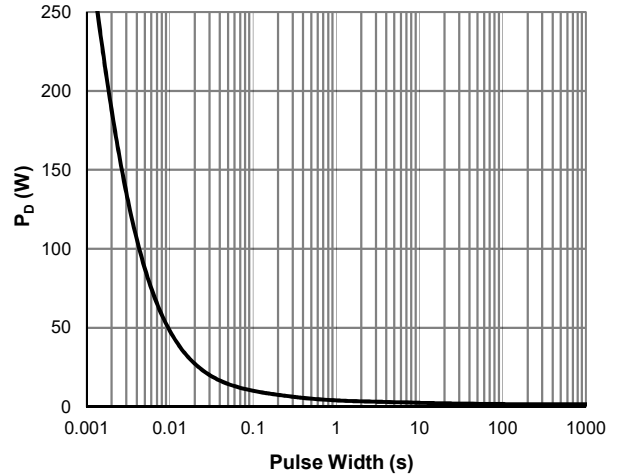


Figure 10: Single Pulse Power Rating, Junction-to-Case

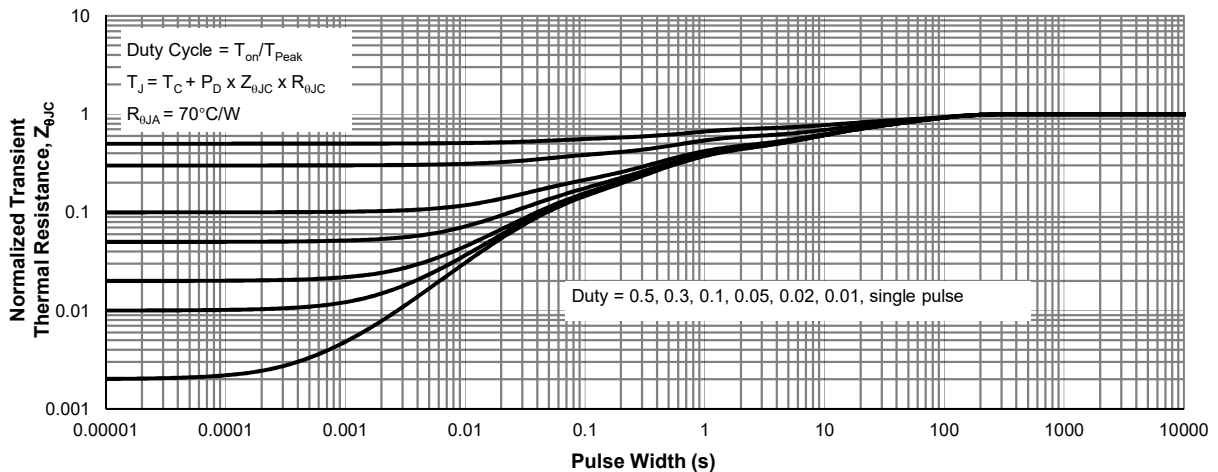
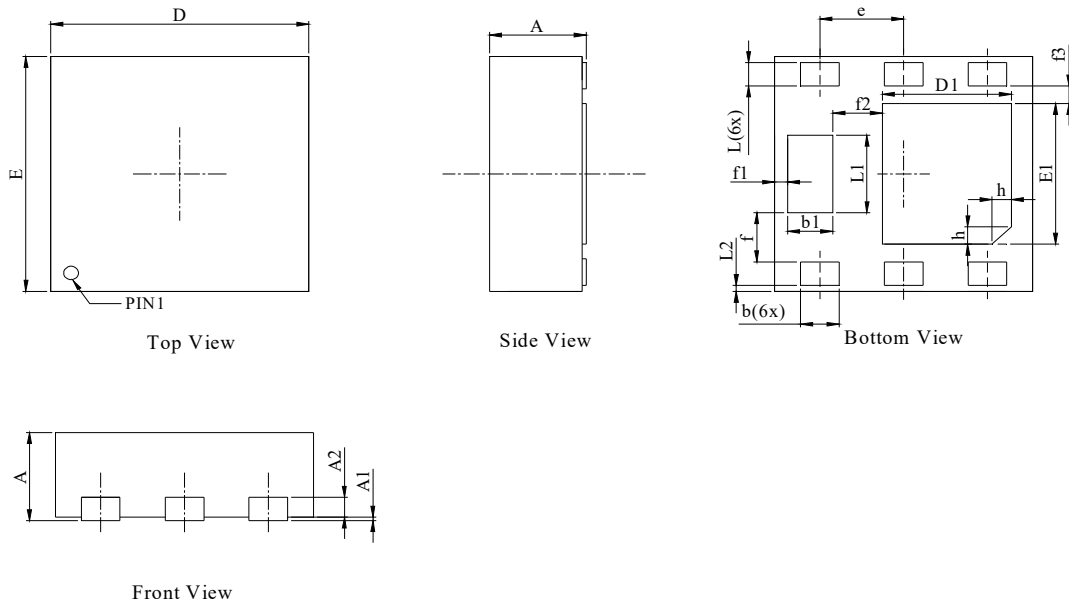
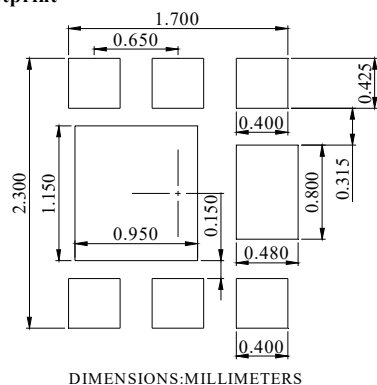


Figure 11: Normalized Maximum Transient Thermal Impedance

**U-DFN2020-6L Package Information**
**Package Outline**

**Front View**

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.500	-	0.600
A1	-	-	0.005
A2	-	0.080	0.250
D	1.900	2.000	2.100
E	1.900	2.000	2.100
D1	0.900	1.000	1.100
E1	1.100	1.200	1.300
b	0.250	0.300	0.350
b1	0.300	0.350	0.400
L	0.150	0.200	0.250
L1	0.610	0.660	0.710
L2	0.010	0.050	0.090
e	0.650 BSC		
f	0.420 REF		
f1	0.100 REF		
f2	0.385 REF		
f3	0.150 REF		
h	0.150 REF		

**Recommended Soldering Footprint**


DIMENSIONS: MILLIMETERS