100V 3.3mΩ 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}	100	V
$V_{GS(th)\_Typ}$	2.7	V
I_D (@ V_{GS} = 10V) (1)	112	A
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 10V)	3.3	mΩ

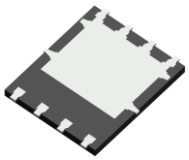
Applications

- Power Managerment in Telecom., Industrial Automation, CE
- Current Switching in DC/DC & AC/DC Sub-systems
- Motor Driving in Power Tool, E-vehicle, Robotics

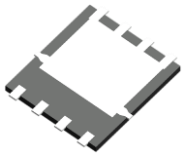
PDFN5x6-8L

Top View

Bottom View Type-A

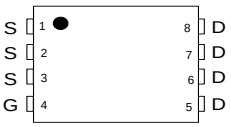


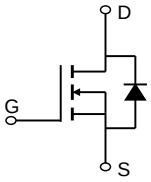
Bottom View Type-B



Pin Configuration

Top View



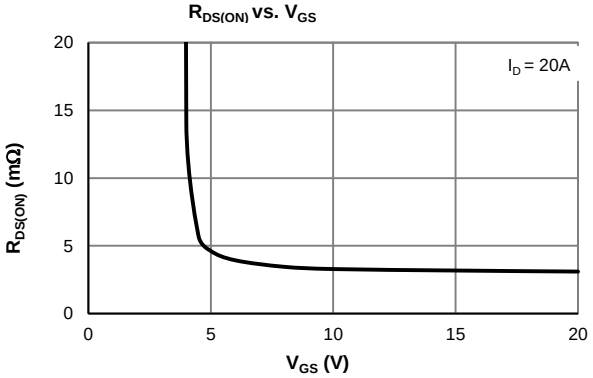


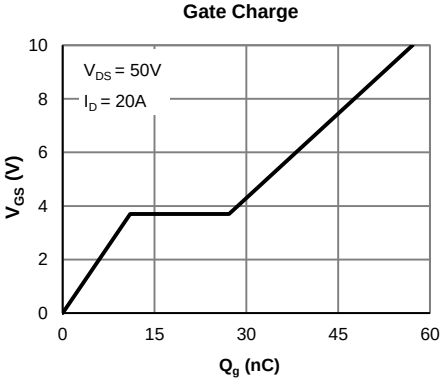
Ordering Information

Device	Package Type	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSH1004BG-13A	Type-A	PDFN5x6-8L	8	SH1004B	1	-55 to 150	13-inch Reel	5000
JMSH1004BG-13B	Type-B	PDFN5x6-8L	8	SH1004B	1	-55 to 150	13-inch Reel	5000

Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DS}	100	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	112	A
	T_C = 100°C		71	
Pulsed Drain Current (2)		I_{DM}	403	A
Avalanche Current (3)		I_{AS}	68	A
Avalanche Energy (3)		E_{AS}	231	mJ
Power Dissipation (4)	T_C = 25°C	P_D	104	W
	T_C = 100°C		42	
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	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, 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	2.0	2.7	4.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		3.3	4.3	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 20A		100		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.70	1.0	V
Diode Continuous Current	I_S	T_C = 25°C			104	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		3434		pF
Output Capacitance	C_{oss}			906		pF
Reverse Transfer Capacitance	C_{rss}			14.0		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		2.3		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 50V, I_D = 20A		57		nC
Total Gate Charge (@V_{GS} = 6V)	Q_g			38		nC
Gate Source Charge	Q_{gs}			11.0		nC
Gate Drain Charge	Q_{gd}			16.1		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 50V R_L = 2.5Ω, R_{GEN} = 3Ω		14.1		ns
Turn-On Rise Time	t_r			34		ns
Turn-Off DelayTime	$t_{D(off)}$			60		ns
Turn-Off Fall Time	t_f			50		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 15A, dI_F/dt = 100A/μs		59		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 15A, dI_F/dt = 100A/μs		62		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	65	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.9	1.2	°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} = 50V] 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

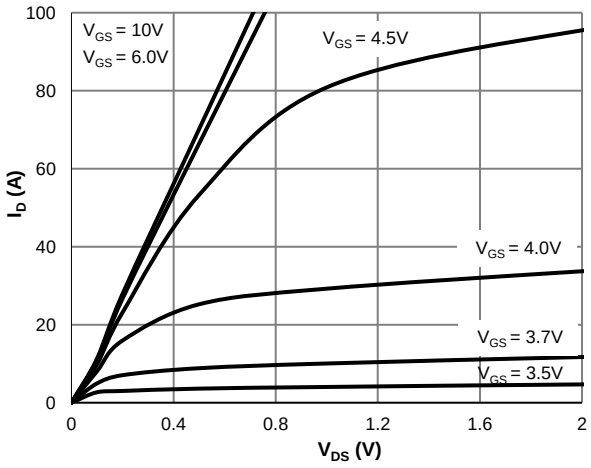


Figure 1: Saturation Characteristics

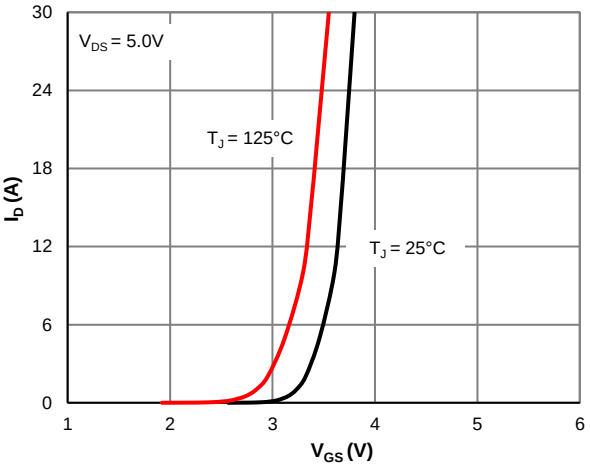


Figure 2: Transfer Characteristics

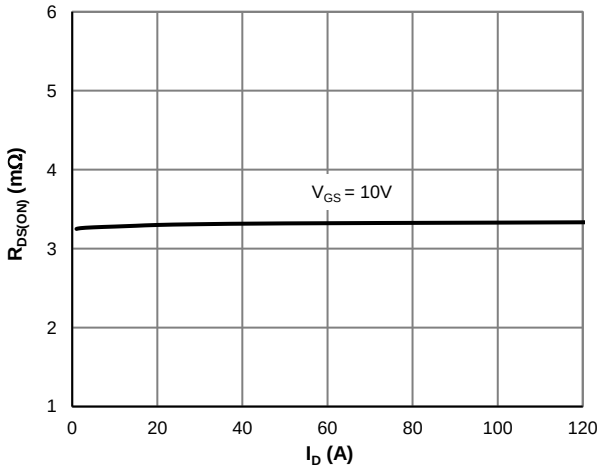


Figure 3: $R_{DS(ON)}$ vs. Drain Current

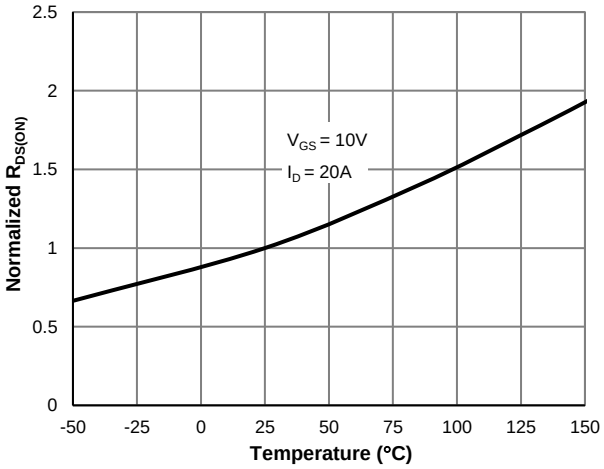


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

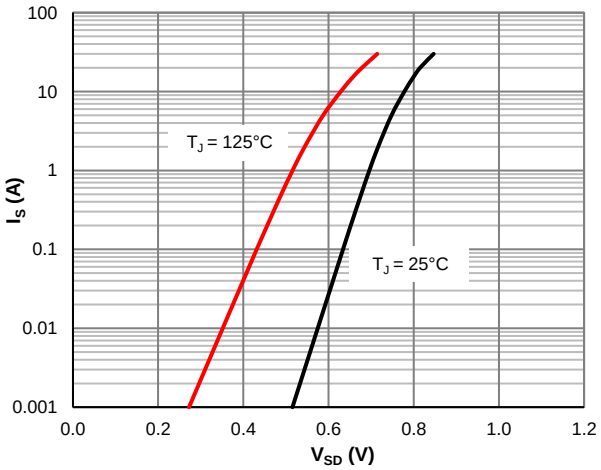


Figure 5: Body-Diode Characteristics

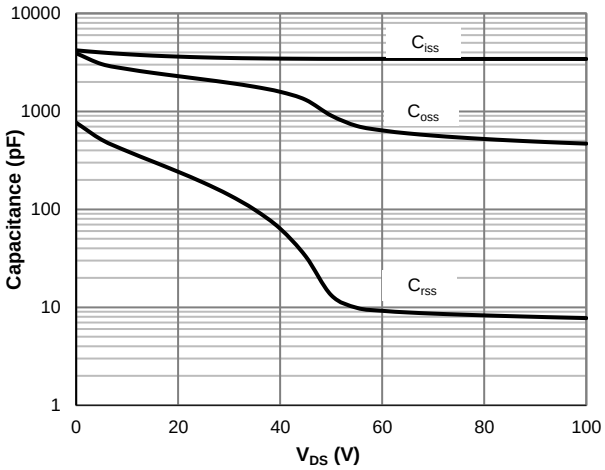


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

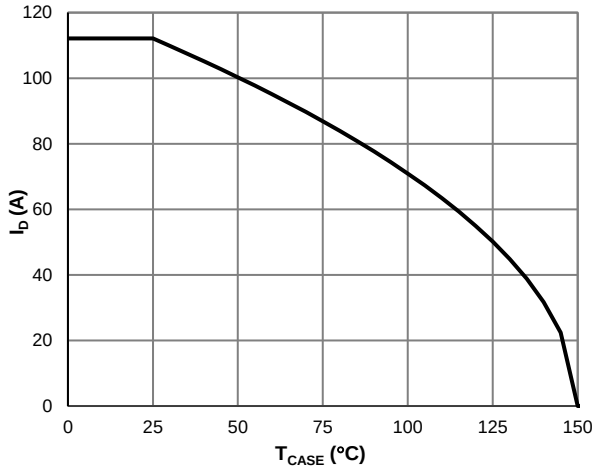


Figure 7: Current De-rating

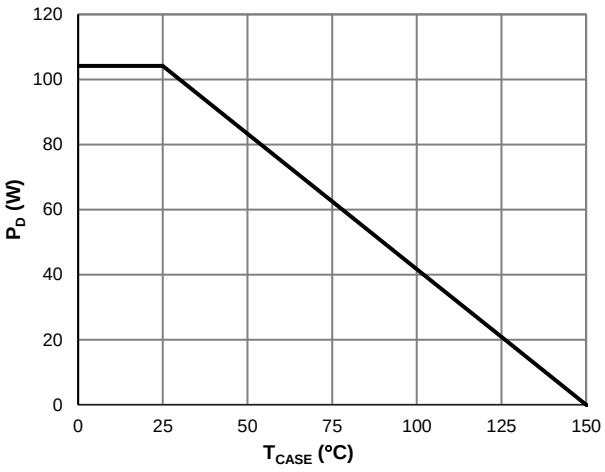


Figure 8: Power De-rating

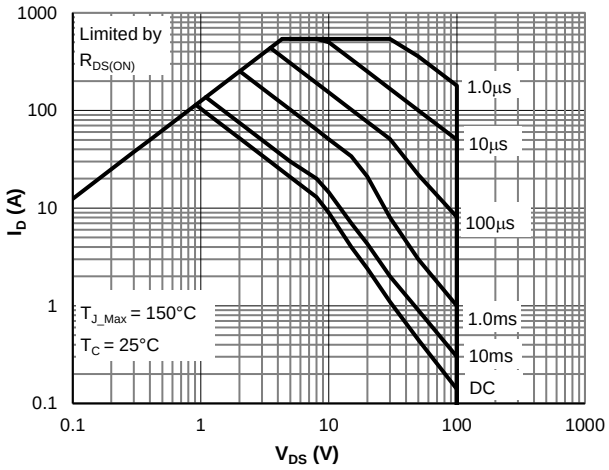


Figure 9: Maximum Safe Operating

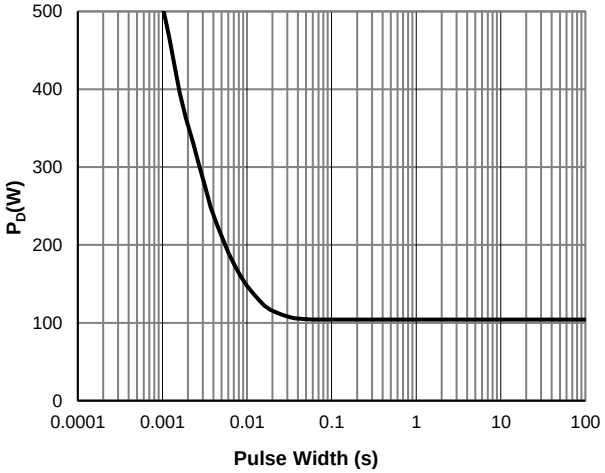


Figure 10: Single Pulse Power Rating, Junction-to-Case

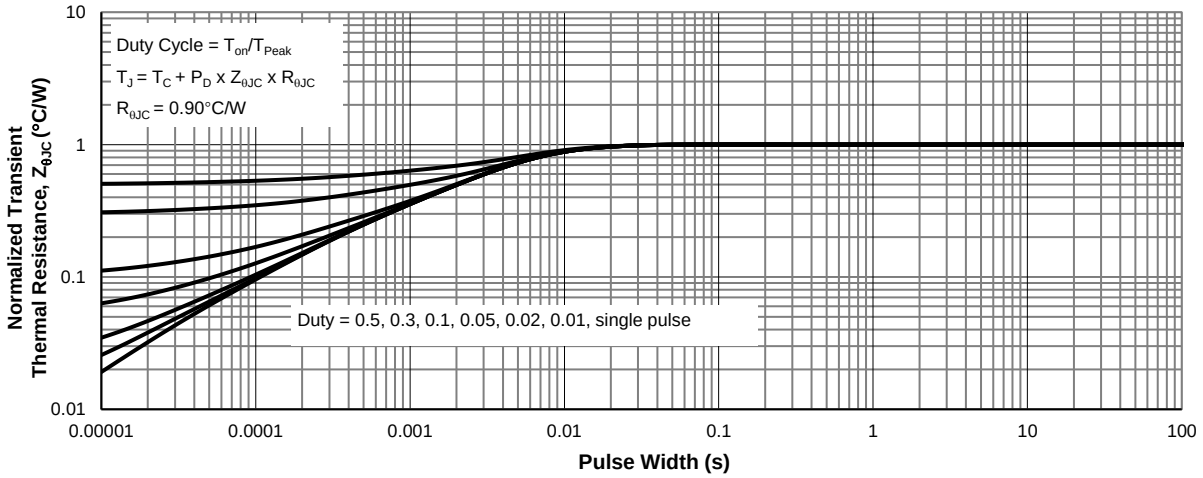
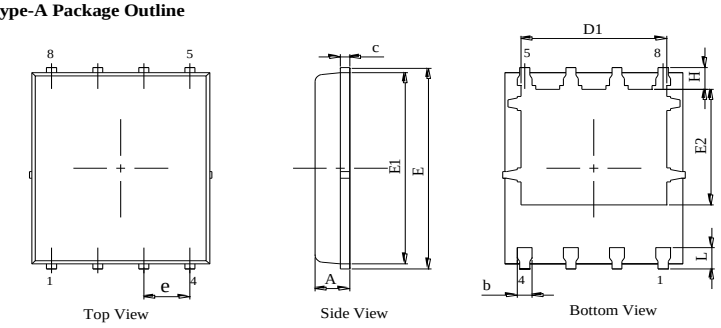


Figure 11: Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L Package Information

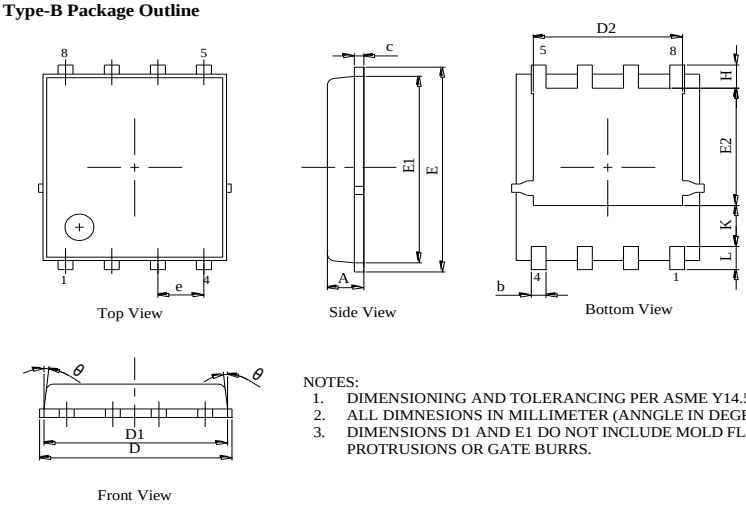
Type-A Package Outline



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.20	0.30	0.40
c	0.21	0.25	0.34
D	4.90	5.00	5.10
D1	3.91	4.01	4.11
D2	4.80	4.90	5.00
E	5.90	6.00	6.10
E1	5.65	5.75	5.85
E2	3.37	3.48	3.58
e	1.27BSC		
H	0.55	0.65	0.75
L	0.55	0.65	0.75
θ	0 °	--	12 °

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.

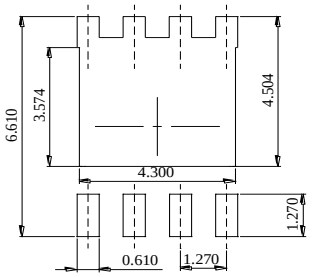
Type-B Package Outline



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	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
θ	-	-	10 °

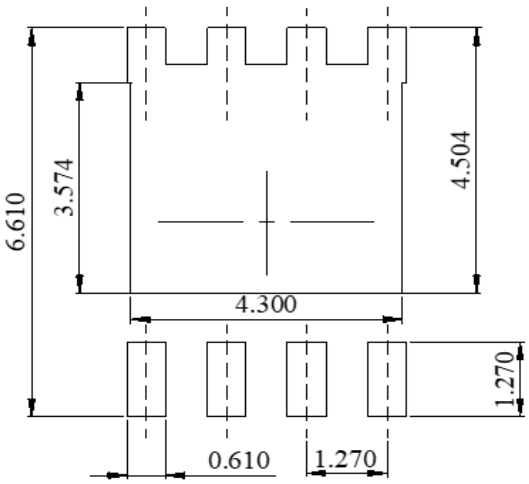
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS

Footprint



DIMENSIONS:MILLIMETERS