# 60V 10.5mΩ Dual N-Ch Power MOSFET

Features

- Low ON-resistance, $R_{DS(ON)}$
- Low Gate Charge, Q_g
- 100% UIS and R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant
- AEC-Q101 Qualified for Automotive Applications
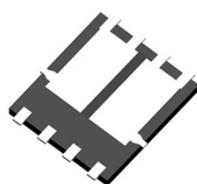
Product Summary

Parameter	Value	Unit
V_{DS}	60	V
$V_{GS(th)\_Typ}$	1.6	V
I_D (@ V_{GS} = 10V) [(1)]	33	A
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 10V)	10.5	mΩ
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 4.5V)	13.5	mΩ

PDFN5x6-8L-D
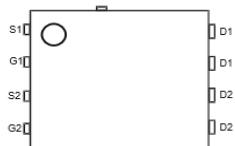
Top View

Bottom View
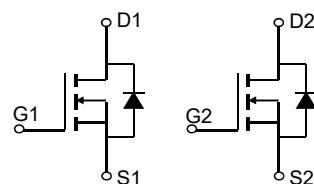
Pin Configuration
Top View

Chip-1 & Chip-2
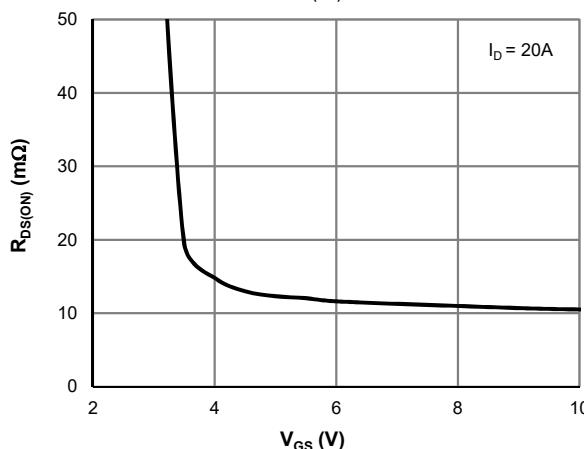
Ordering Information
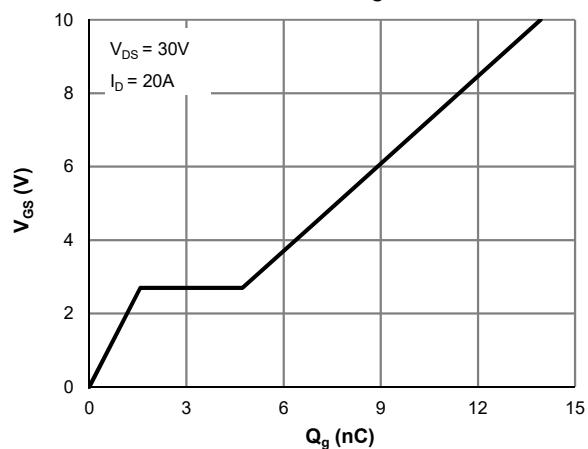
Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL0615AGDQ-13	PDFN5x6-8L-D	8	L0615ADQ	1	-55 to 175	13-inch Reel	5000

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	33	A
	T_C = 100°C		23	
Pulsed Drain Current [(2)]		I_{DM}	131	A
Avalanche Current [(3)]		I_{AS}	20	A
Avalanche Energy [(3)]		E_{AS}	20	mJ
Power Dissipation [(4)]	T_C = 25°C	P_D	28	W
	T_C = 100°C		14.2	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

$R_{DS(ON)}$ vs. V_{GS}

I_D = 20A

Gate Charge

V_{DS} = 30V
I_D = 20A

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			10.5	13.5	mΩ
		V_{GS} = 4.5V, I_D = 15A			13.5	17.5	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 20A			81		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V			0.71	1.0	V
Diode Continuous Current	I_S	T_C = 25°C				28	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			1.7		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	$R_{\theta JA}$	68	82	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.3	6.0	°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} = 175°C.

3. This single-pulse measurement was taken under the following condition [L = 100µH, V_{GS} = 10V, V_{DD} = 30V] while its value is limited by T_{J_Max} = 175°C.

4. The power dissipation P_D is based on T_{J_Max} = 175°C.

5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics
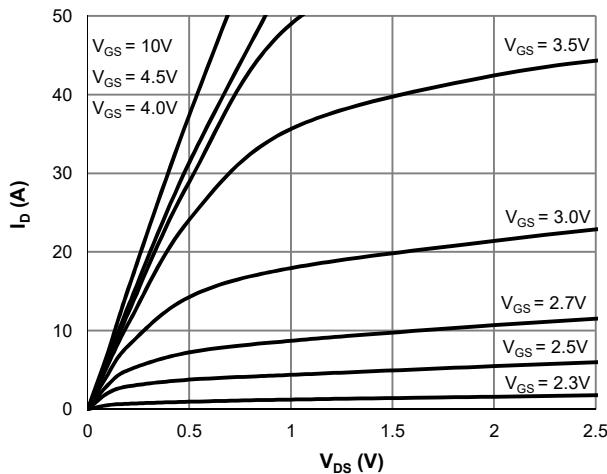
Figure 1: Saturation Characteristics
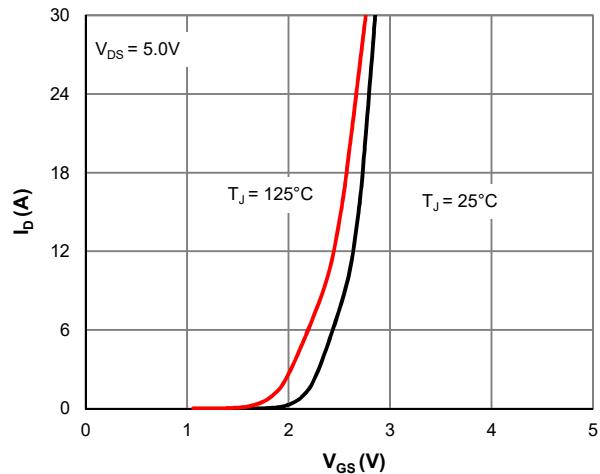
Figure 2: Transfer Characteristics
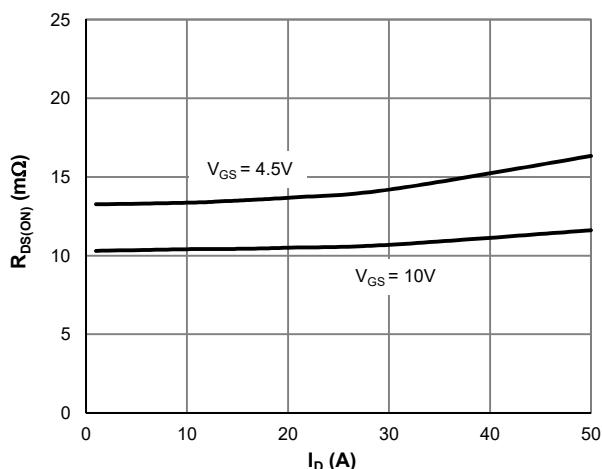
Figure 3: $R_{DS(ON)}$ vs. Drain Current
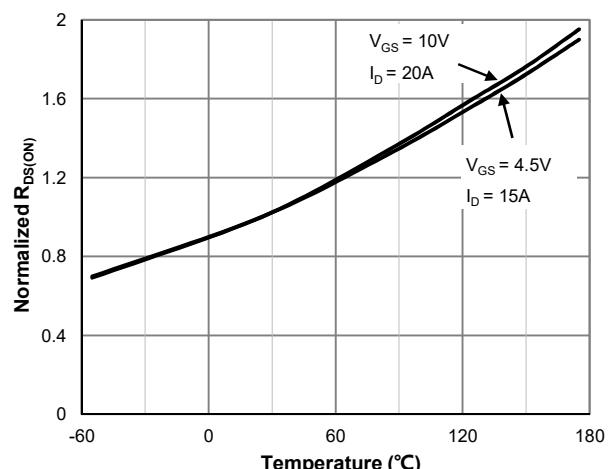
Figure 4: $R_{DS(ON)}$ vs. Junction Temperature
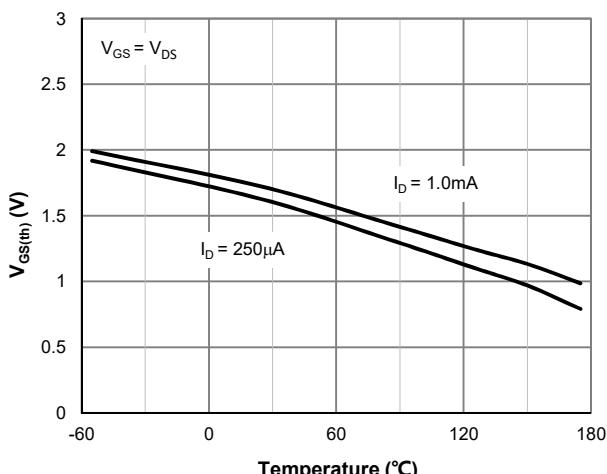
Figure 5: $V_{GS(th)}$ vs. Junction Temperature
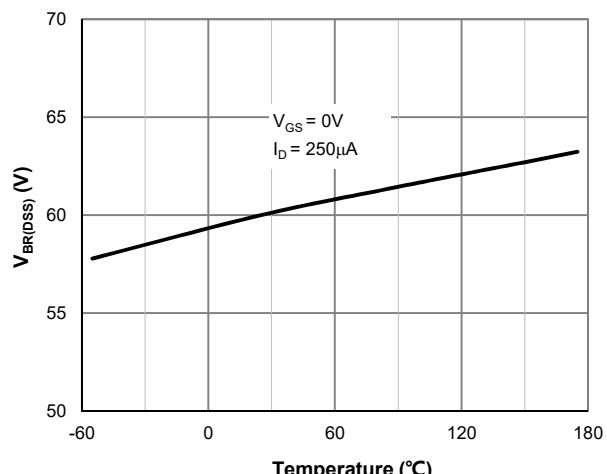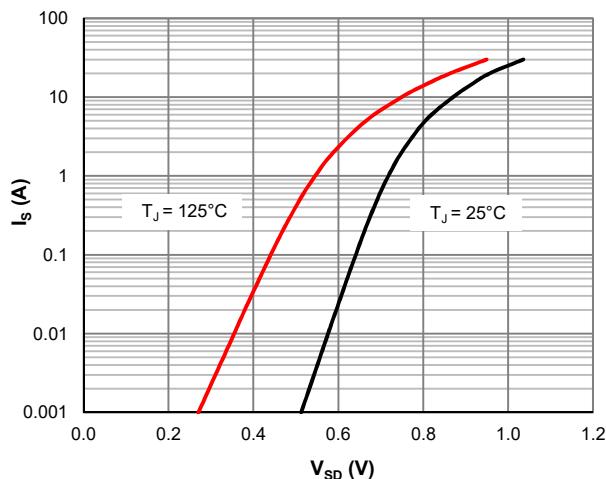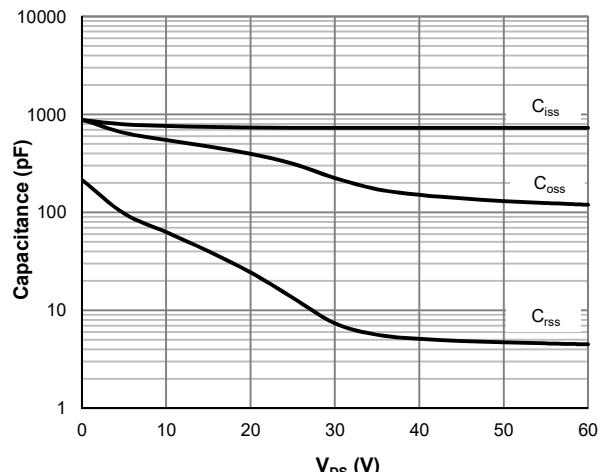
Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature
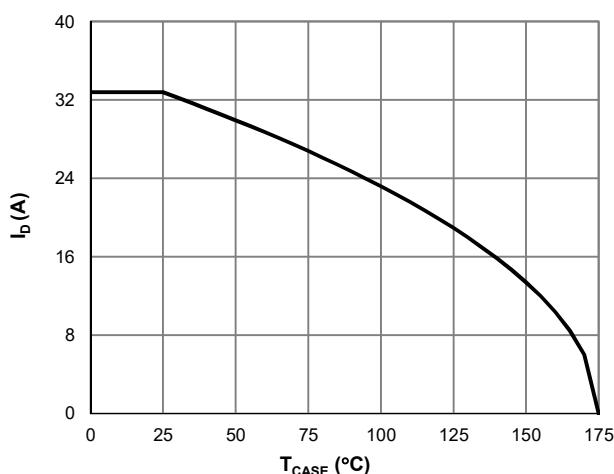
Typical Electrical & Thermal Characteristics
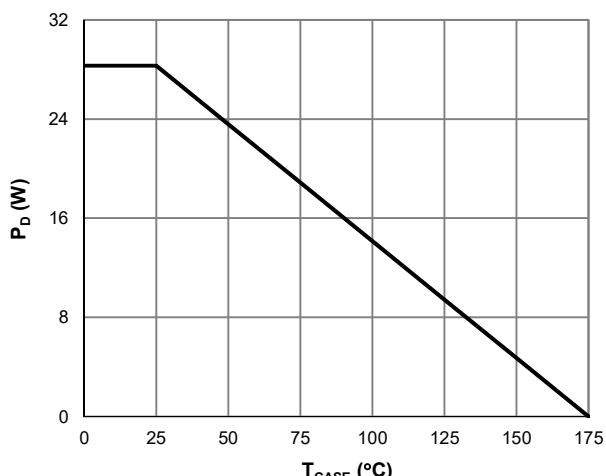
**Figure 7: Body-Diode Characteristics**
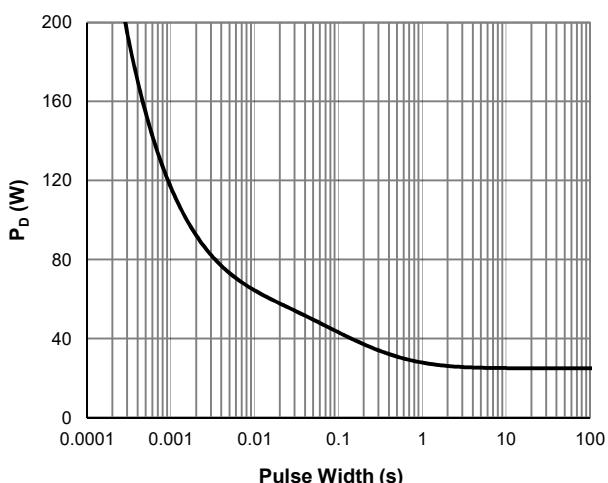
Figure 8: Capacitance Characteristics
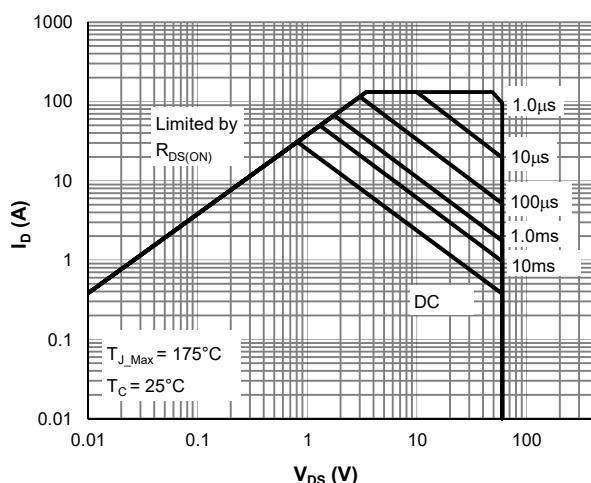
Figure 9: Current De-rating

**Figure 10: Power De-rating**

Figure 11: Single Pulse Power Rating, Junction-to-Case

Figure 12: Maximum Safe Operating Area

Typical Electrical & Thermal Characteristics
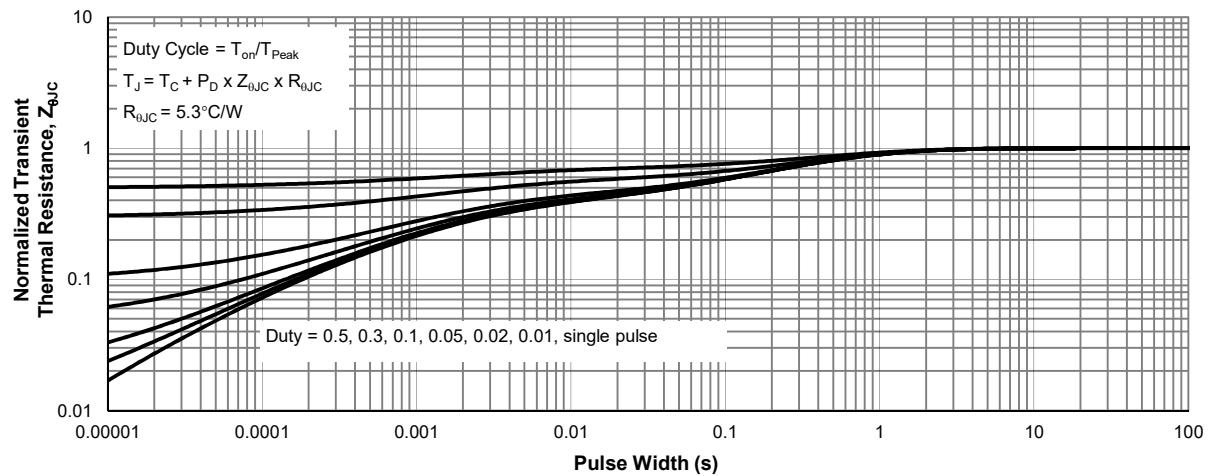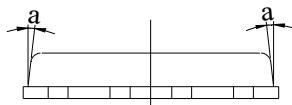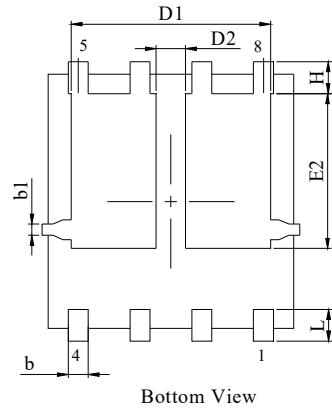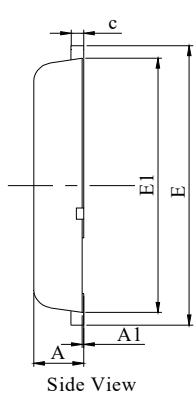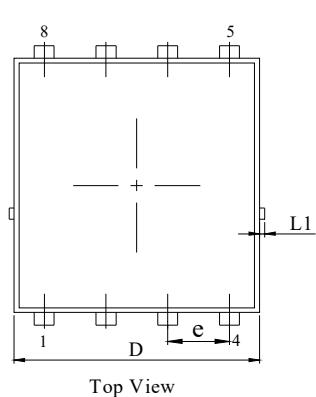
Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L-D Package Information

Package Outline

Top View

Side View

Bottom View
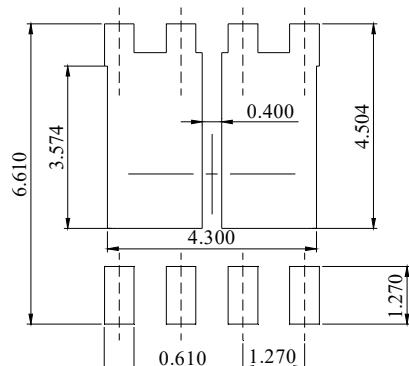
Front View

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	-	0.10
b	0.31	0.41	0.51
b1	0.15	0.25	0.35
c	0.23	-	0.33
D	4.95	5.05	5.15
D1	4.00	4.10	4.20
D2	0.50	0.60	0.70
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.31	3.41	3.51
e	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
L1	-	-	0.125
a	-	-	12°

Recommended Soldering Footprint

DIMENSIONS:MILLIMETERS