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

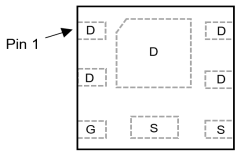
- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Load Switching, Quick/Wireless Charging, Motor Driving

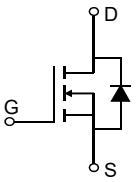
U-DFN2020-6L

Top View

Bottom View

Top View
Pin Configuration



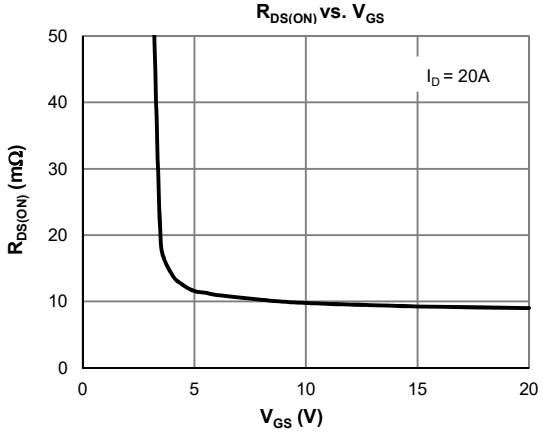


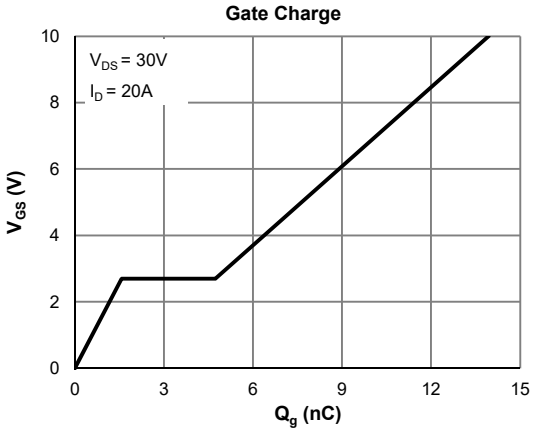
Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL0615AV-7	U-DFN2020-6L	6	BN	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}	60	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	21	A
	T_C = 100°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)	T_C = 25°C	P_D	9.6	W
	T_C = 100°C		6.2	
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 = 250μA, V_{GS} = 0V	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48V, 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	1.6	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		9.8	12.8	mΩ
		V_{GS} = 4.5V, I_D = 15A		12.5	16.3	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 20A		81		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			9.6	A
DYNAMIC PARAMETERS [5]						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 30V, f = 1MHz		731		pF
Output Capacitance	C_{oss}			224		pF
Reverse Transfer Capacitance	C_{rss}			7.4		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		2.4		Ω
SWITCHING PARAMETERS [5]						
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 30V, I_D = 20A		13.9		nC
Total Gate Charge (@ V_{GS} = 4.5V)	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} = 10V, V_{DS} = 30V R_L = 1.5Ω, R_{GEN} = 6Ω		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 = 15A, dI_F/dt = 100A/μS		24		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 15A, dI_F/dt = 100A/μS		9.3		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	65	80	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	10.0	13.0	°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} = 30V] 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

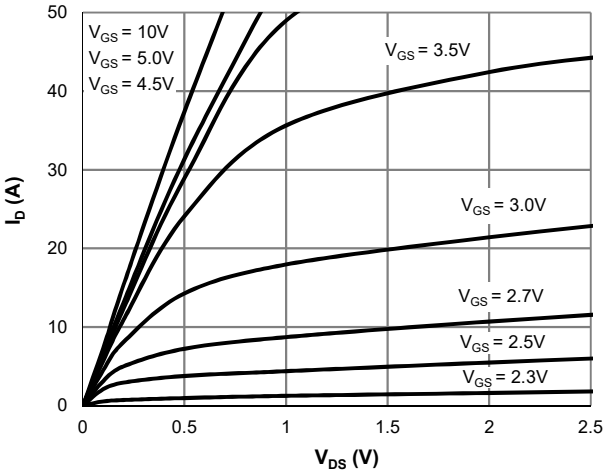


Figure 1: Saturation Characteristics

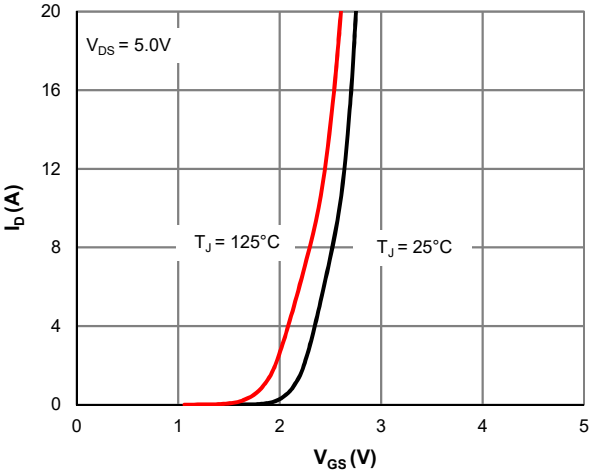


Figure 2: Transfer Characteristics

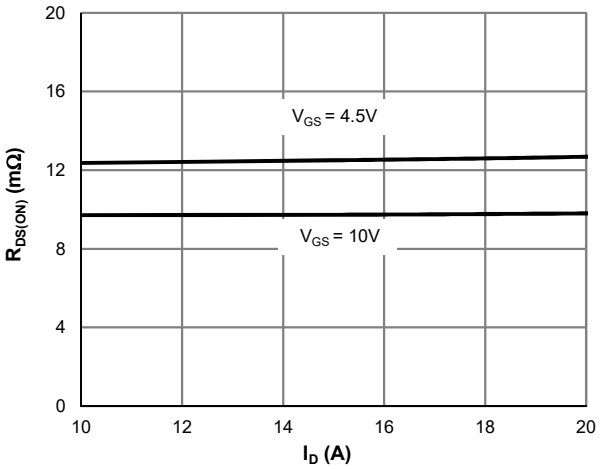


Figure 3: $R_{DS(ON)}$ vs. Drain Current

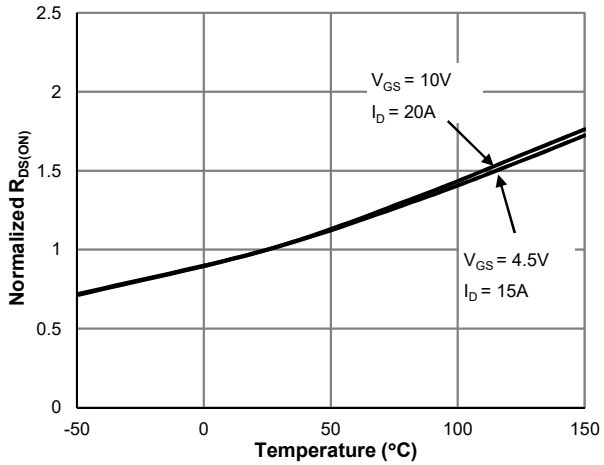


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

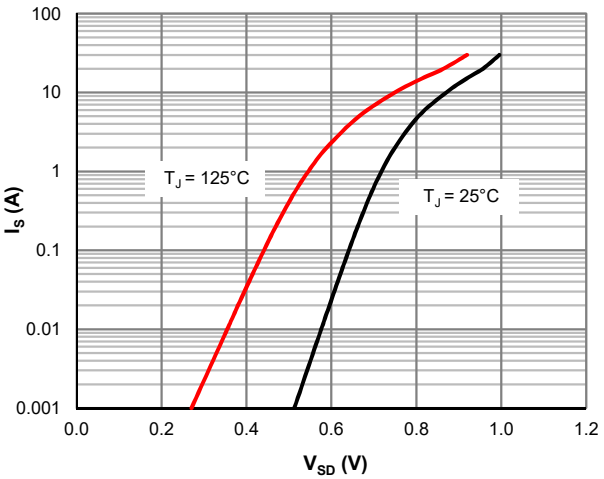


Figure 5: Body-Diode Characteristics

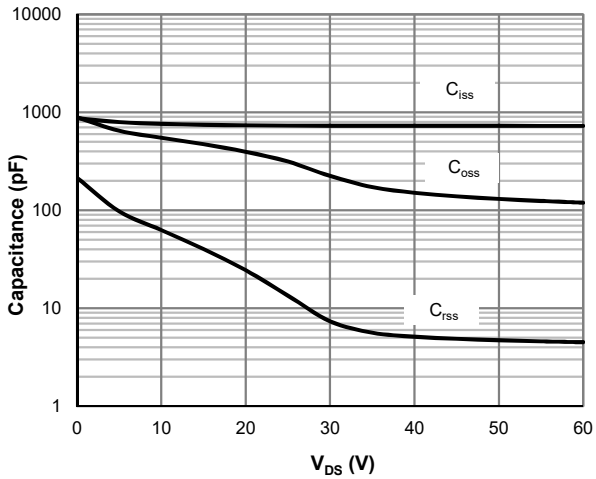


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

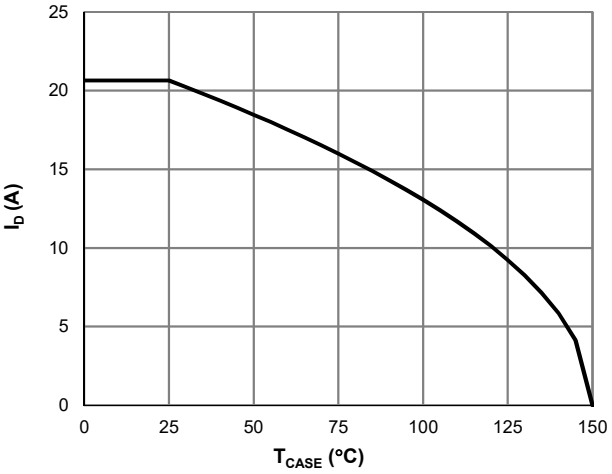


Figure 7: Current De-rating

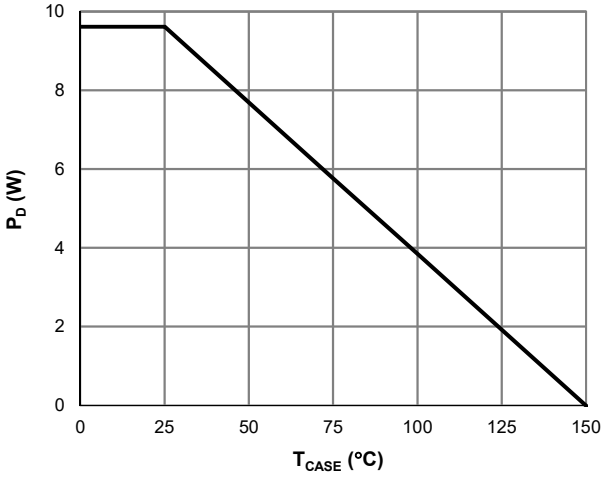


Figure 8: Power De-rating

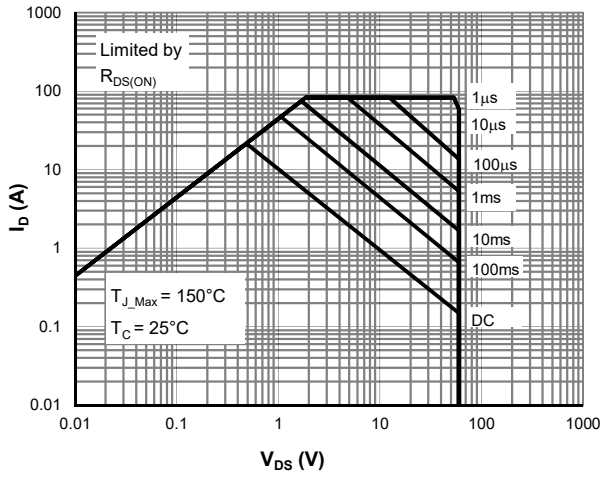


Figure 9: Maximum Safe Operating Area

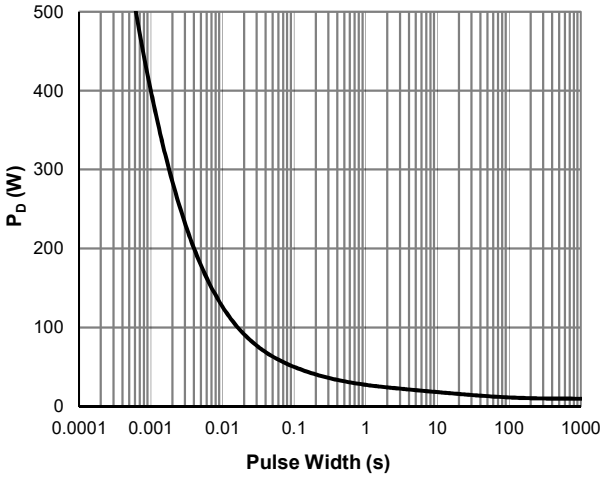


Figure 10: Single Pulse Power Rating, Junction-to-Case

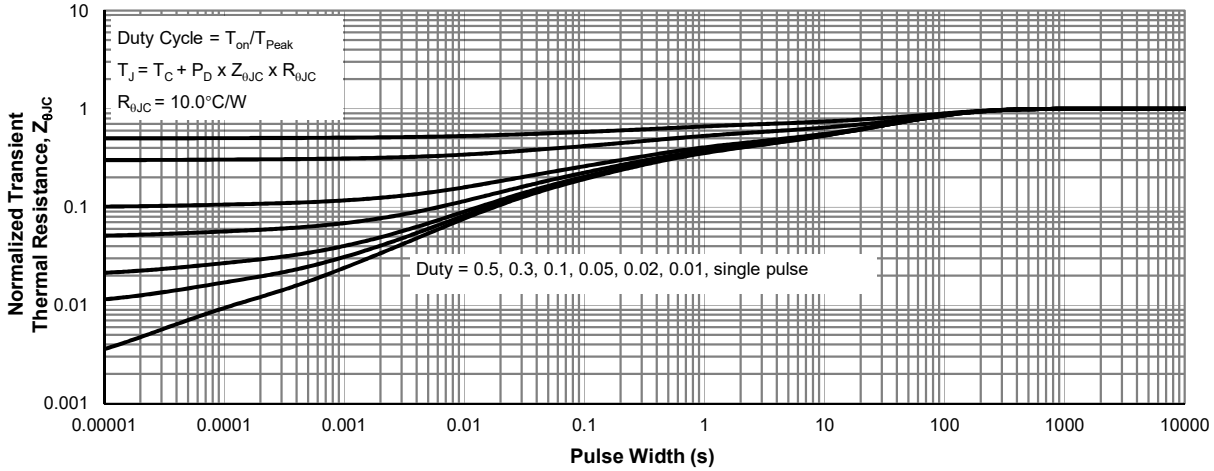
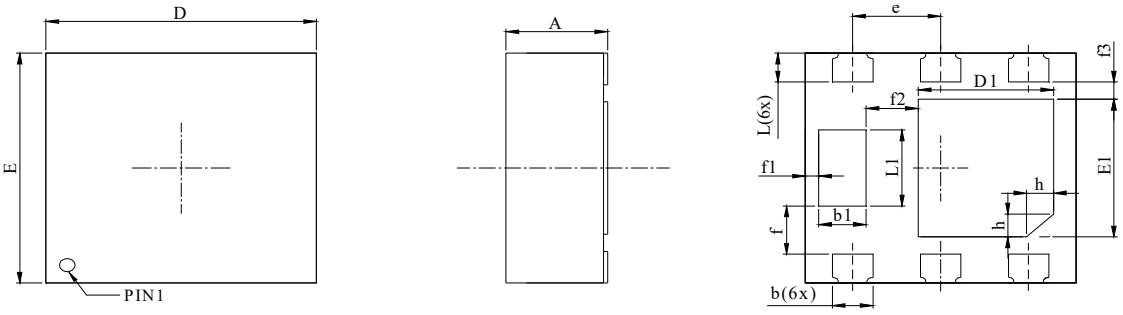


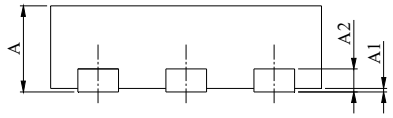
Figure 11: Normalized Maximum Transient Thermal Impedance

U-DFN2020-6L Package Information

Package Outline



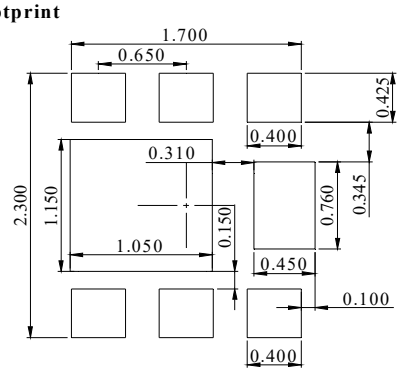
Top View　　Side View　　Bottom View



Front View

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