

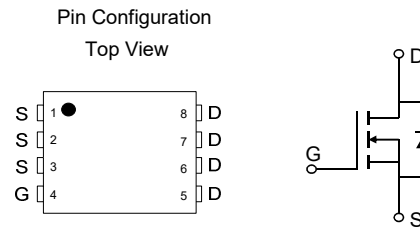
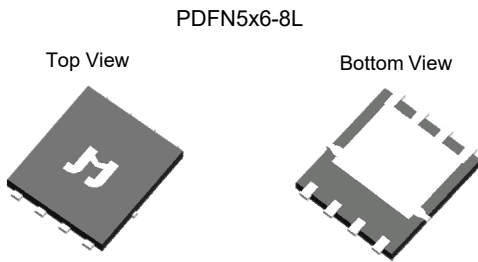
60V 2.4mΩ N-Ch Power MOSFET

Features

- Ultra-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

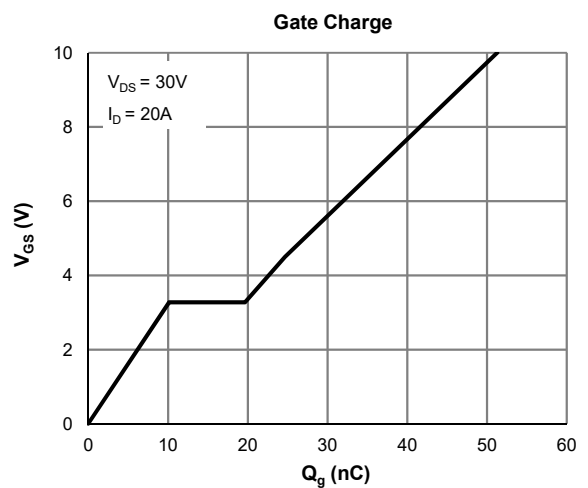
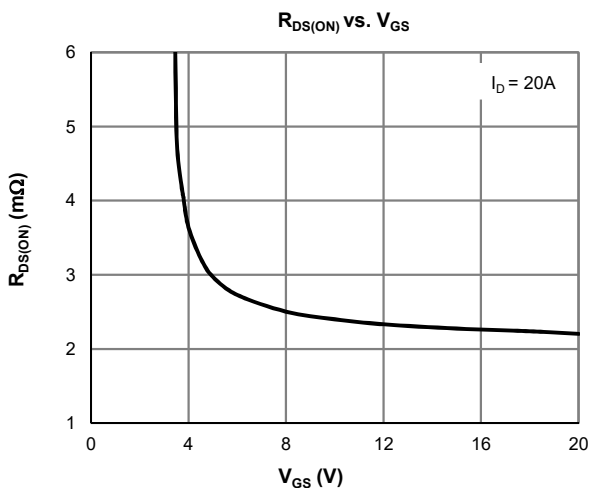
Parameter	Value	Unit
V_{DS}	60	V
$V_{GS(th),Typ}$	1.6	V
I_D (@ $V_{GS} = 10V$) ⁽¹⁾	147	A
$R_{DS(ON),Typ}$ (@ $V_{GS} = 10V$)	2.4	mΩ
$R_{DS(ON),Typ}$ (@ $V_{GS} = 4.5V$)	3.4	mΩ


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL0603BGQ-13	PDFN5x6-8L	8	SL0603BQ	1	-55 to 175	13-inch Reel	3000

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ 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	$T_C = 25^\circ\text{C}$	147
		$T_C = 100^\circ\text{C}$	104
Pulsed Drain Current ⁽²⁾	I_{DM}	588	A
Avalanche Energy ⁽³⁾	E_{AS}	338	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ\text{C}$	136
		$T_C = 100^\circ\text{C}$	68
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 175	°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 T _J = 55°C			1.0 5.0	μA
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		2.4	3.0	mΩ
		V _{GS} = 4.5V, I _D = 15A		3.4	4.4	mΩ
Forward Transconductance	g _{FS}	V _{DS} = 5V, I _D = 20A		77		S
Diode Forward Voltage	V _{SD}	I _S = 1A, V _{GS} = 0V		0.65	1.0	V
Diode Continuous Current	I _S	T _C = 25°C			136	A

DYNAMIC PARAMETERS ⁽⁵⁾

Input Capacitance	C _{ISS}	V _{GS} = 0V, V _{DS} = 30V, f = 1MHz		3174		pF
Output Capacitance	C _{OSS}			872		pF
Reverse Transfer Capacitance	C _{RSS}			39		pF
Gate Resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz		1.5		Ω

SWITCHING PARAMETERS ⁽⁵⁾

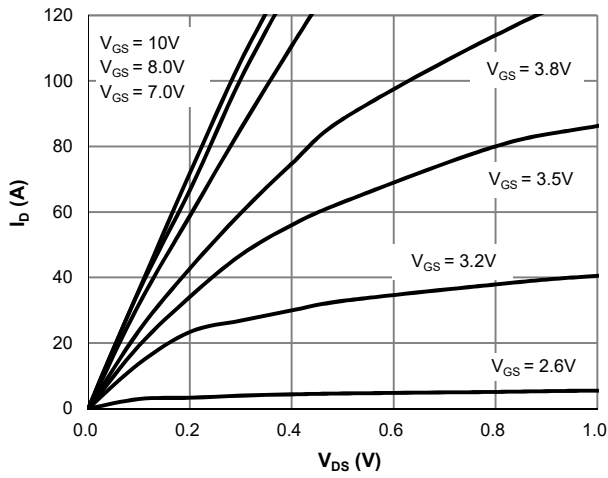
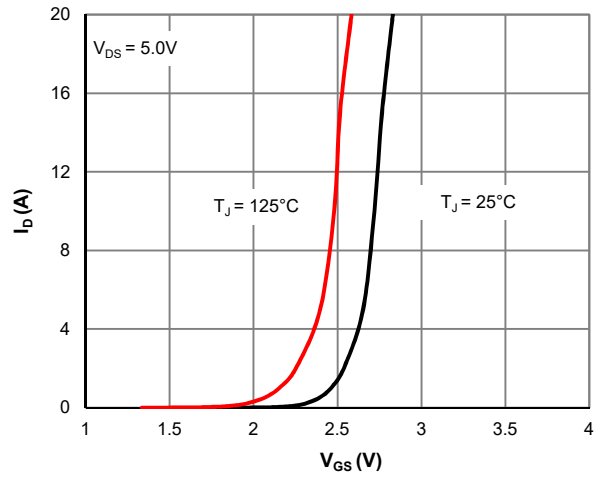
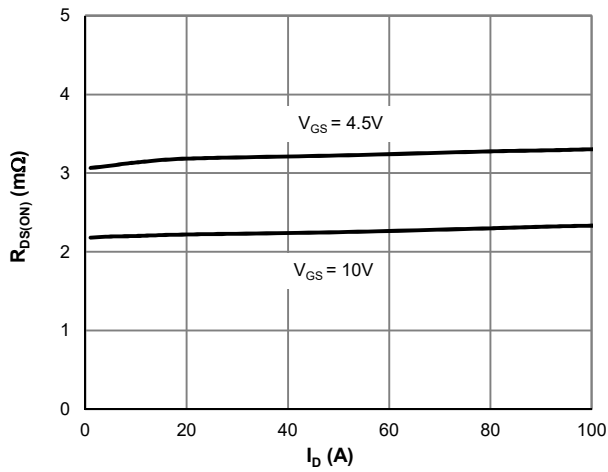
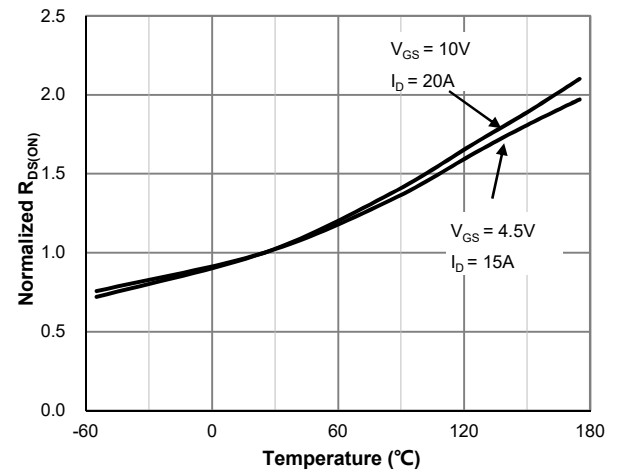
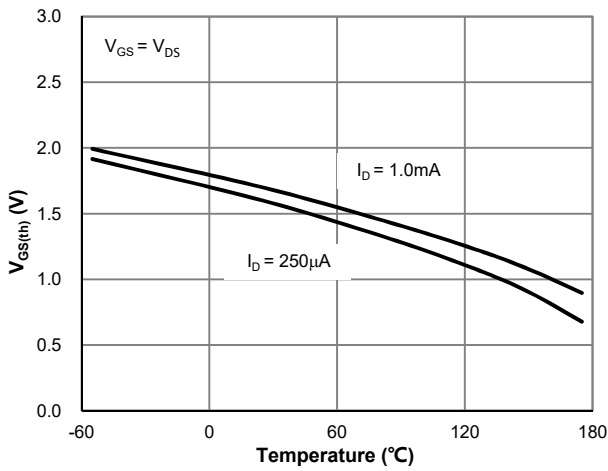
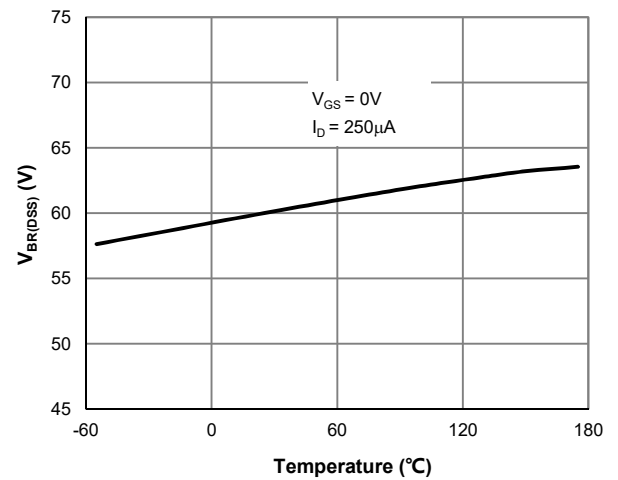
Total Gate Charge (@ V _{GS} = 10V)	Q _g	V _{GS} = 0 to 10V V _{DS} = 30V, I _D = 20A		51		nC
Total Gate Charge (@ V _{GS} = 4.5V)	Q _g			25		nC
Gate Source Charge	Q _{gs}			10.1		nC
Gate Drain Charge	Q _{gd}			9.5		nC
Turn-On DelayTime	t _{D(on)}			15.9		ns
Turn-On Rise Time	t _r	V _{GS} = 10V, V _{DS} = 30V		67		ns
Turn-Off DelayTime	t _{D(off)}	R _L = 1.5Ω, R _{GEN} = 6Ω		64		ns
Turn-Off Fall Time	t _f			108		ns
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20A, dI _F /dt = 100A/μS		49		ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 20A, dI _F /dt = 100A/μS		52		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	R _{θJA}	45	55	°C/W
Thermal Resistance, Junction-to-Case	R _{θJC}	1.1	1.3	°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. E_{AS} of 338 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = 15A, V_{GS} = 10V, V_{DD} = 30V; 100% test at L = 0.3mH, I_{AS} = 40A.
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

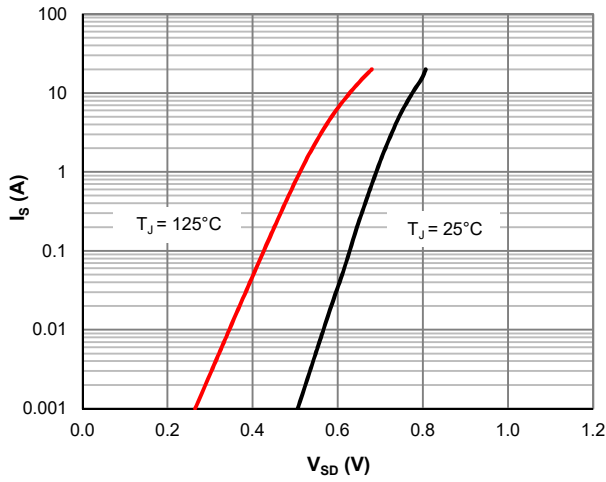


Figure 7: Body-Diode Characteristics

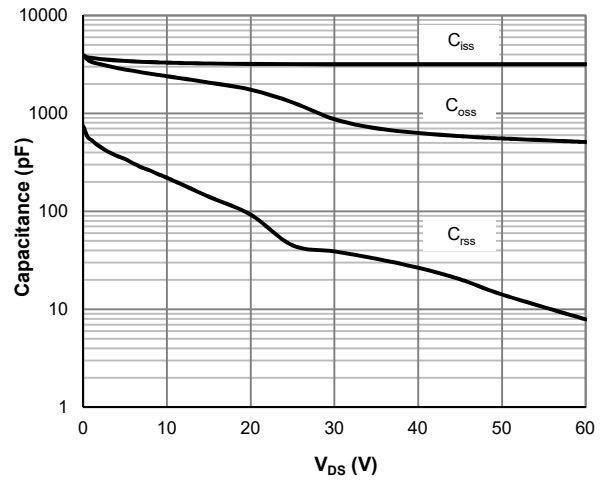


Figure 8: Capacitance Characteristics

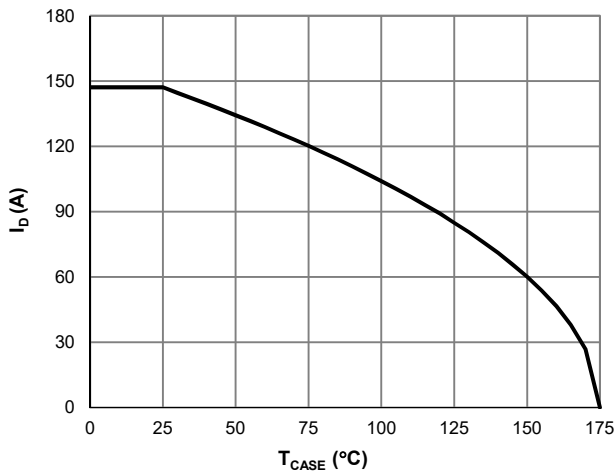


Figure 9: Current De-rating

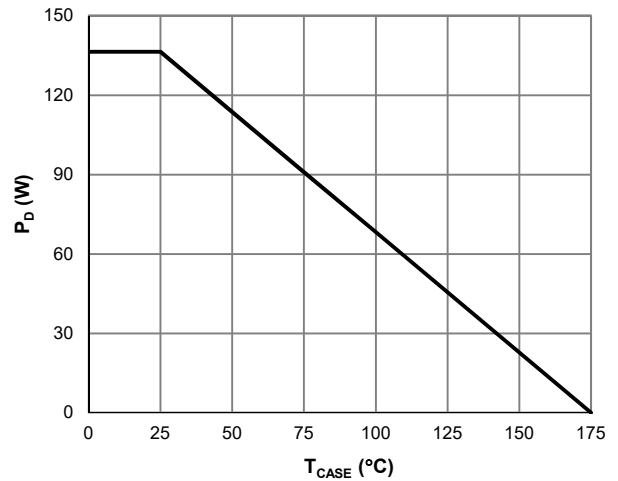


Figure 10: Power De-rating

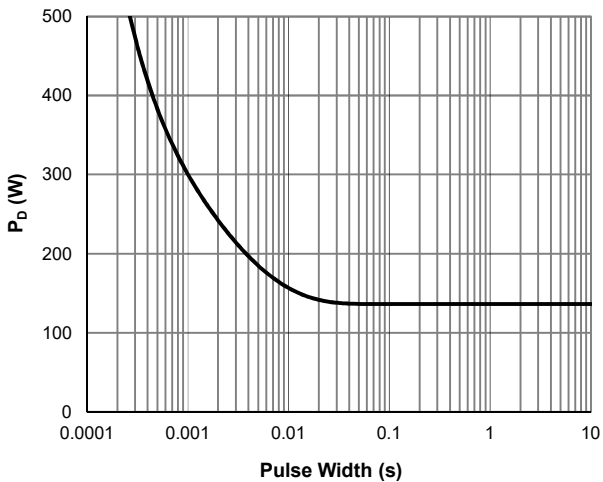


Figure 11: Single Pulse Power Rating, Junction-to-Case

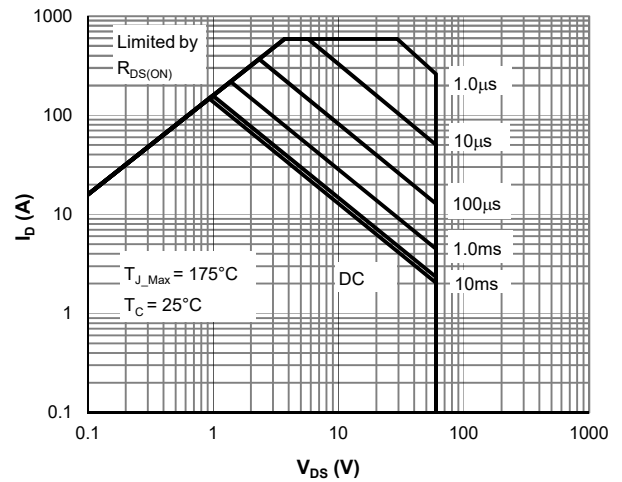


Figure 12: Maximum Safe Operating Area



Typical Electrical & Thermal Characteristics

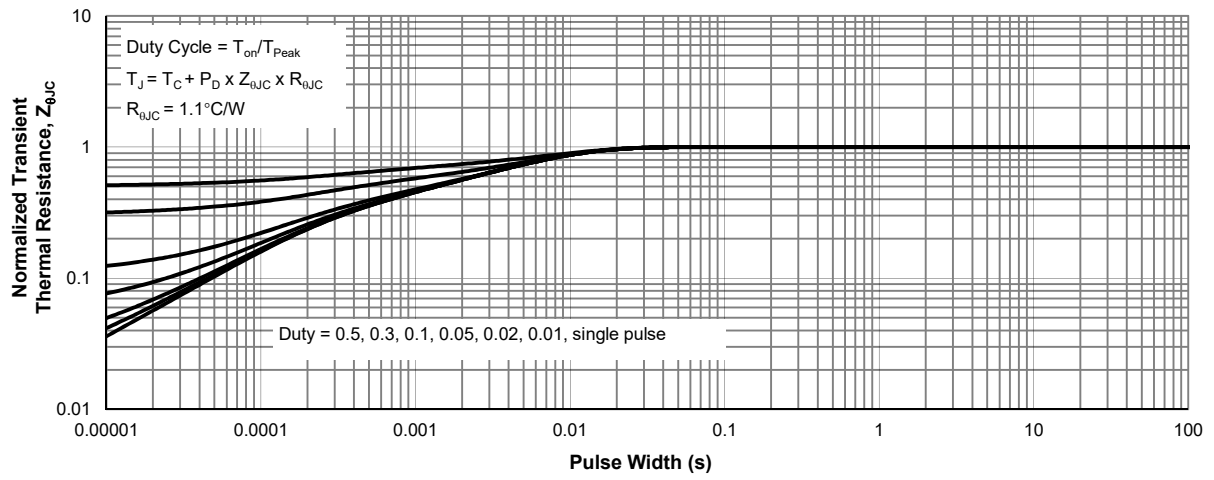
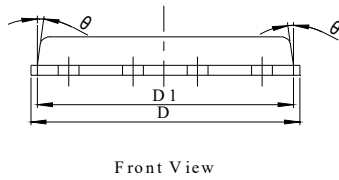
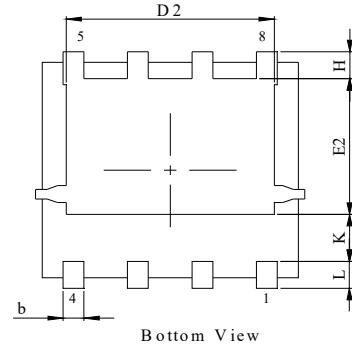
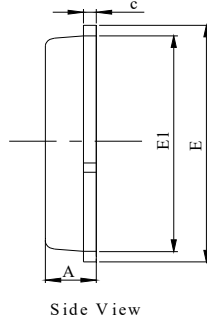
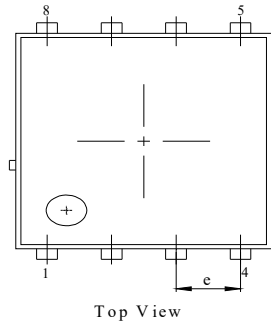
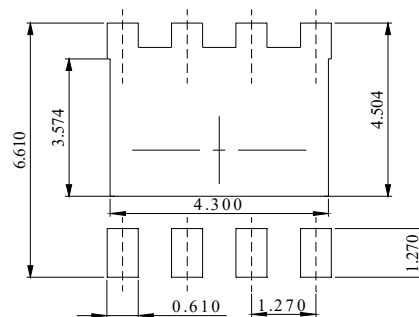


Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L Package Information
Package Outline

NOTES:

1. Dimension and tolerance per ASME Y14.5M, 1994.
2. All dimensions in millimeter (angle 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
b	0.31	0.41	0.51
c	0.20	0.25	0.30
D	5.00	5.20	5.40
D1	4.95	5.05	5.15
D2	4.00	4.10	4.20
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.42	3.53	3.63
e	1.27 BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
K	1.23 REF		
θ	-	-	10°

Recommended Soldering Footprint


DIMENSIONS: MILLIMETERS