



150V 3.8mΩ N-Ch Power MOSFET

Features

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- High Current Capability
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

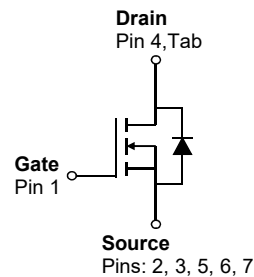
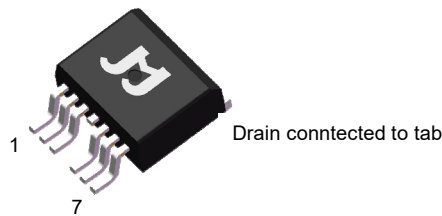
Product Summary

Parameter	Value	Unit
V_{DS}	150	V
$V_{GS(th), Typ}$	3.2	V
$I_D (@ V_{GS} = 10V)^{(1)}$	205	A
$R_{DS(ON), Typ} (@ V_{GS} = 10V)$	3.8	mΩ

Applications

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

TO-263-7L Top View

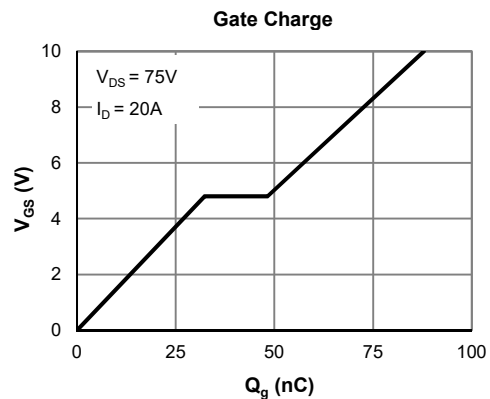
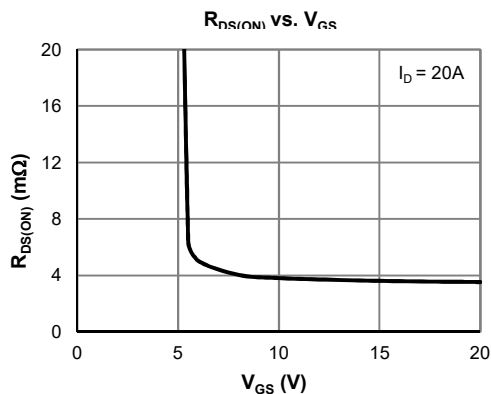


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSH1504AE7-13	TO-263-7L	3	SH1504A	1	-55 to 150	13-inch Reel	800

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	150	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_C = 25^\circ\text{C}$	205
		$T_C = 100^\circ\text{C}$	130
Pulsed Drain Current ⁽²⁾	I_{DM}	637	A
Avalanche Current ⁽³⁾	I_{AS}	77	A
Avalanche Energy ⁽³⁾	E_{AS}	889	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ\text{C}$	417
		$T_C = 100^\circ\text{C}$	167
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C



**Electrical Characteristics** (@ $T_J = 25^\circ\text{C}$ unless otherwise specified)

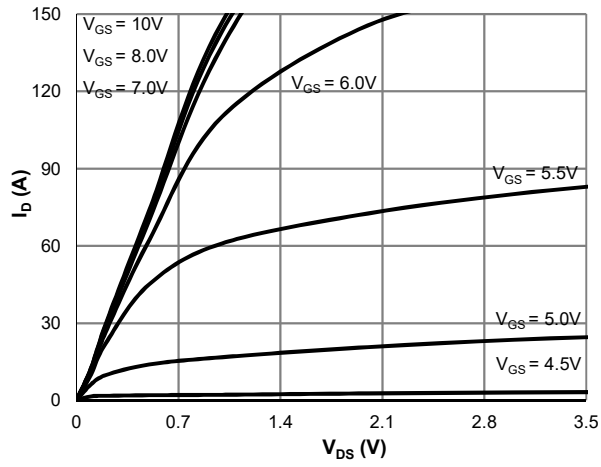
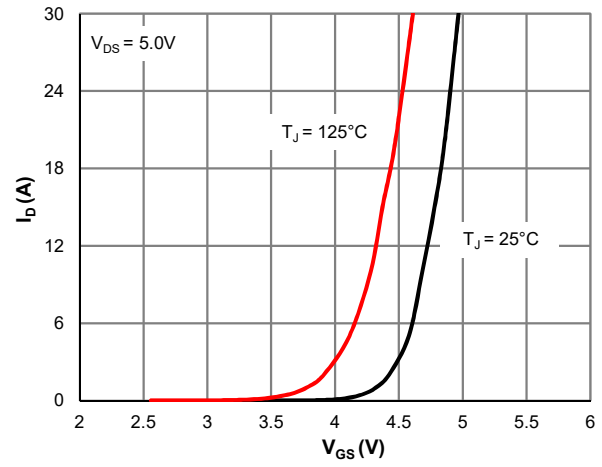
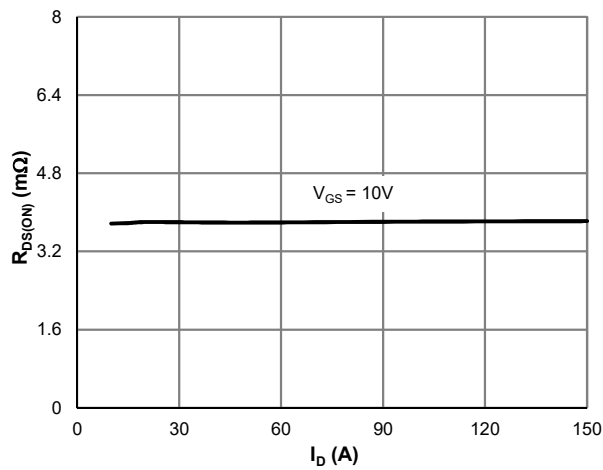
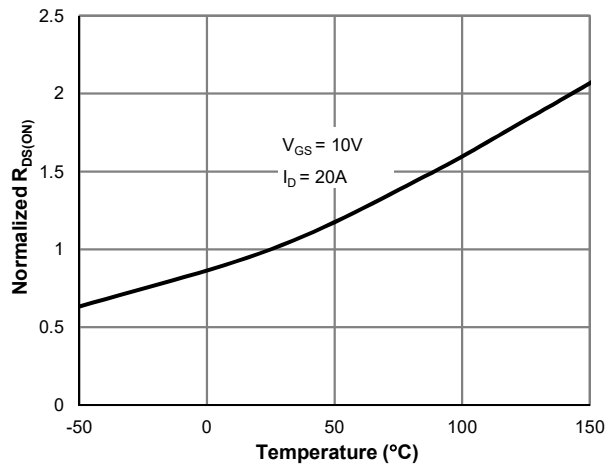
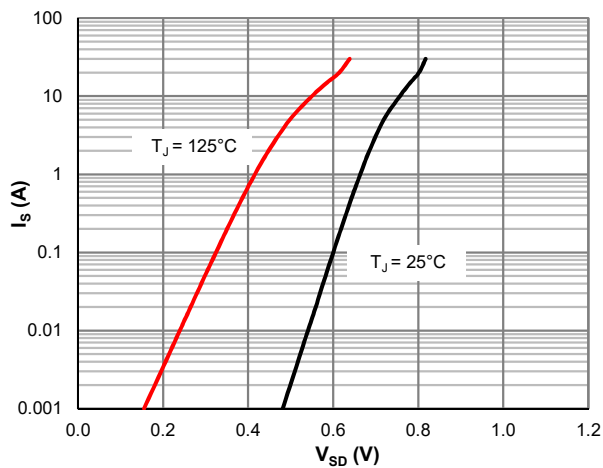
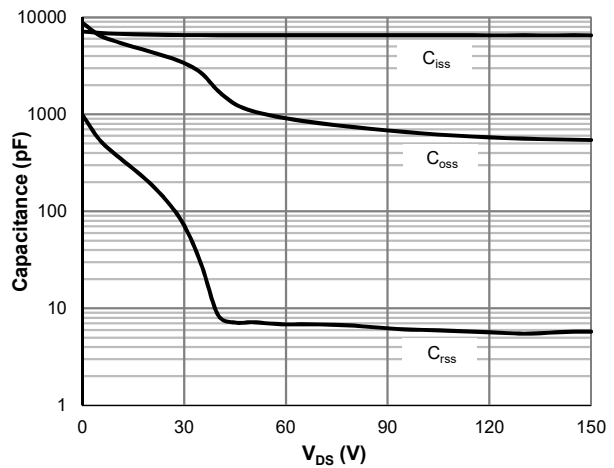
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	150			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$			1.0	μA
					5.0	
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.5	3.2	4.5	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$, $I_D = 20\text{A}$		3.8	4.8	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}$, $I_D = 20\text{A}$		65		S
Diode Forward Voltage	V_{SD}	$I_S = 1\text{A}$, $V_{GS} = 0\text{V}$		0.71	1.0	V
Diode Continuous Current	I_S	$T_C = 25^\circ\text{C}$			417	A
DYNAMIC PARAMETERS ⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 75\text{V}$, $f = 1\text{MHz}$		6540		pF
Output Capacitance	C_{oss}			772		pF
Reverse Transfer Capacitance	C_{rss}			6.7		pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$, $f = 1\text{MHz}$		2.4		Ω
SWITCHING PARAMETERS ⁽⁵⁾						
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0$ to 10V $V_{DS} = 75\text{V}$, $I_D = 20\text{A}$		88		nC
Total Gate Charge (@ $V_{GS} = 6.0\text{V}$)	Q_g			57		nC
Gate Source Charge	Q_{gs}			32		nC
Gate Drain Charge	Q_{gd}			16		nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 75\text{V}$ $R_L = 3.75\Omega$, $R_{GEN} = 6\Omega$		48		ns
Turn-On Rise Time	t_r			90		ns
Turn-Off DelayTime	$t_{D(off)}$			94		ns
Turn-Off Fall Time	t_f			60		ns
Body Diode Reverse Recovery Time	t_{rr}		$I_F = 15\text{A}$, $di_F/dt = 100\text{A}/\mu\text{S}$		122	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15\text{A}$, $di_F/dt = 100\text{A}/\mu\text{S}$		279		nC

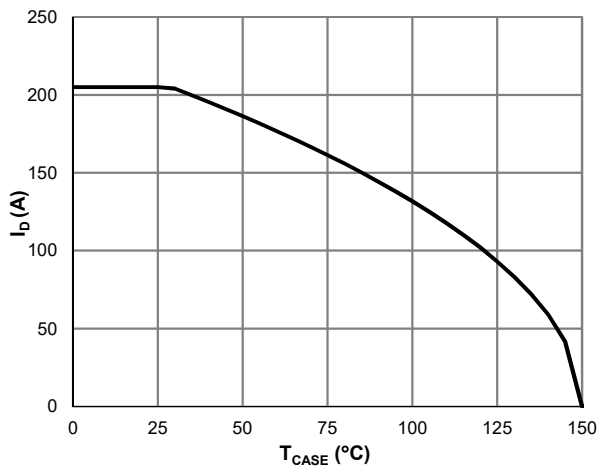
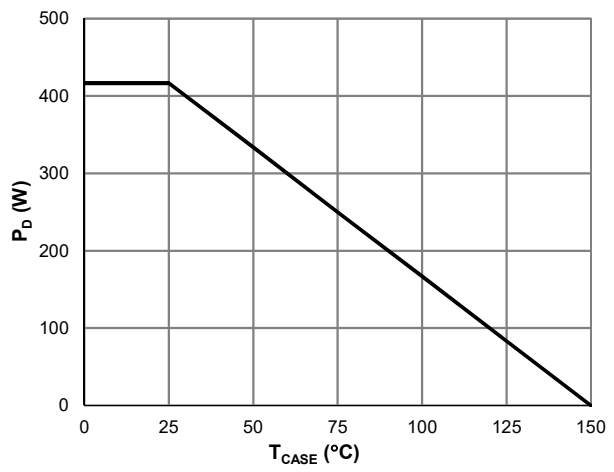
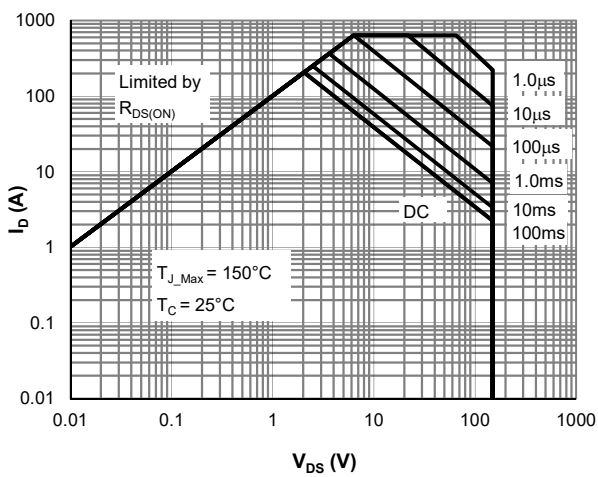
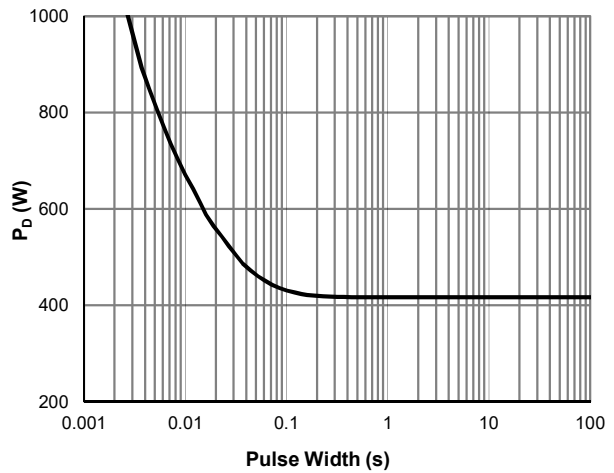
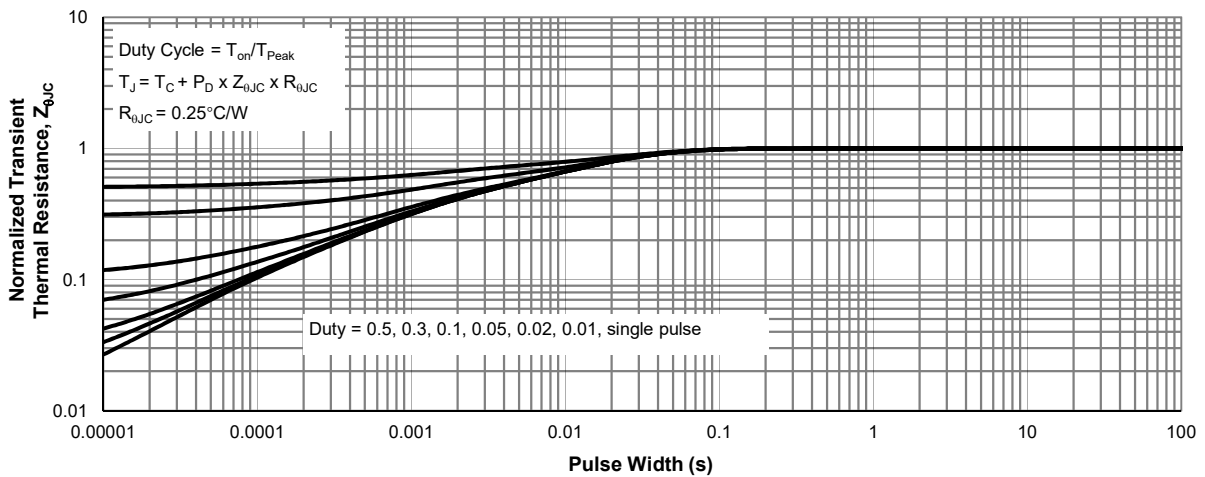
Thermal Performance

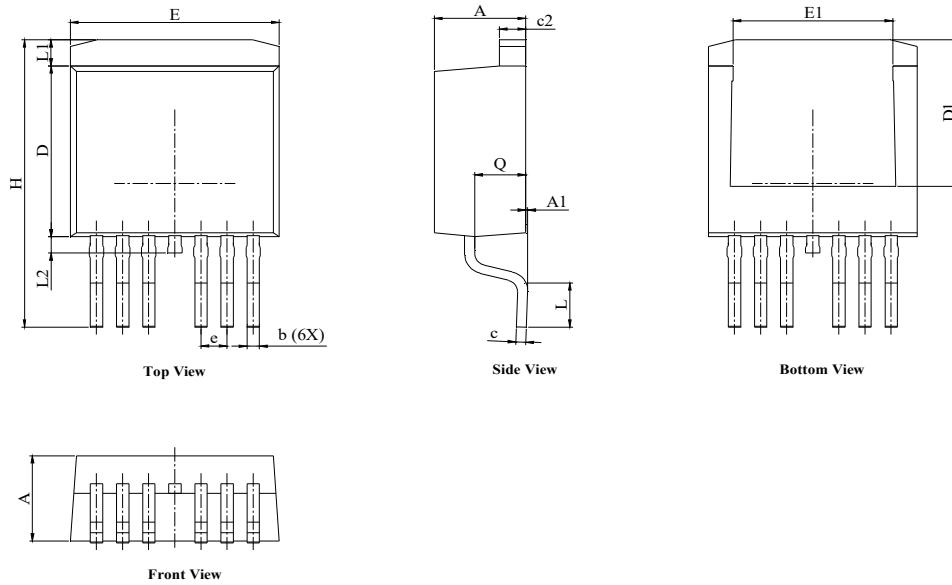
Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	43	52	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.25	0.30	$^\circ\text{C}/\text{W}$

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 $T_{J_Max} = 150^\circ\text{C}$.
3. This single-pulse measurement was taken under the following condition [$L = 300\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DS} = 75\text{V}$] while its value is limited by $T_{J_Max} = 150^\circ\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max} = 150^\circ\text{C}$.
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

TO-263-7L Package Information
Package Outline


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.24	4.44	4.64
A1	0.00	0.10	0.25
b	0.50	0.60	0.70
c	0.40	0.50	0.60
c2	1.15	1.27	1.40
D	8.82	8.92	9.02
D1	7.65 REF.		
E	9.96	10.16	10.36
E1	6.80	7.80	8.00
e	1.27 BSC		
H	14.61	15.00	15.88
L	1.78	2.32	2.80
L1	1.36 REF.		
L2	1.20 REF.		
L3	0.25 BSC		
Q	2.30	2.48	2.70

Recommended Soldering Footprint
