



JMSL1006AK

100V 5.4mΩ 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

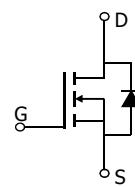
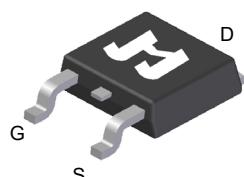
Product Summary

Parameter	Value	Unit
V_{DS}	100	V
$V_{GS(th)}_{Typ}$	1.7	V
$I_D (@ V_{GS} = 10V)^{(1)}$	99	A
$R_{DS(ON)}_{Typ} (@ V_{GS} = 10V)$	5.4	mΩ
$R_{DS(ON)}_{Typ} (@ V_{GS} = 4.5V)$	6.6	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-252-3L Top View

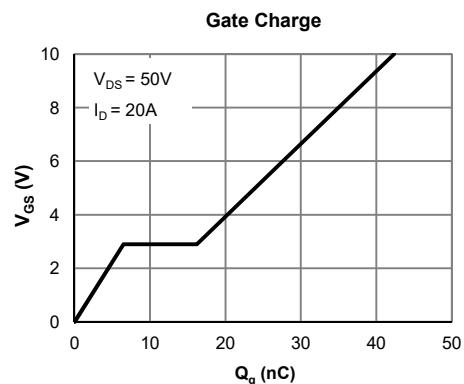
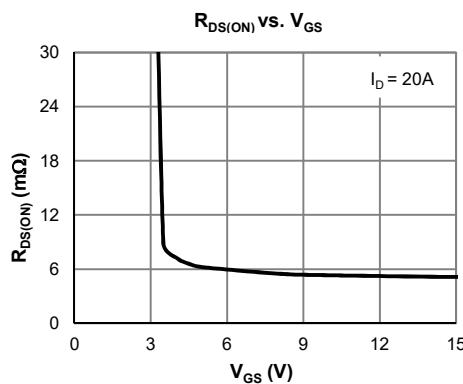


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL1006AK-13	TO-252-3L	3	SL1006A	1	-55 to 175	13-inch Reel	2500

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ 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)	I_D	99	A
$T_C = 100^\circ\text{C}$		70	
Pulsed Drain Current (2)	I_{DM}	265	A
Avalanche Current (3)	I_{AS}	50	A
Avalanche Energy (3)	E_{AS}	125	mJ
Power Dissipation (4)	P_D	121	W
$T_C = 100^\circ\text{C}$		60	
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	$V_{(\text{BR})\text{DSS}}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1.0 5.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2	1.7	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(\text{ON})}$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$ $V_{GS} = 4.5\text{V}, I_D = 15\text{A}$		5.4 6.6	6.6 8.0	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}, I_D = 20\text{A}$		112		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	$T_C = 25^\circ\text{C}$			121	A
DYNAMIC PARAMETERS⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$		2604		pF
Output Capacitance	C_{oss}			567		pF
Reverse Transfer Capacitance	C_{rss}			9.6		pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		1.8		Ω
SWITCHING PARAMETERS⁽⁵⁾						
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 75\text{V}, I_D = 20\text{A}$		42		nC
Total Gate Charge (@ $V_{GS} = 6.0\text{V}$)	Q_g			28		nC
Gate Source Charge	Q_{gs}			6.5		nC
Gate Drain Charge	Q_{gd}			9.7		nC
Turn-On DelayTime	$t_{D(\text{on})}$	$V_{GS} = 10\text{V}, V_{DS} = 75\text{V}$ $R_L = 3.75\Omega, R_{\text{GEN}} = 6\Omega$		11.3		ns
Turn-On Rise Time	t_r			17.6		ns
Turn-Off DelayTime	$t_{D(\text{off})}$			46		ns
Turn-Off Fall Time	t_f			36		ns
Body Diode Reverse Recovery Time	t_{rr}		$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	49		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		44		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	40	48	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.95	1.24	$^\circ\text{C/W}$

Notes:

1. Computed continuous current assumes the condition of $T_{J_{\text{Max}}}$ while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_{\text{Max}}} = 175^\circ\text{C}$.
3. This single-pulse measurement was taken under the following condition [$L = 100\mu\text{H}, V_{GS} = 10\text{V}, V_{DD} = 50\text{V}$] while its value is limited by $T_{J_{\text{Max}}} = 175^\circ\text{C}$.
4. The power dissipation P_D is based on $T_{J_{\text{Max}}} = 175^\circ\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

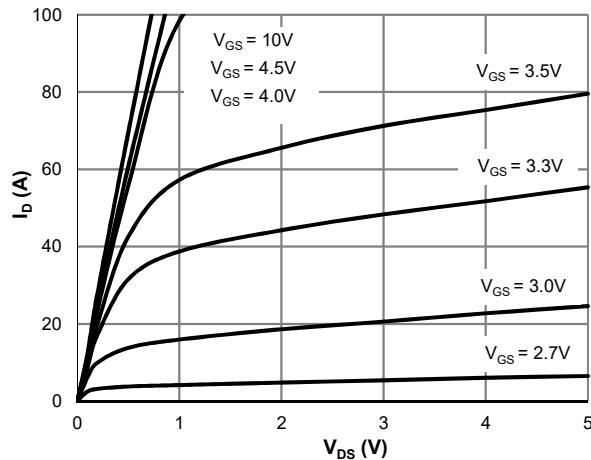


Figure 1: Saturation Characteristics

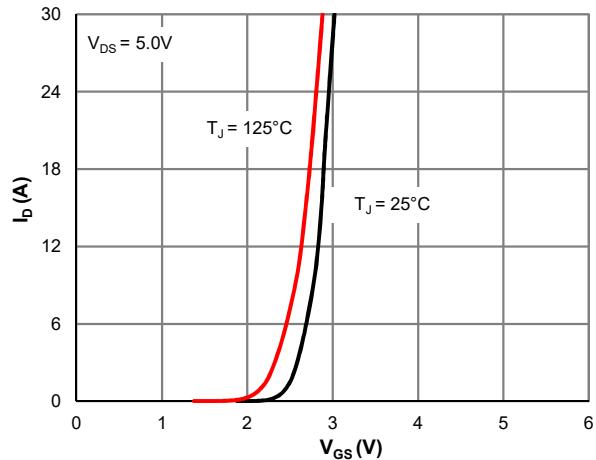


Figure 2: Transfer Characteristics

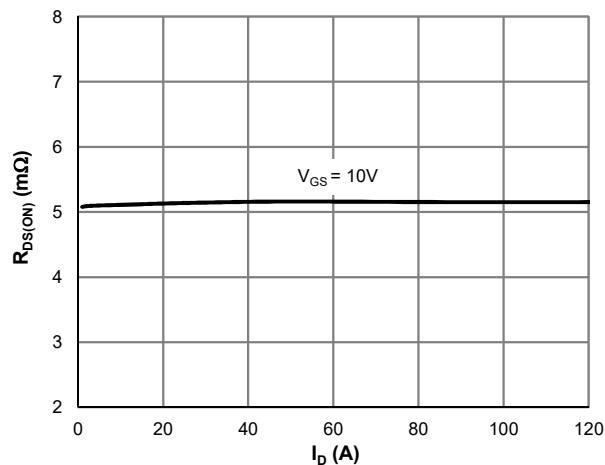


Figure 3: $R_{DS(ON)}$ vs. Drain Current

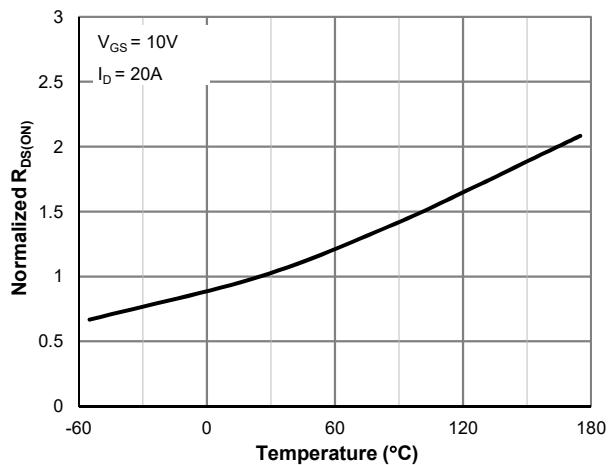


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

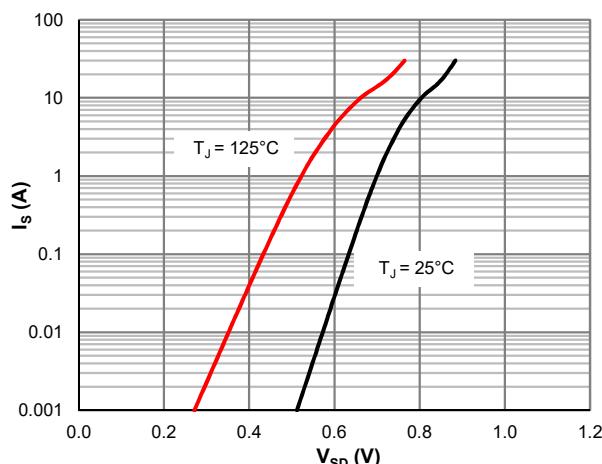


Figure 5: Body-Diode Characteristics

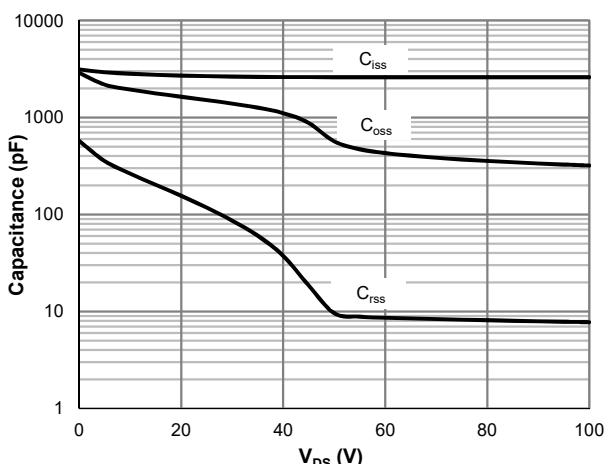


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

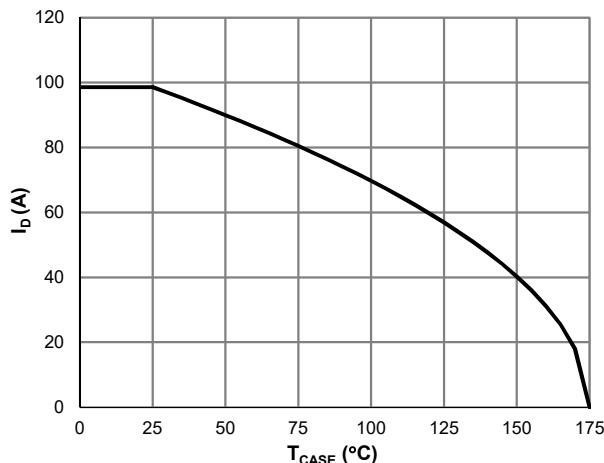


Figure 7: Current De-rating

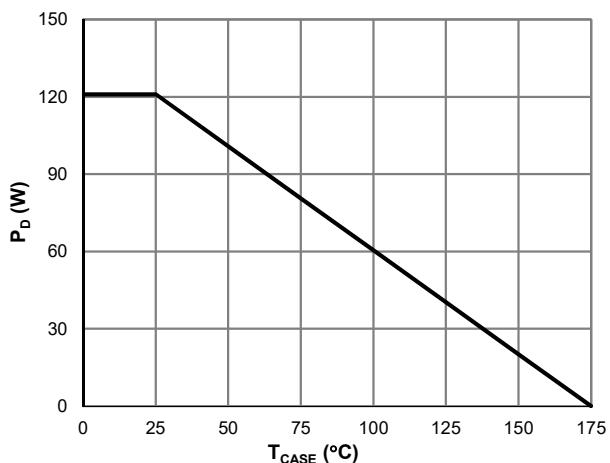


Figure 8: Power De-rating

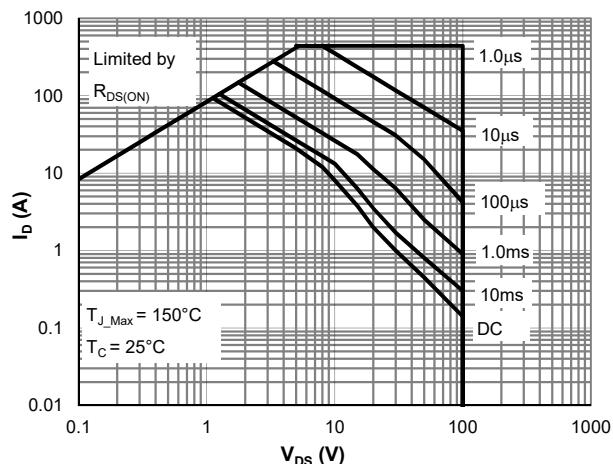


Figure 9: Maximum Safe Operating

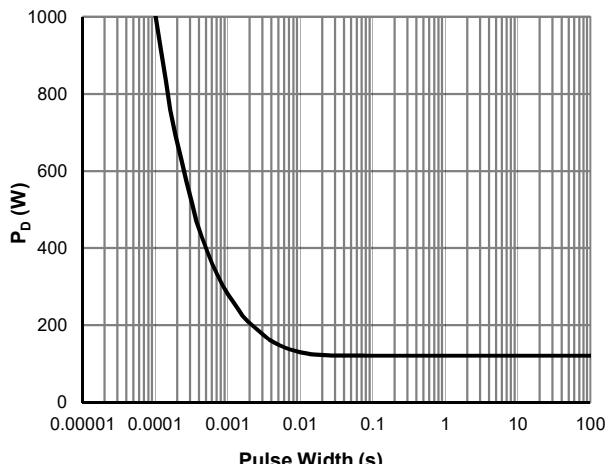


Figure 10: Single Pulse Power Rating, Junction-to-Case

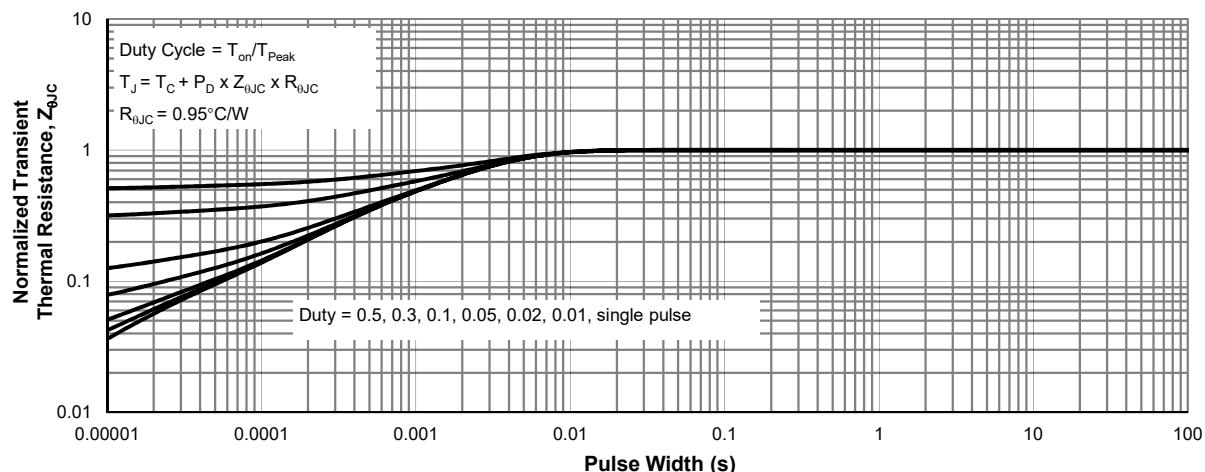
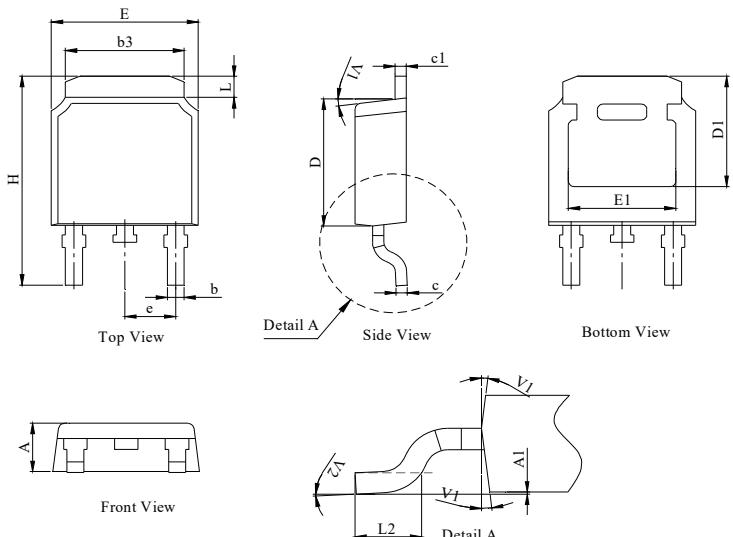


Figure 11: Normalized Maximum Transient Thermal Impedance

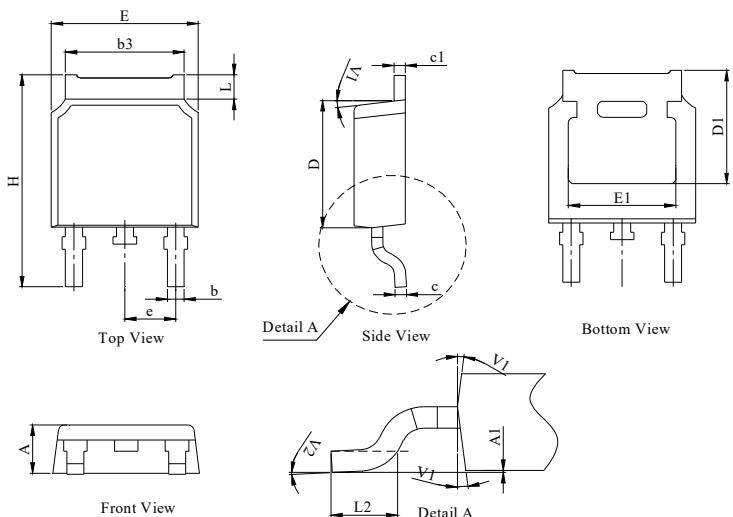
TO-252-3L Package Information

Package Outline Type-A



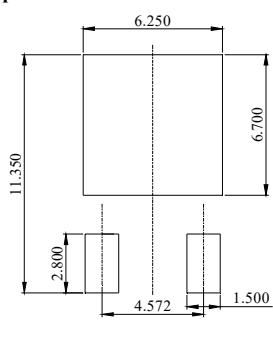
DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.18	2.30	2.39
A1	0	--	0.13
b	0.64	0.76	0.89
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	--	6°

Package Outline Type-B



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.10	2.30	2.40
A1	0	--	0.13
b	0.66	0.76	0.86
b3	5.21	5.38	5.55
c	0.40	0.50	0.60
c1	0.44	0.50	0.58
D	5.90	6.10	6.30
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.29 BSC		
H	9.50	10.00	10.70
L	1.09	--	1.21
L2	1.35	--	1.65
V1	7° REF		
V2	0°	--	6°

Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS