

85V 4.1mΩ 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

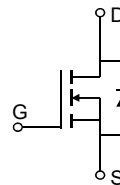
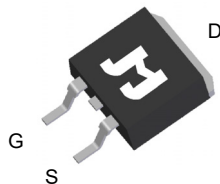
Product Summary

Parameter	Value	Unit
V_{DS}	85	V
$V_{GS(th_Typ)}$	3.0	V
I_D (@ $V_{GS} = 10V$) ⁽¹⁾	146	A
$R_{DS(ON)_Typ}$ (@ $V_{GS} = 10V$)	4.1	mΩ

Applications

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

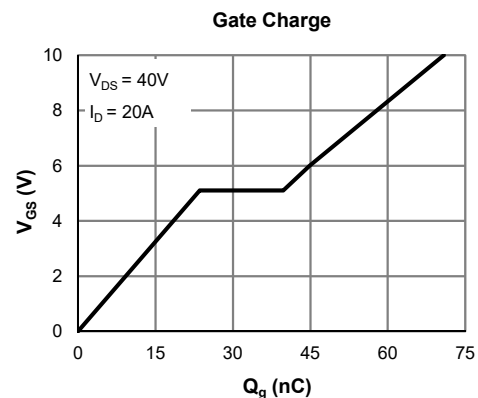
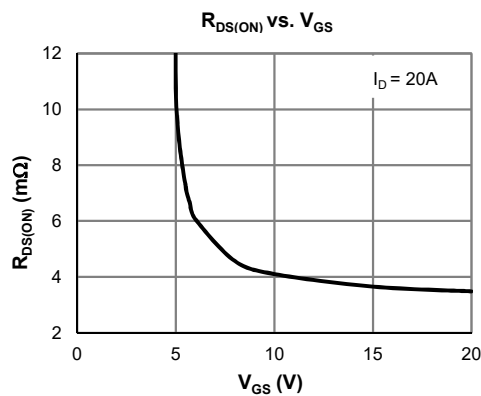
TO-263-3L Top View


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSH0804DE-13	TO-263-3L	3	SH0804D	1	-55 to 150	13-inch Reel	1000

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	85	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_C = 25^\circ\text{C}$	146
		$T_C = 100^\circ\text{C}$	92
Pulsed Drain Current ⁽²⁾	I_{DM}	453	A
Avalanche Current ⁽³⁾	I_{AS}	60	A
Avalanche Energy ⁽³⁾	E_{AS}	180	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ\text{C}$	179
		$T_C = 100^\circ\text{C}$	71
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	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	85			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 68\text{V}$, $V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			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	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.0	3.0	4.0	V
Static Drain-Source ON-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 20\text{A}$		4.1	4.8	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}$, $I_D = 20\text{A}$		69		S
Diode Forward Voltage	V_{SD}	$I_S = 1\text{A}$, $V_{GS} = 0\text{V}$		0.70	1.0	V
Diode Continuous Current	I_S	$T_C = 25^\circ\text{C}$			179	A
DYNAMIC PARAMETERS ⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 40\text{V}$, $f = 1\text{MHz}$		4562		pF
Output Capacitance	C_{oss}			738		pF
Reverse Transfer Capacitance	C_{rss}			15.9		pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$, $f = 1\text{MHz}$		1.3		Ω
SWITCHING PARAMETERS ⁽⁵⁾						
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0$ to 10V $V_{DS} = 40\text{V}$, $I_D = 20\text{A}$		71		nC
Total Gate Charge (@ $V_{GS} = 6.0\text{V}$)	Q_g			45		nC
Gate Source Charge	Q_{gs}			24		nC
Gate Drain Charge	Q_{gd}			16.2		nC
Turn-On Delay Time	$t_{D(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 40\text{V}$ $R_L = 2\Omega$, $R_{GEN} = 6\Omega$		20		ns
Turn-On Rise Time	t_r			34		ns
Turn-Off Delay Time	$t_{D(off)}$			48		ns
Turn-Off Fall Time	t_f			28		ns
Body Diode Reverse Recovery Time	t_{rr}		$I_F = 20\text{A}$, $di_F/dt = 100\text{A}/\mu\text{s}$		48	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 20\text{A}$, $di_F/dt = 100\text{A}/\mu\text{s}$		61		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	55	65	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.55	0.70	$^\circ\text{C}/\text{W}$

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 [$L = 100\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DS} = 50\text{V}$] 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

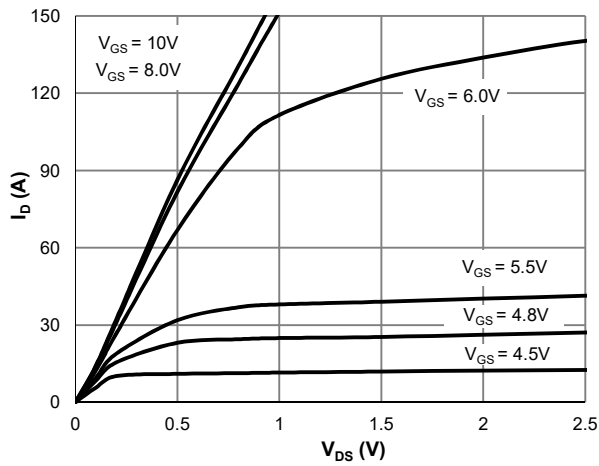


Figure 1: Saturation Characteristics

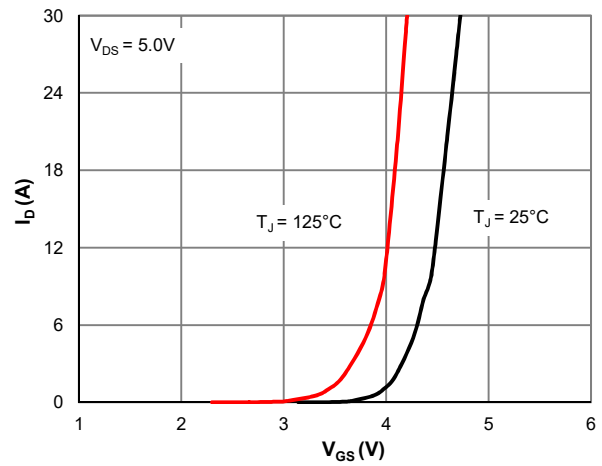


Figure 2: Transfer Characteristics

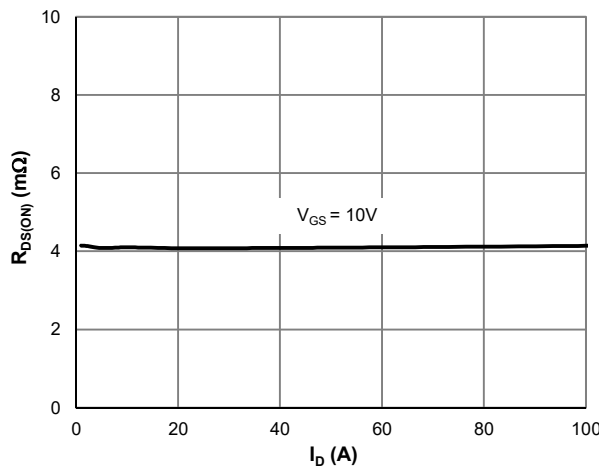


Figure 3: $R_{DS(ON)}$ vs. Drain Current

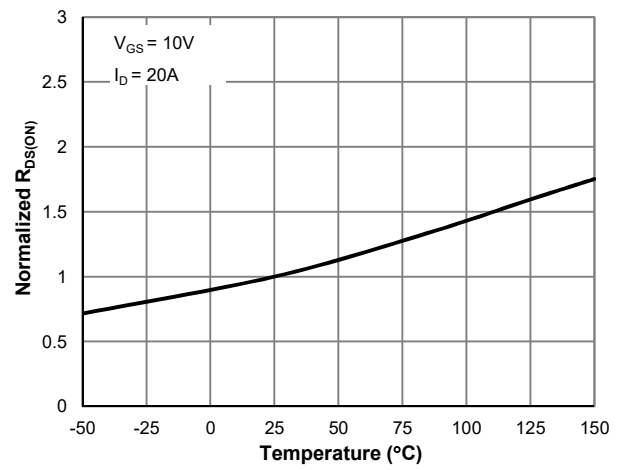


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

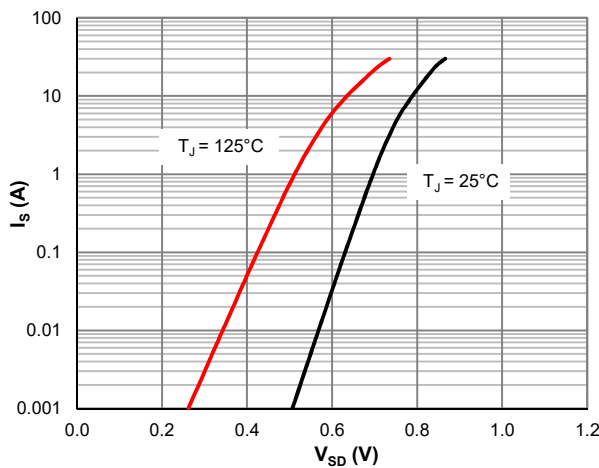


Figure 5: Body-Diode Characteristics

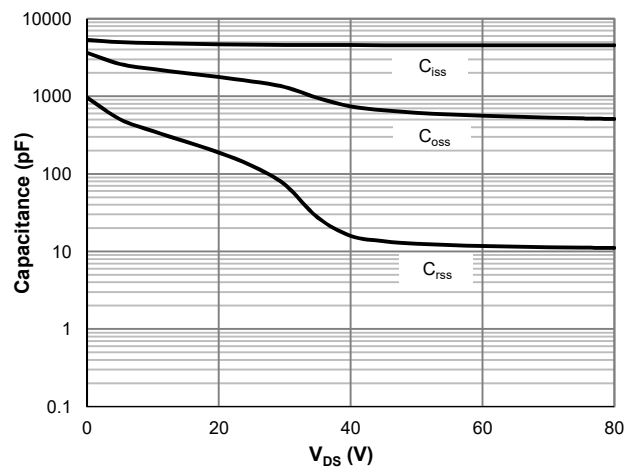


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

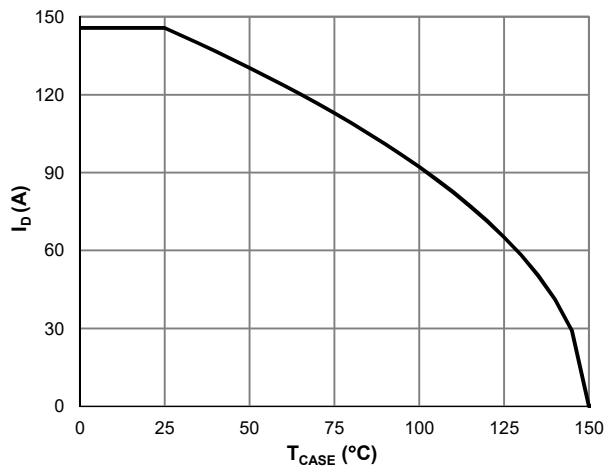


Figure 7: Current De-rating

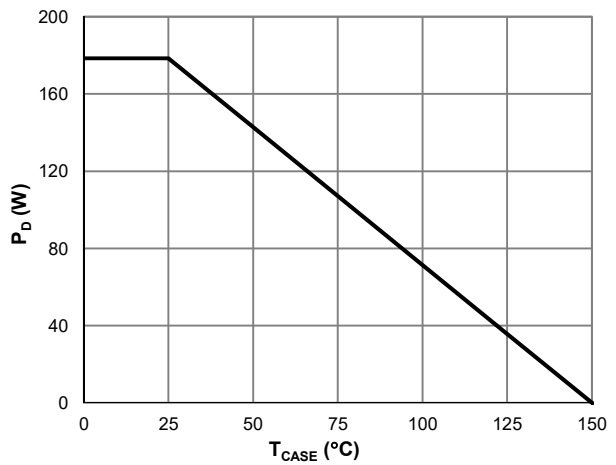


Figure 8: Power De-rating

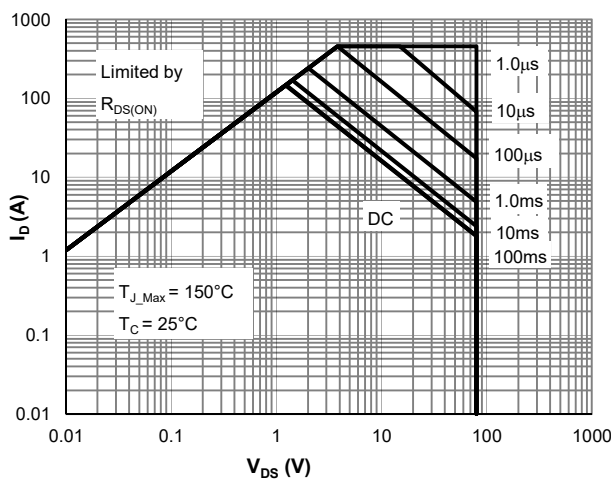


Figure 9: Maximum Safe Operating Area

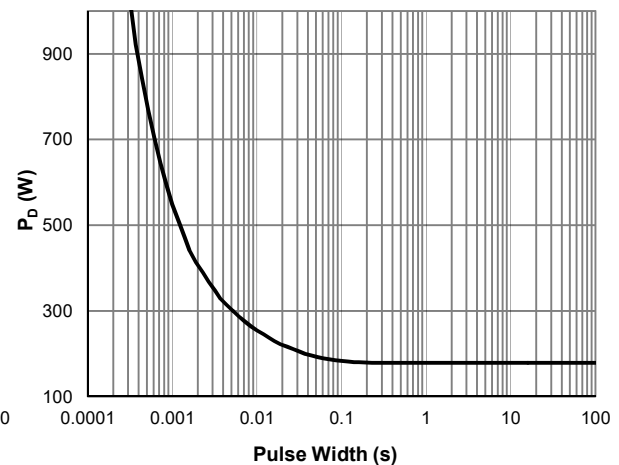


Figure 10: Single Pulse Power Rating, Junction-to-Case

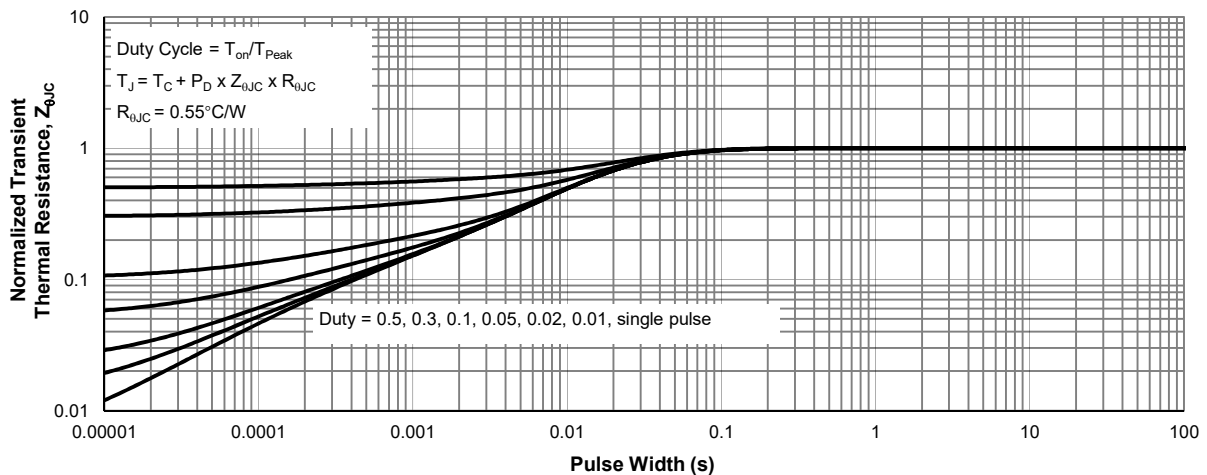
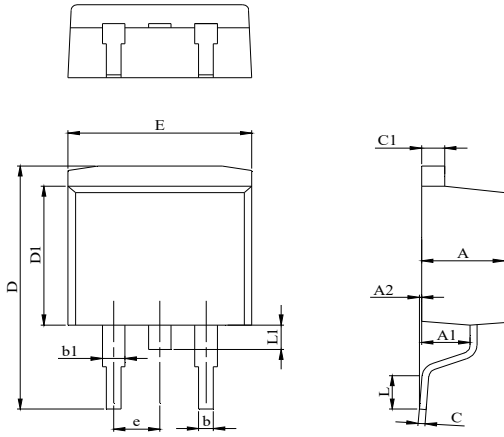
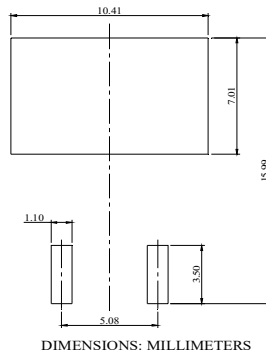


Figure 11: Normalized Maximum Transient Thermal Impedance

TO-263-3L Package Information
Package Outline


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.24		4.77
A1	2.30		2.89
A2	0.00	0.10	0.25
b	0.70		0.96
b1	1.17		1.70
C	0.30		0.60
C1	1.15		1.42
D	14.10		15.88
D1	8.50		9.60
E	9.78		10.36
L	1.78		2.79
L1			1.75
e		2.54	

Recommended Footprint


DIMENSIONS: MILLIMETERS