



150V 5.2mΩ N-Ch Power MOSFET

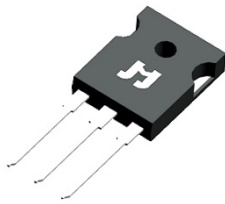
Features

- 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

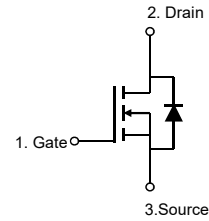
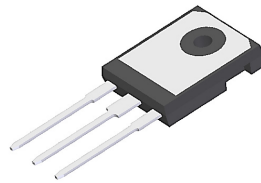
Product Summary

Parameter	Value	Unit
V_{DS}	150	V
$V_{GS(th_Typ)}$	3.2	V
I_D (@ $V_{GS} = 10V$) ⁽¹⁾	174	A
$R_{DS(ON)_Typ}$ (@ $V_{GS} = 10V$)	5.2	mΩ

TO-247-3L Top View



TO-247-3L Bottem View

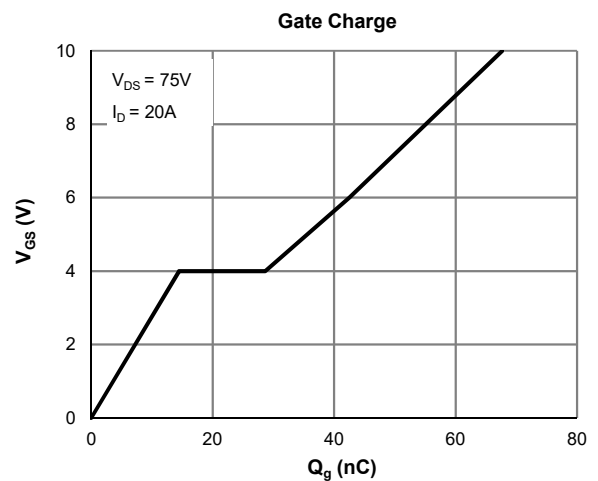
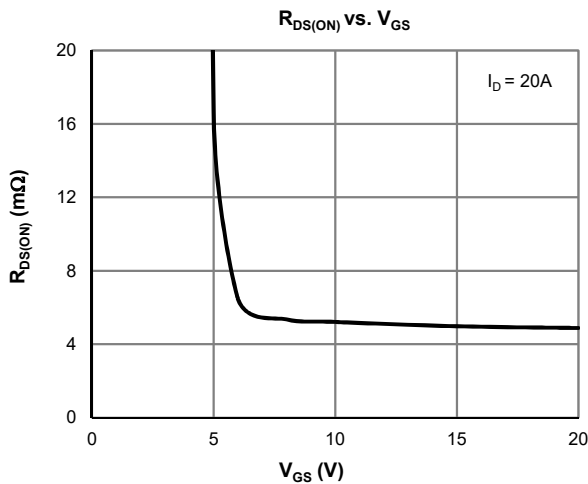


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSH1506ASQ-13	TO-247-3L	3	SH1506AQ	NA	-55 to 175	Tube	30

Absolute Maximum Ratings (@ $T_A = 25^\circ C$ 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	$T_C = 25^\circ C$	174
		$T_C = 100^\circ C$	123
Pulsed Drain Current ⁽²⁾	I_{DM}	695	A
Avalanche Current ⁽³⁾	I_{AS}	60	A
Avalanche Energy ⁽³⁾	E_{AS}	540	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ C$	500
		$T_C = 100^\circ C$	250
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C



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

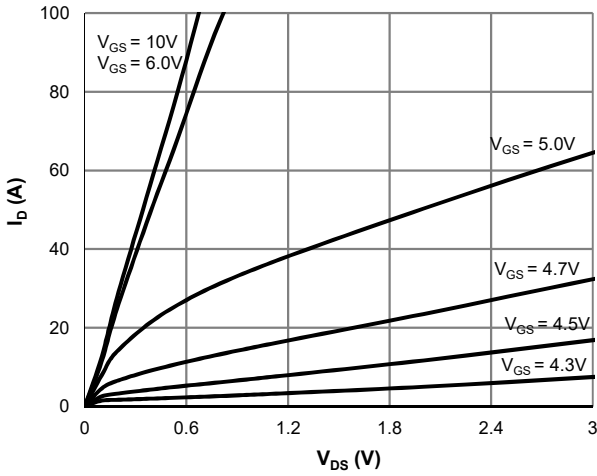
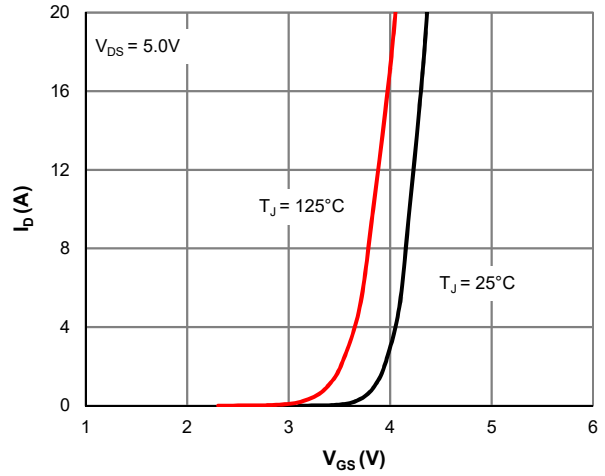
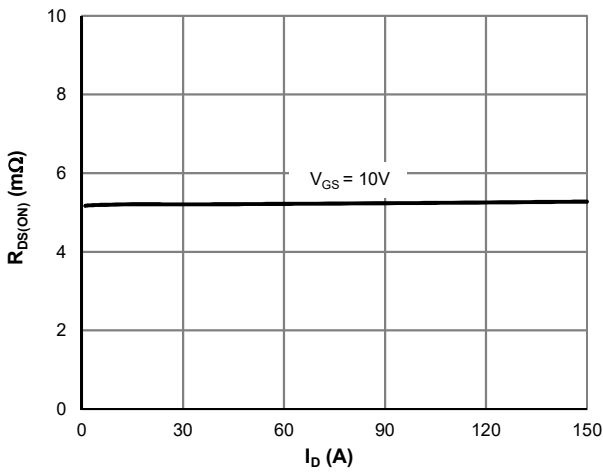
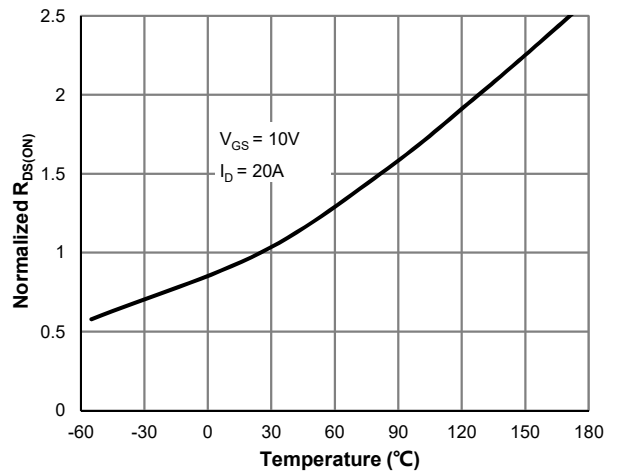
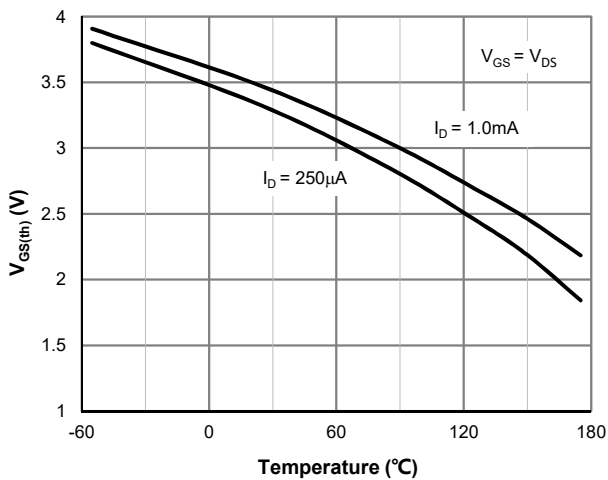
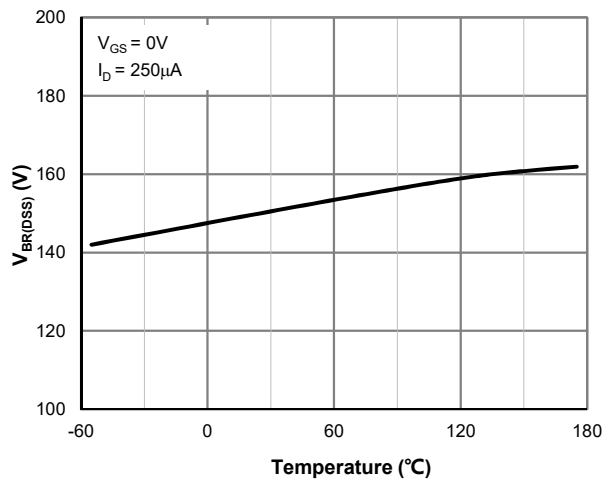
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	150			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$			1.0	μA
					5.0	
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 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	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$, $I_D = 20\text{A}$		5.2	6.5	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}$, $I_D = 20\text{A}$		64		S
Diode Forward Voltage	V_{SD}	$I_S = 1\text{A}$, $V_{GS} = 0\text{V}$		0.68	1.0	V
Diode Continuous Current	I_S	$T_C = 25^\circ\text{C}$			500	A
DYNAMIC PARAMETERS ⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 75\text{V}$, $f = 1\text{MHz}$		4320		pF
Output Capacitance	C_{oss}			535		pF
Reverse Transfer Capacitance	C_{rss}			7.2		pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$, $f = 1\text{MHz}$		2.1		Ω
SWITCHING PARAMETERS ⁽⁵⁾						
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0$ to 10V $V_{DS} = 75\text{V}$, $I_D = 20\text{A}$		68		nC
Total Gate Charge (@ $V_{GS} = 6.0\text{V}$)	Q_g			43		nC
Gate Source Charge	Q_{gs}			15		nC
Gate Drain Charge	Q_{gd}			14.0		nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 75\text{V}$ $R_L = 3.8\Omega$, $R_{GEN} = 6\Omega$		19		ns
Turn-On Rise Time	t_r			30		ns
Turn-Off DelayTime	$t_{D(off)}$			53		ns
Turn-Off Fall Time	t_f			41		ns
Body Diode Reverse Recovery Time	t_{rr}		$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$		100	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$		150		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	40	48	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.30	0.36	$^\circ\text{C}/\text{W}$

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 $T_{J_Max} = 175^\circ\text{C}$.
3. This single-pulse measurement was taken under the following condition [$L = 300\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DD} = 75\text{V}$] while its value is limited by $T_{J_Max} = 175^\circ\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max} = 175^\circ\text{C}$.
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: $V_{GS(th)}$ vs. Junction Temperature

Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Electrical & Thermal Characteristics

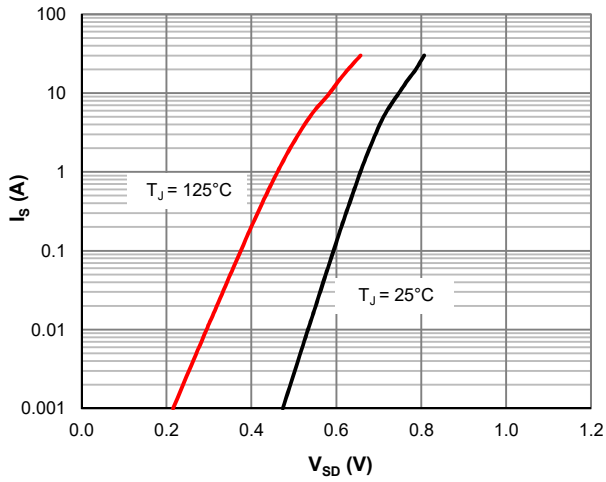


Figure 7: Body-Diode Characteristics

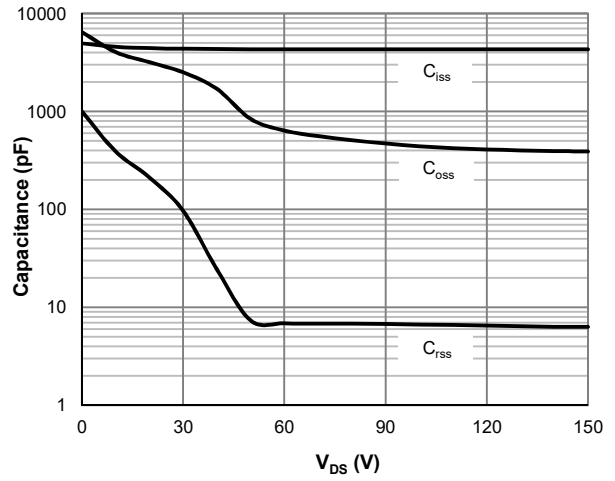


Figure 8: Capacitance Characteristics

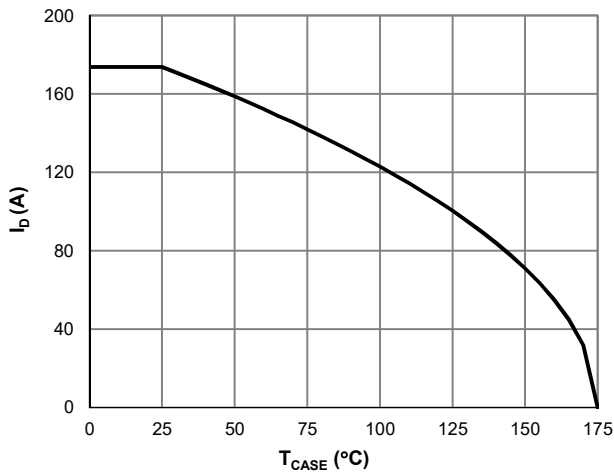


Figure 9: Current De-rating

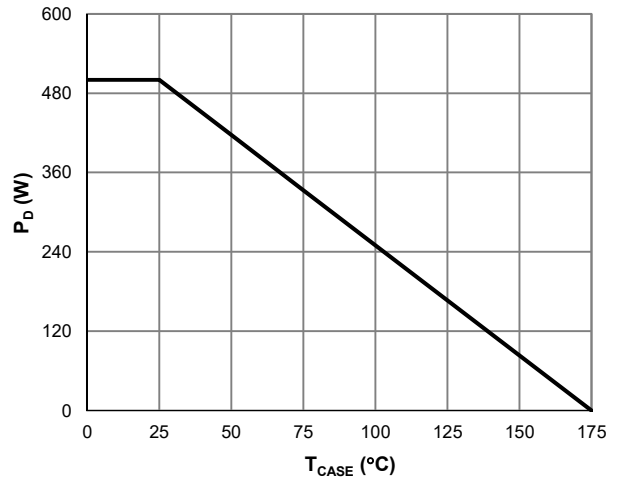


Figure 10: Power De-rating

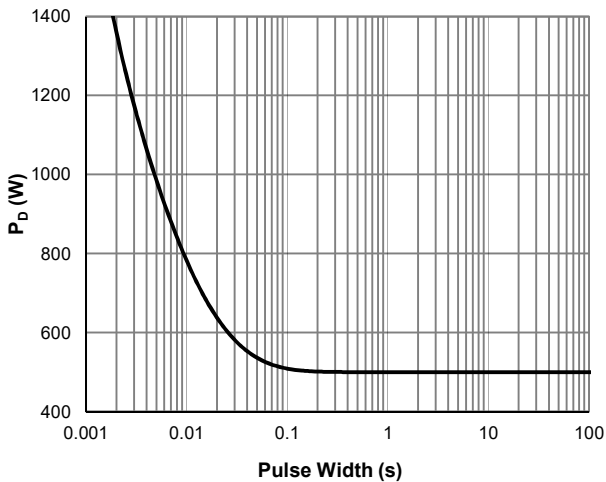


Figure 11: Single Pulse Power Rating, Junction-to-Case

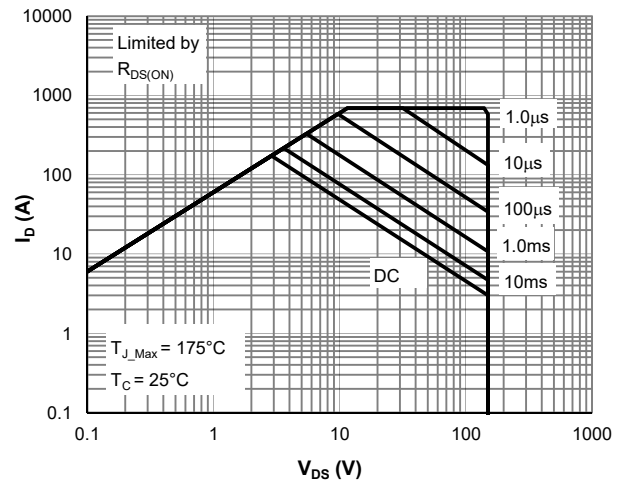


Figure 12: Maximum Safe Operating Area



Typical Electrical & Thermal Characteristics

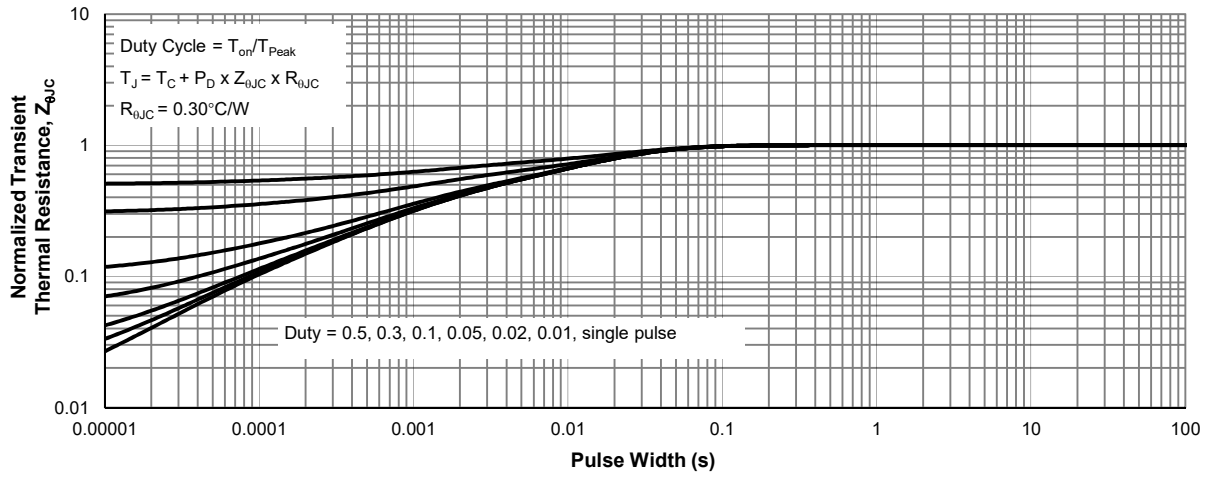
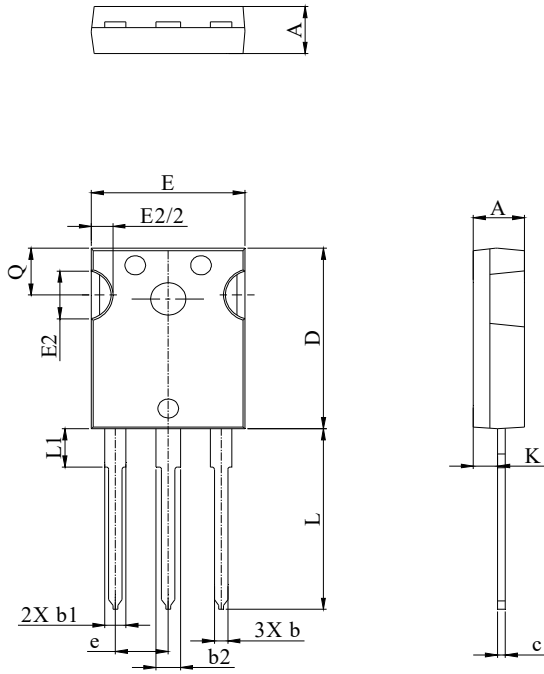


Figure 13: Normalized Maximum Transient Thermal Impedance

TO-247-3L Package Information
Package Outline


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.80	5.02	5.21
b	1.00	1.20	1.40
b1	1.90	2.00	2.39
b2	2.87	3.00	3.22
c	0.41	0.60	0.79
D	20.80	21.00	21.20
E	15.50	15.94	16.13
E2	4.32		5.49
L	19.70	20.07	20.32
L1	4.00		4.40
K	2.20		2.50
e	5.44 BSC		