



60V 9.8mΩ N-Ch Power MOSFET

Features

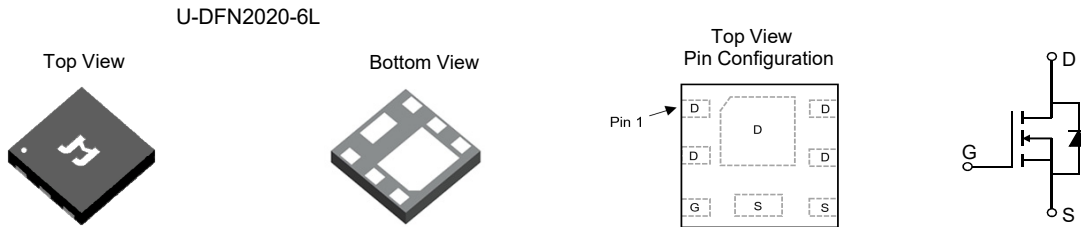
- Low $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

Product Summary

Parameter	Value	Unit
V_{DS}	60	V
$V_{GS(th_Typ)}$	1.6	V
I_D (@ $V_{GS} = 10V$) ⁽¹⁾	21	A
$R_{DS(ON_Typ)}$ (@ $V_{GS} = 10V$)	9.8	mΩ
$R_{DS(ON_Typ)}$ (@ $V_{GS} = 4.5V$)	12.5	mΩ

Applications

- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Load Switching, Quick/Wireless Charging, Motor Driving

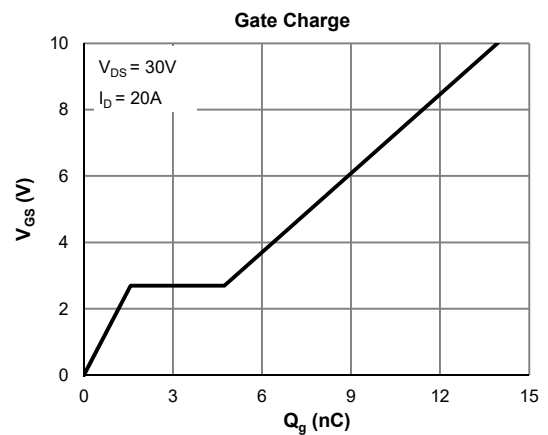
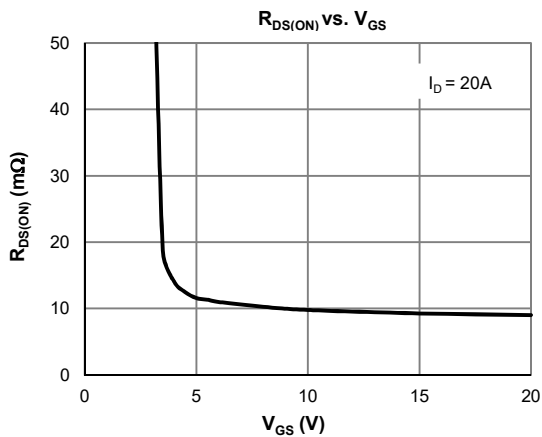


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL0615AV-7	U-DFN2020-6L	6	BN	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}	60	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_C = 25^\circ C$	21
		$T_C = 100^\circ C$	17
Pulsed Drain Current ⁽²⁾	I_{DM}	83	A
Avalanche Current ⁽³⁾	I_{AS}	20	A
Avalanche Energy ⁽³⁾	E_{AS}	20	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ C$	9.6
		$T_C = 100^\circ C$	6.2
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
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1.0 5.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2	1.6	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$		9.8	12.8	m Ω
		$V_{GS} = 4.5\text{V}, I_D = 15\text{A}$		12.5	16.3	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}, I_D = 20\text{A}$		81		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	$T_C = 25^\circ\text{C}$			9.6	A

DYNAMIC PARAMETERS ⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 30\text{V}, f = 1\text{MHz}$		731		pF
Output Capacitance	C_{oss}			224		pF
Reverse Transfer Capacitance	C_{rss}			7.4		pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		2.4		Ω

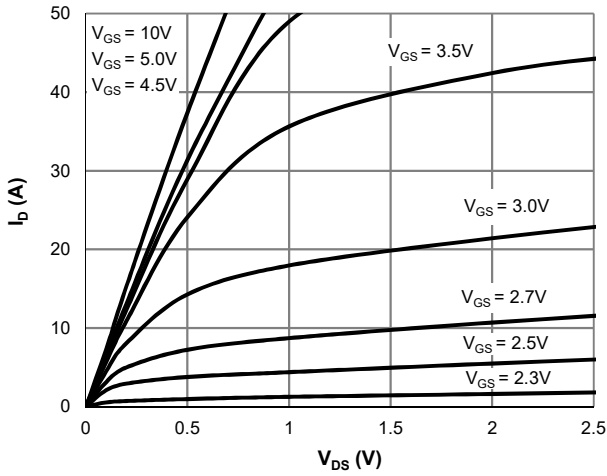
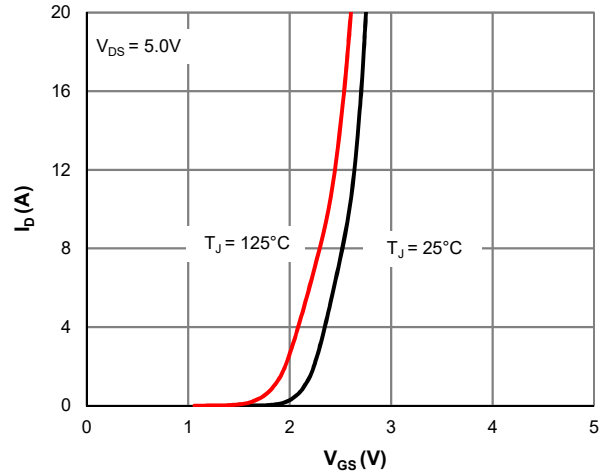
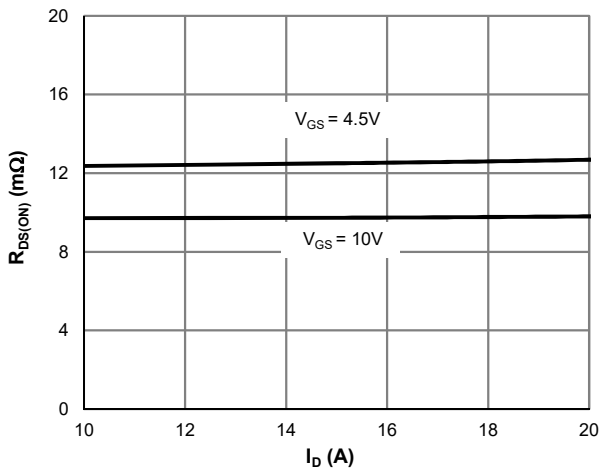
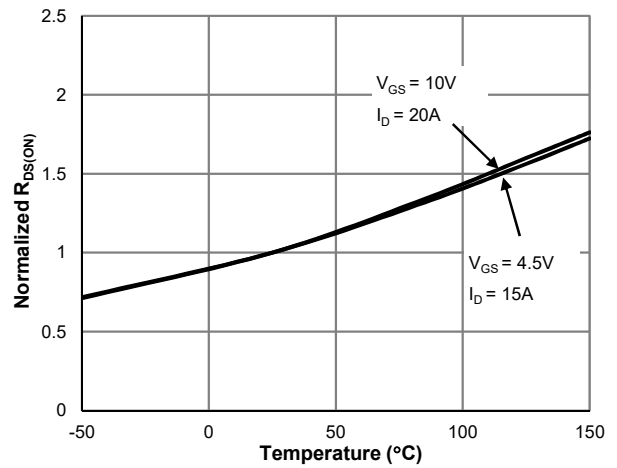
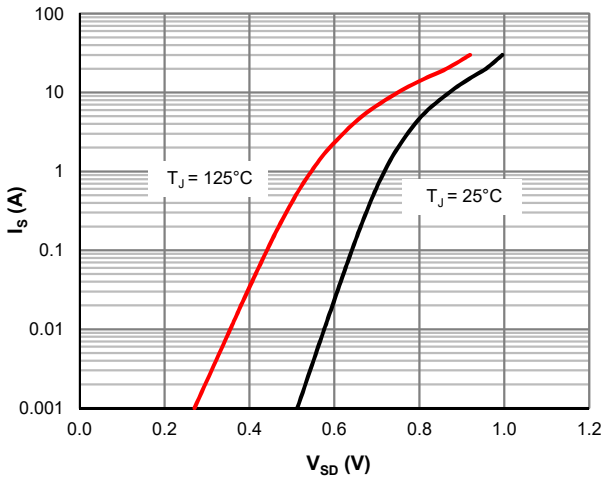
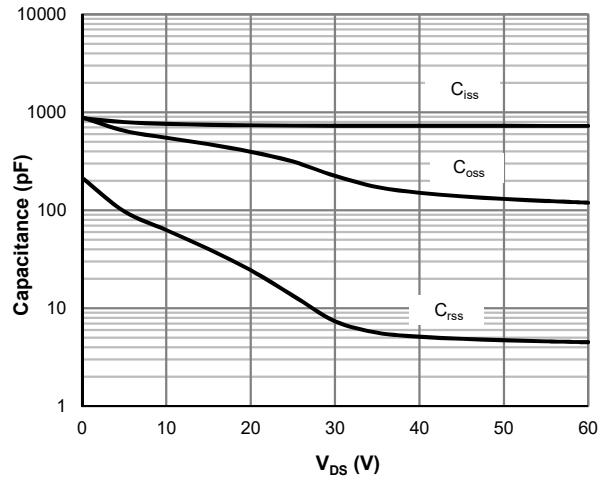
SWITCHING PARAMETERS ⁽⁵⁾						
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 30\text{V}, I_D = 20\text{A}$		13.9		nC
Total Gate Charge (@ $V_{GS} = 4.5\text{V}$)	Q_g			7.0		nC
Gate Source Charge	Q_{gs}			1.6		nC
Gate Drain Charge	Q_{gd}			3.1		nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 30\text{V}$ $R_L = 1.5\Omega, R_{GEN} = 6\Omega$		3.7		ns
Turn-On Rise Time	t_r			4.3		ns
Turn-Off DelayTime	$t_{D(off)}$			16.2		ns
Turn-Off Fall Time	t_f			6.5		ns
Body Diode Reverse Recovery Time	t_{rr}		$I_F = 15\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$		24	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$		9.3		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	65	80	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	10.0	13.0	$^\circ\text{C}/\text{W}$

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 [$L = 100\mu\text{H}, V_{GS} = 10\text{V}, V_{DS} = 30\text{V}$] 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

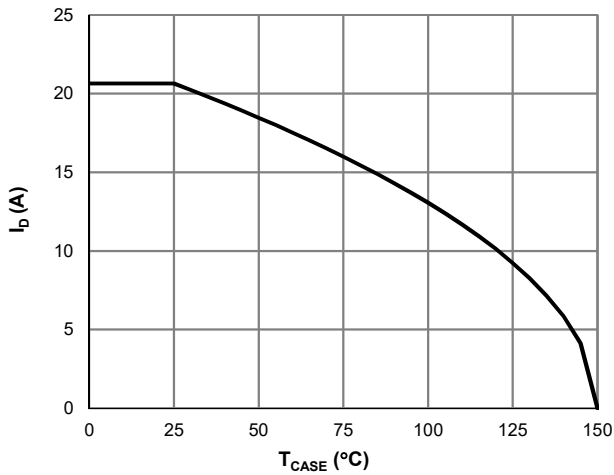


Figure 7: Current De-rating

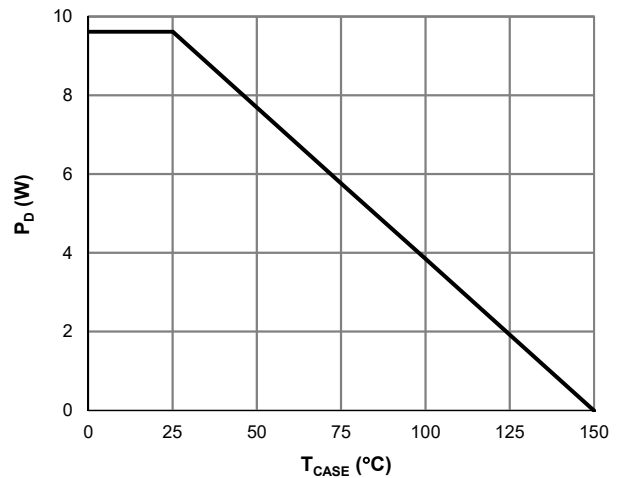


Figure 8: Power De-rating

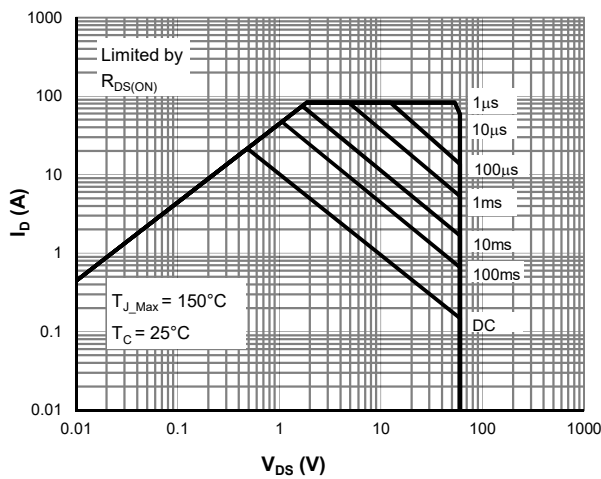


Figure 9: Maximum Safe Operating Area

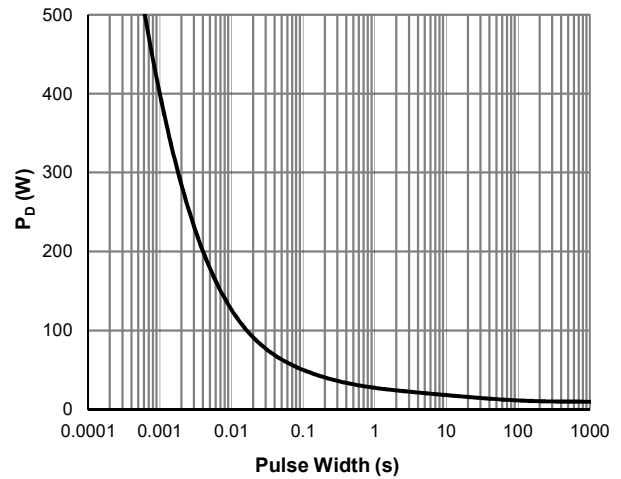


Figure 10: Single Pulse Power Rating, Junction-to-Case

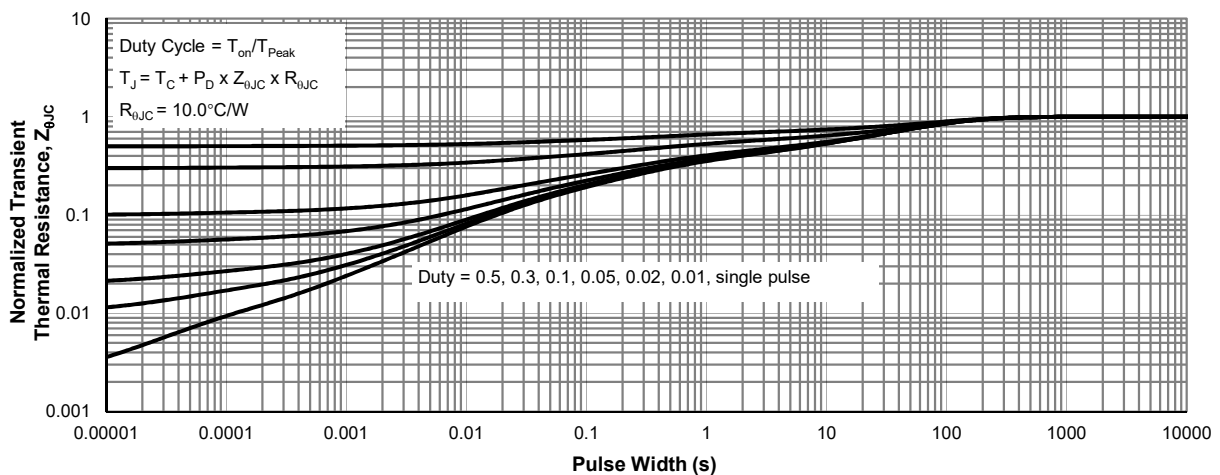
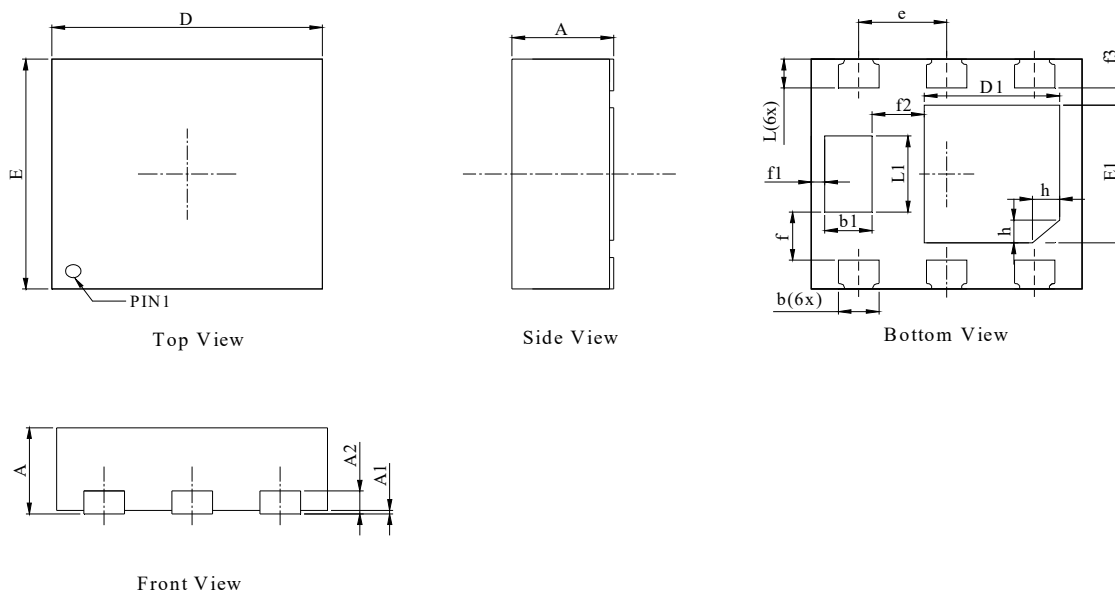
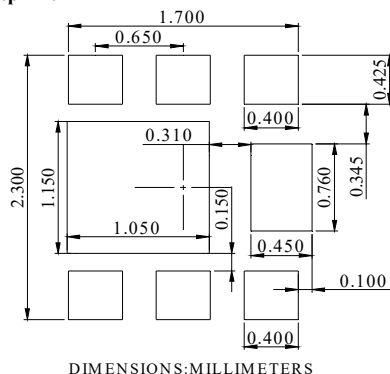


Figure 11: Normalized Maximum Transient Thermal Impedance

U-DFN2020-6L Package Information
Package Outline


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.700	0.750	0.800
A1	-	-	0.005
A2	-	0.203	-
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	0.200	0.250	0.300
L1	0.560	0.660	0.760
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