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

Product Summary

Parameter	Value	Unit
V_{DS}	100	V
$V_{GS(th)\_Typ}$	1.9	V
I_D (@ V_{GS} = 10V) (1)	4.7	A
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 10V)	29	mΩ
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 4.5V)	37	mΩ

Applications

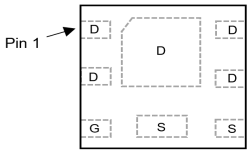
- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC Sub-systems
- Power/Load Switching in End Systems of Small Enclosure

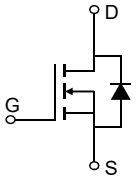
U-DFN2020-6L

Top View

Bottom View

Top View
Pin Configuration



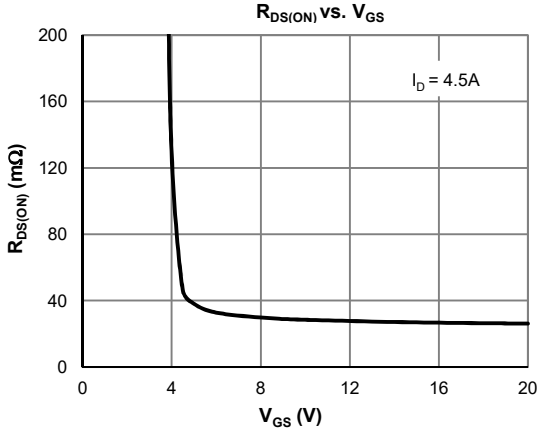


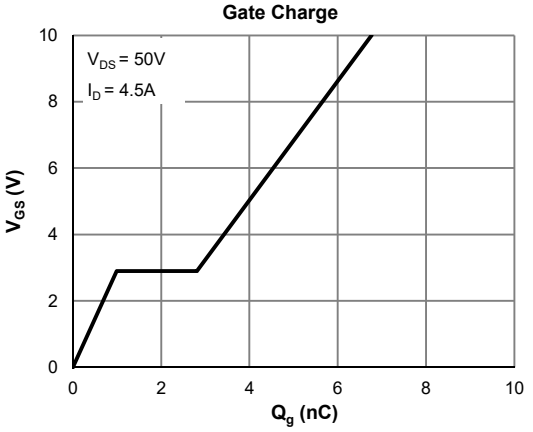
Ordering Information

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°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 (1)	T_A = 25°C	I_D	4.7	A
	T_A = 70°C		3.8	
Pulsed Drain Current (2)		I_{DM}	18.8	A
Avalanche Current (3)		I_{AS}	16.0	A
Avalanche Energy (3)		E_{AS}	12.8	mJ
Power Dissipation (4)	T_A = 25°C	P_D	1.5	W
	T_A = 70°C		0.94	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C





Electrical Characteristics (@ T_J = 25°C unless otherwise specified)

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

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	70	85	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	18.0	24	°C/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°C.
3. This single-pulse measurement was taken under the following condition [L = 100μH, V_{GS} = 10V, V_{DS} = 50V] while its value is limited by T_{J_Max} = 150°C.
4. The power dissipation P_D is based on T_{J_Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

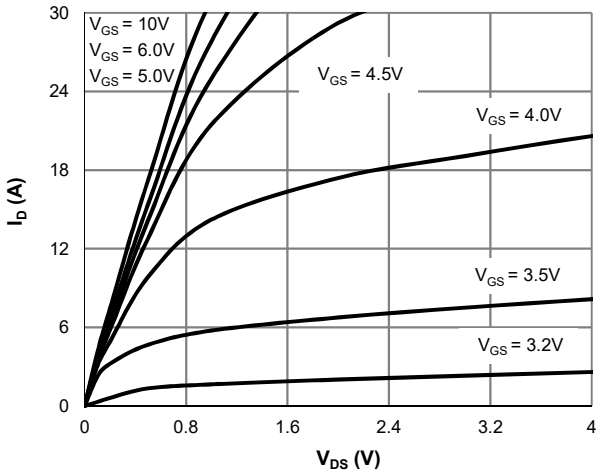


Figure 1: Saturation Characteristics

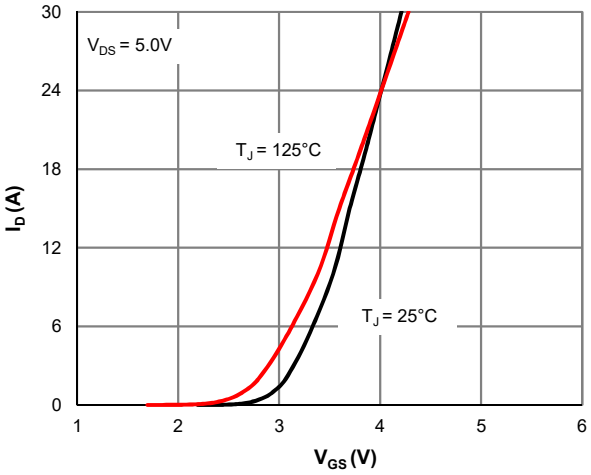


Figure 2: Transfer Characteristics

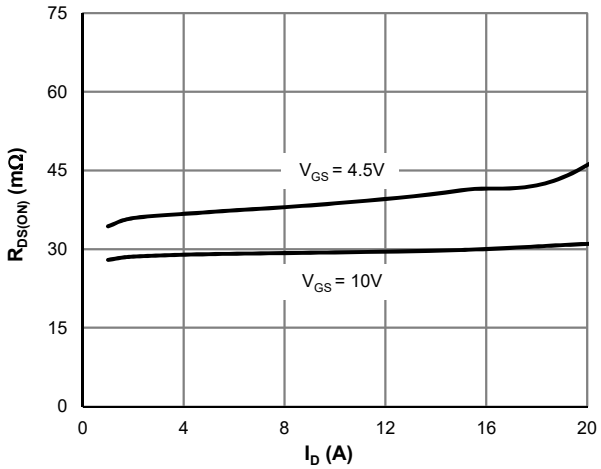


Figure 3: $R_{DS(ON)}$ vs. Drain Current

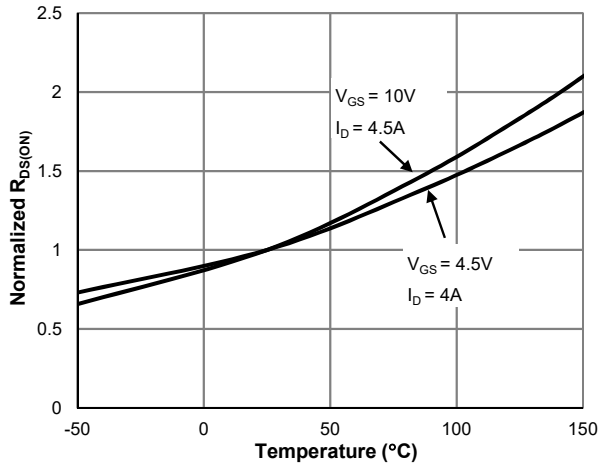


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

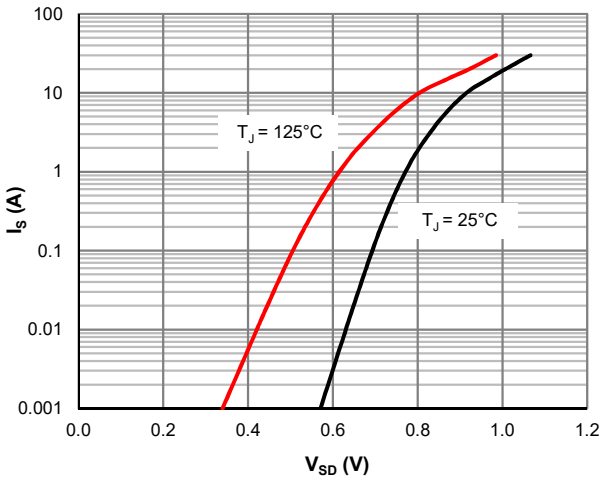


Figure 5: Body-Diode Characteristics

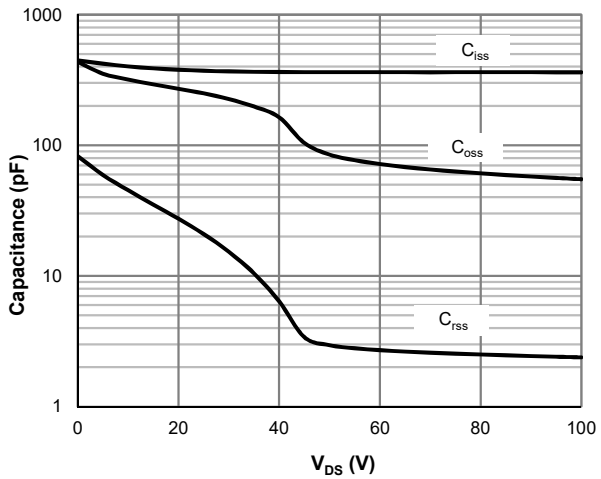


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

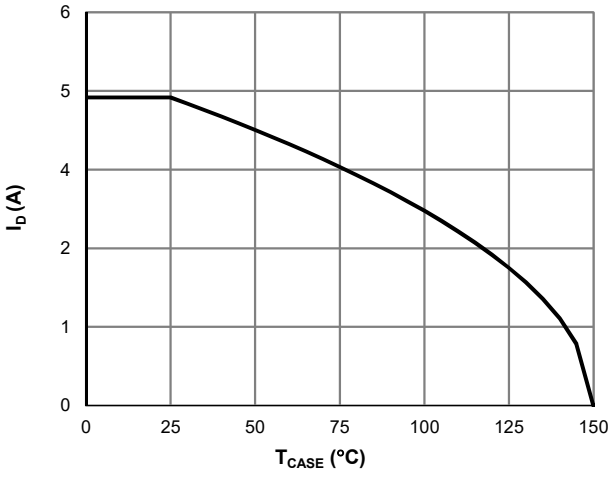


Figure 7: Current De-rating

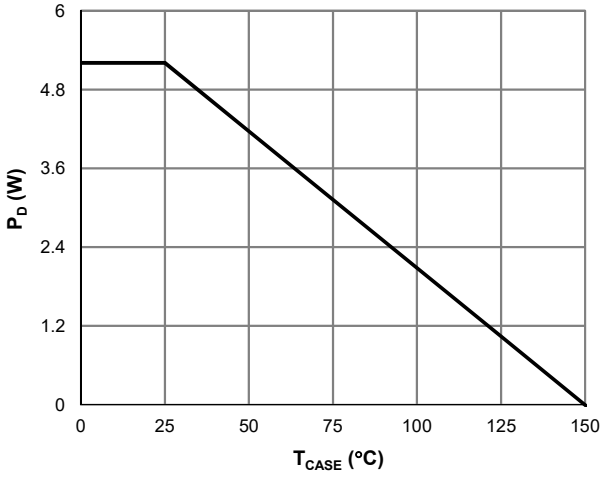


Figure 8: Power De-rating

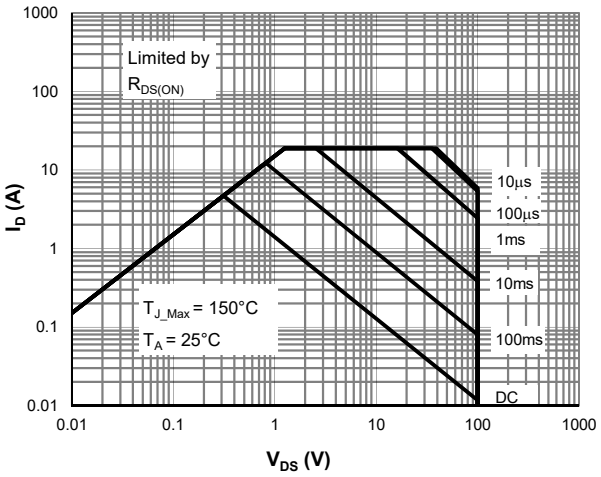


Figure 9: Maximum Safe Operating Area

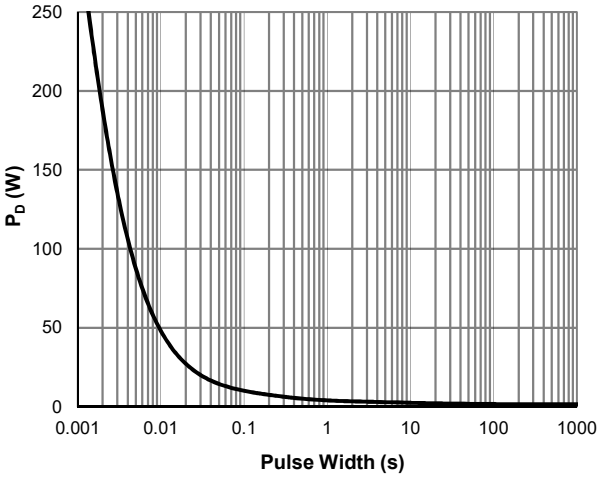


Figure 10: Single Pulse Power Rating, Junction-to-Case

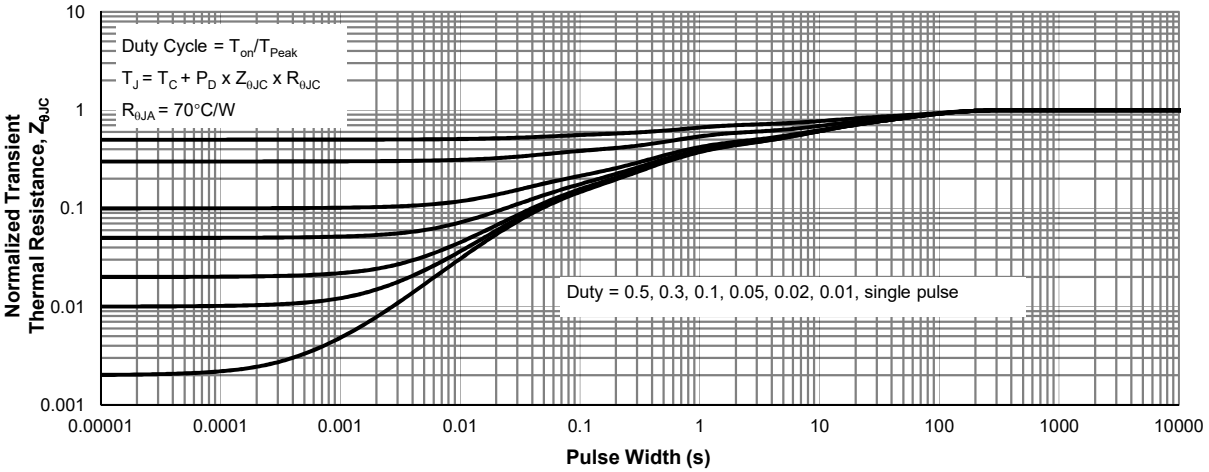
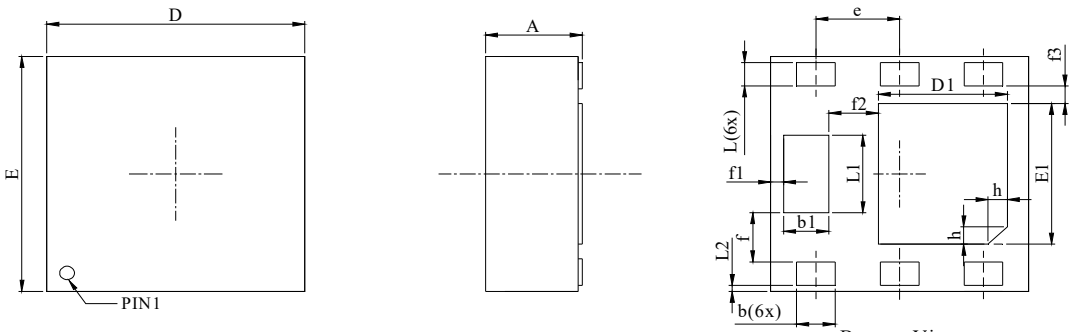
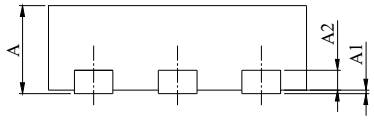


Figure 11: Normalized Maximum Transient Thermal Impedance

U-DFN2020-6L Package Information

Package Outline

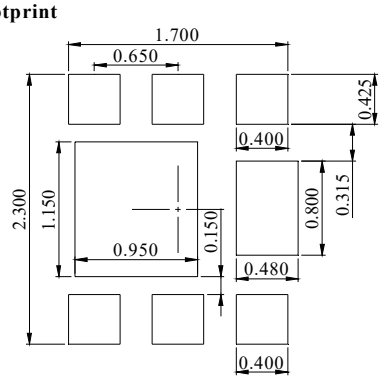




Front View

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