30V 3.7mΩ N-Ch Power MOSFET

Features

- Ultra-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}	30	V
$V_{GS(th)_Typ}$	1.6	V
I_D (@ V_{GS} = 10V) (1)	29	A
$R_{DS(ON)_Typ}$ (@ V_{GS} = 10V)	3.7	mΩ
$R_{DS(ON)_Typ}$ (@ V_{GS} = 4.5V)	5.3	mΩ

Applications

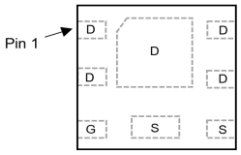
- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC Sub-systems
- Motor Driving, Quick/Wireless Charging

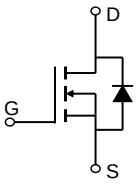
DFN2020-6L

Top View

Bottom View

Top View
Pin Configuration



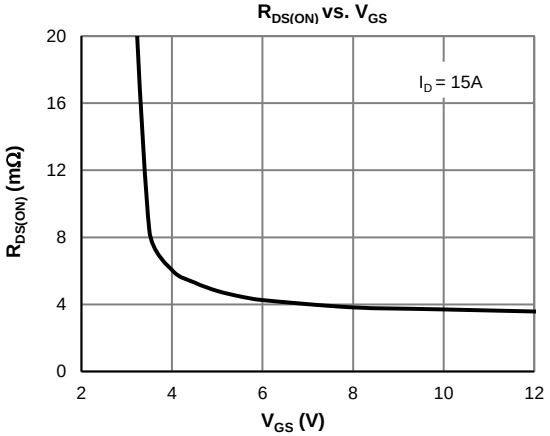


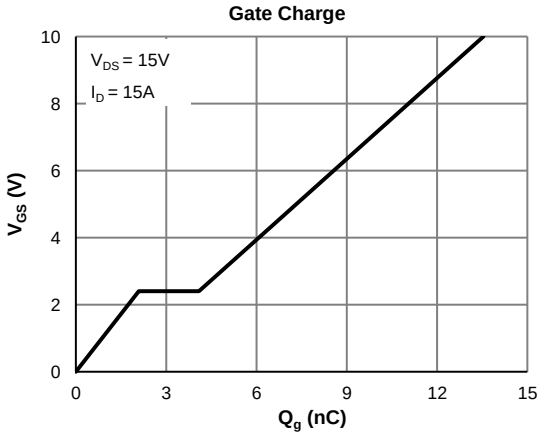
Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL0307AV-7	DFN2020-6L	6	BP	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}	30	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	29	A
	T_C = 100°C		18	
Pulsed Drain Current (2)		I_{DM}	116	A
Avalanche Current (3)		I_{AS}	20	A
Avalanche Energy (3)		E_{AS}	20	mJ
Power Dissipation (4)	T_C = 25°C	P_D	6.3	W
	T_C = 100°C		2.5	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C





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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 = 1mA, V_{GS} = 0V	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, 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 = 15A		3.7	4.8	mΩ
		V_{GS} = 4.5V, I_D = 10A		5.3	7.0	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 15A		198		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			29	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		866		pF
Output Capacitance	C_{oss}			739		pF
Reverse Transfer Capacitance	C_{rss}			54		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		1.8		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 15V, I_D = 15A		13.5		nC
Total Gate Charge (@ V_{GS} = 4.5V)	Q_g			6.7		nC
Gate Source Charge	Q_{gs}			2.1		nC
Gate Drain Charge	Q_{gd}			2.0		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 15V R_L = 1.0Ω, R_{GEN} = 6Ω		2.4		ns
Turn-On Rise Time	t_r			2.5		ns
Turn-Off DelayTime	$t_{D(off)}$			12.7		ns
Turn-Off Fall Time	t_f			6.9		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 15A, dI_F/dt = 100A/μs		26		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 15A, dI_F/dt = 100A/μs		10.6		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	$R_{\theta JC}$	15.0	20	°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} = 15V] 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.

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Typical Electrical & Thermal Characteristics

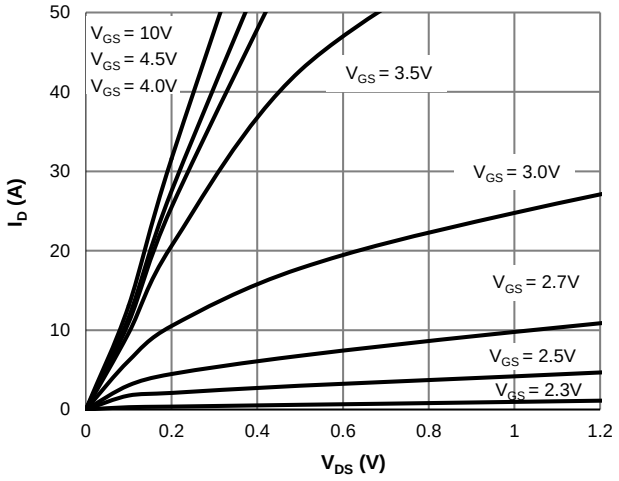

Figure 1: Saturation Characteristics

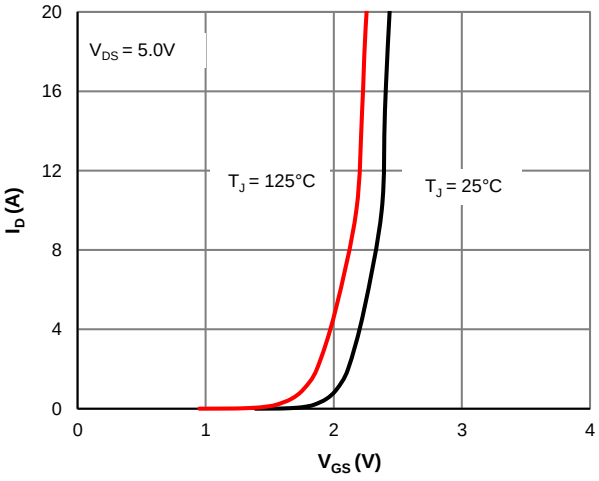

Figure 2: Transfer Characteristics

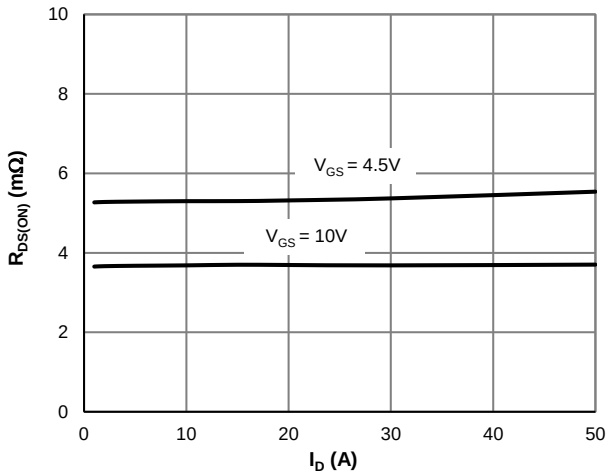

Figure 3: $R_{DS(ON)}$ vs. Drain Current

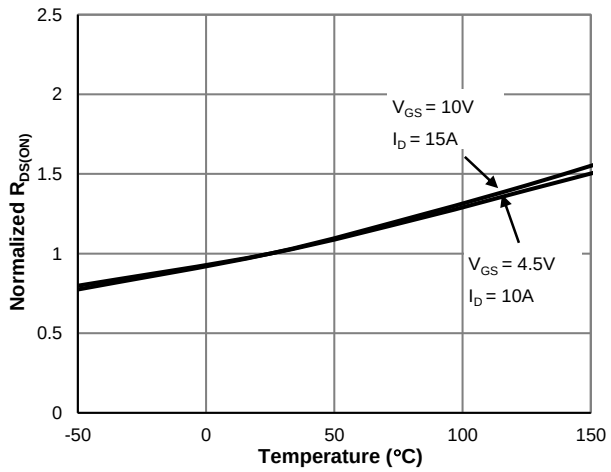

Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

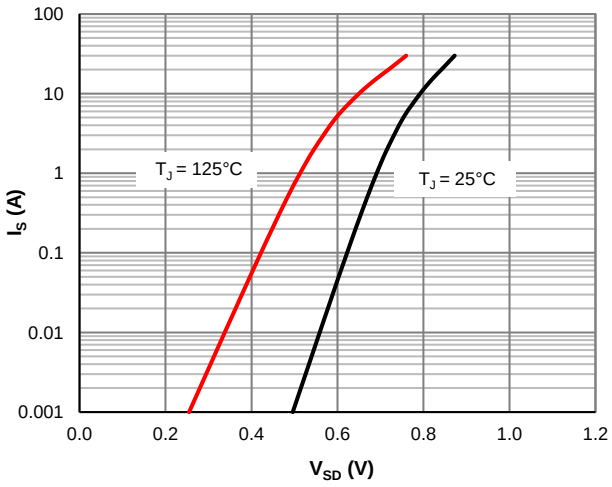

Figure 5: Body-Diode Characteristics

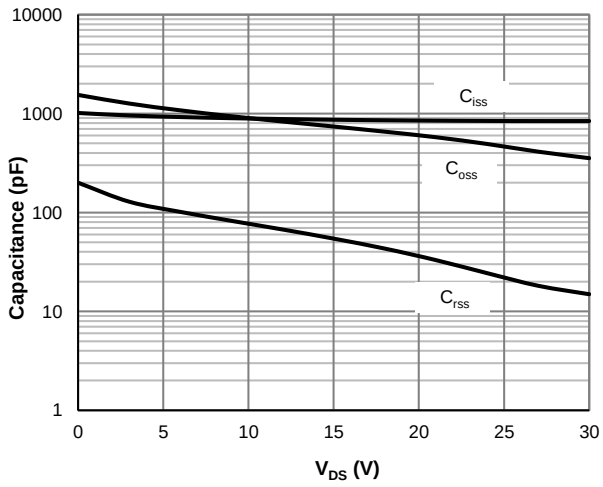

Figure 6: Capacitance Characteristics

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Typical Electrical & Thermal Characteristics

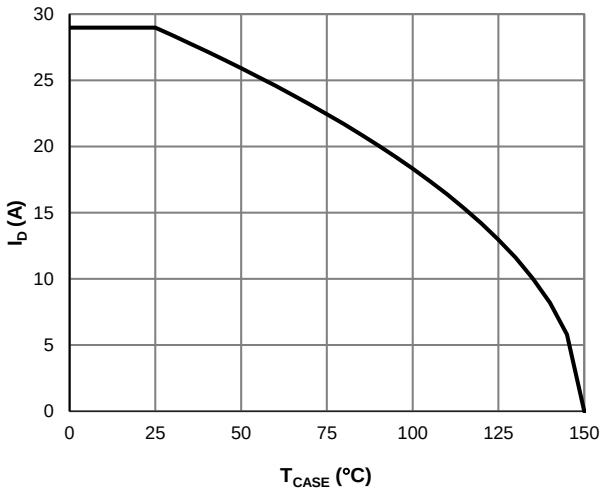

Figure 7: Current De-rating

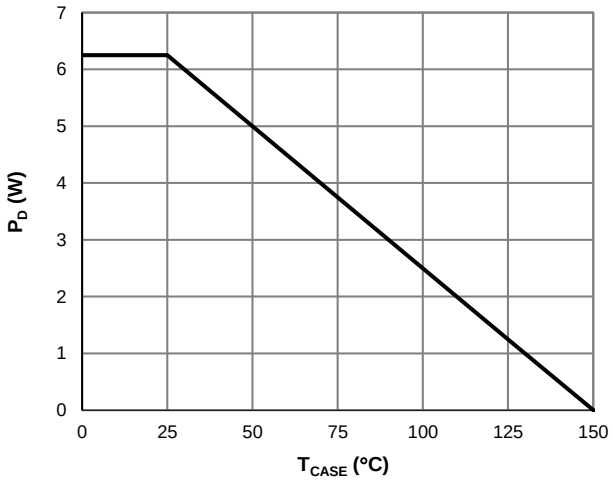

Figure 8: Power De-rating

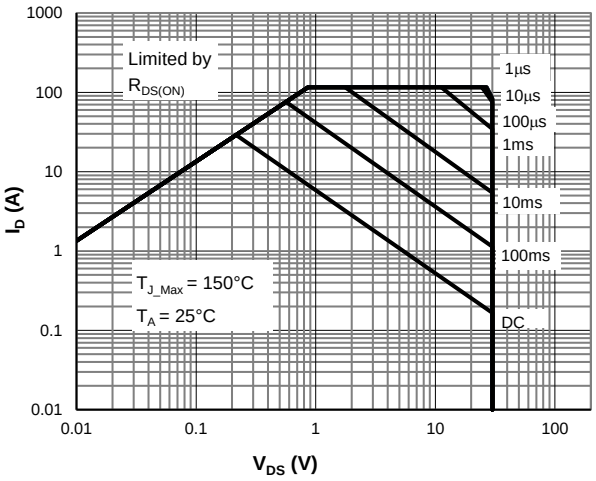

Figure 9: Maximum Safe Operating Area

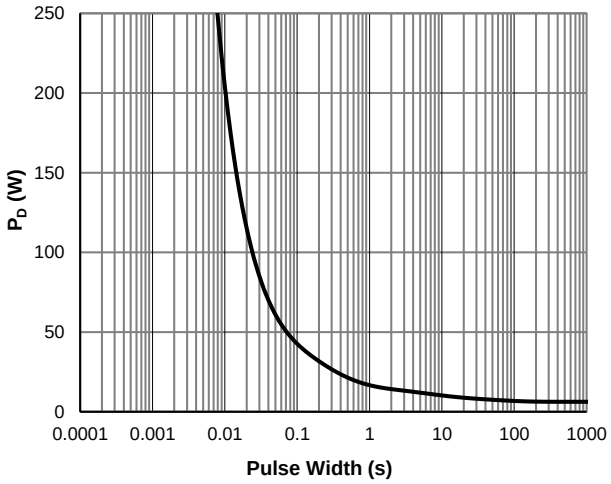

Figure 10: Single Pulse Power Rating, Junction-to-Case

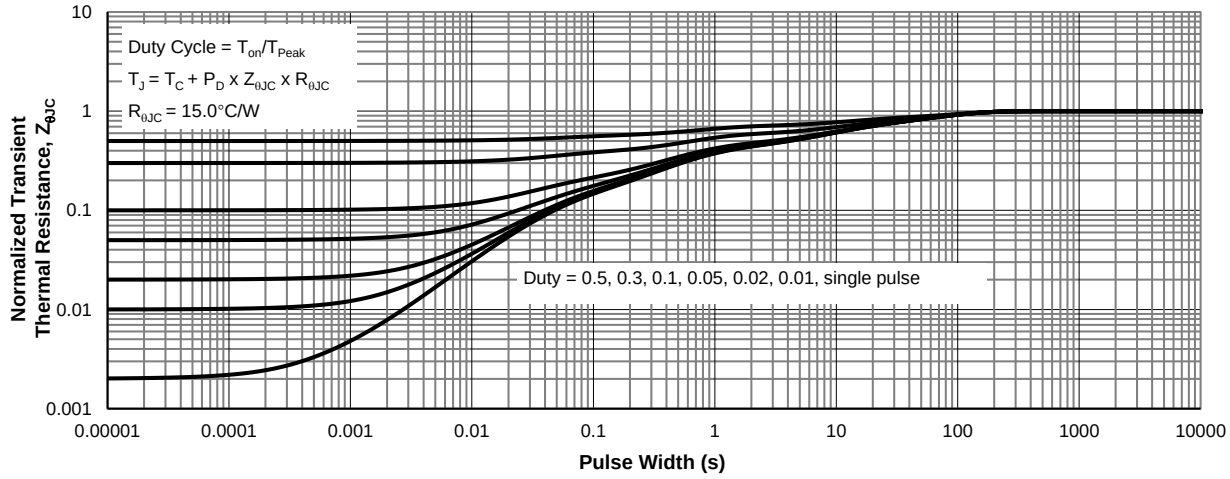

Figure 11: Normalized Maximum Transient Thermal Impedance

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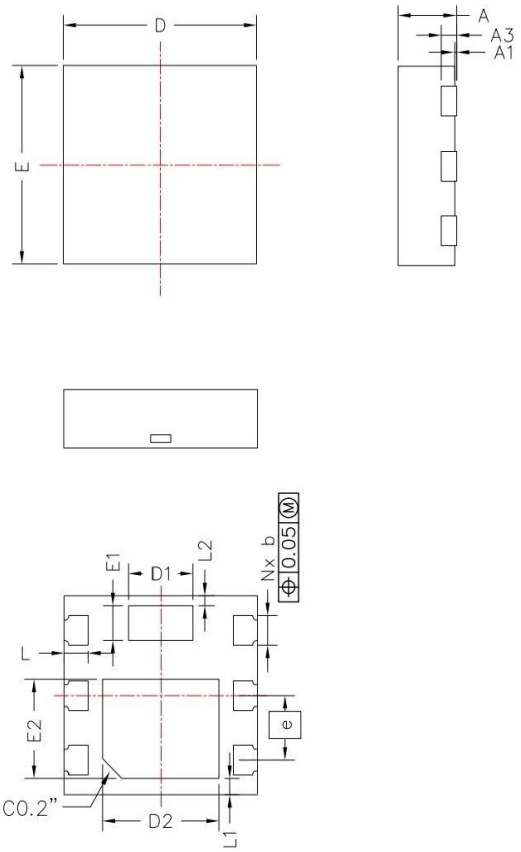
DFN2020-6L Package Information



SYMBOLS	DIMENSIONIN MM			DIMENSIONININCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1			0.050			0.002
A3	0.195	0.203	0.211	0.008	0.008	0.008
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.65BSC			0.026 BSC		
D	1.900	2.000	2.100	0.075	0.079	0.083
E	1.900	2.000	2.100	0.075	0.079	0.083
D1	0.560	0.660	0.760	0.022	0.026	0.030
E1	0.250	0.350	0.450	0.010	0.014	0.018
D2	1.100	1.200	1.300	0.043	0.047	0.051
E2	0.900	1.000	1.100	0.035	0.039	0.043
L	0.150	0.250	0.350	0.006	0.010	0.014
L1	0.065	0.165	0.265	0.003	0.006	0.010
L2	0.000	0.100	0.200	0.000	0.004	0.008

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