



Power MOSFETS

DATASHEET


LM1A059NHV2A

N-Channel
Enhancement Mode MOSFET

 Leadpower-semiconductor Corp., Ltd

 sales@leadpower-semi.com

 (03) 6577339 FAX : (03) 6577229

 www.leadpower-semi.com



Quality Management Systems

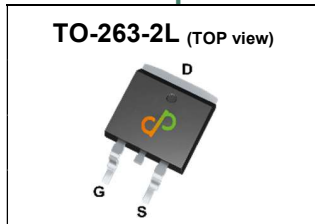
ISO 9001:2015 Certificate

LM1A059NHV2A

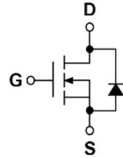


N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	100	V
$R_{DS(ON)-Max}$	6.6	m Ω
I_D	122	A

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

Applications

- Power Management in DC/DC Converters
- USB Power Delivery (USB PD)

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM1A059NHV2A	TO-263-2L	Tape & Reel	800 / Tape & Reel	1A059 □□□□□□

Note : □□□□□□ = Lot Code

Absolute Maximum Ratings (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit
V_{DSS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
T_J	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
$I_{DM}^{①}$	Pulse Drain Current Tested	T _C =25°C 160	A
I_D	Continuous Drain Current	T _C =25°C 122 ^①	A
		T _C =100°C 97	
P_D	Maximum Power Dissipation	T _C =25°C 156	W
		T _C =100°C 63	
I_D	Continuous Drain Current	T _A =25°C 17.1	A
		T _A =70°C 13.7	
P_D	Maximum Power Dissipation	T _A =25°C 1.9	W
		T _A =70°C 1.2	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH 41	A
		L=0.5mH 25	
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH 84	mJ
		L=0.5mH 156	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	0.8 °C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	65 °C/W

Note ① : Max. current is limited by bonding wire

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz

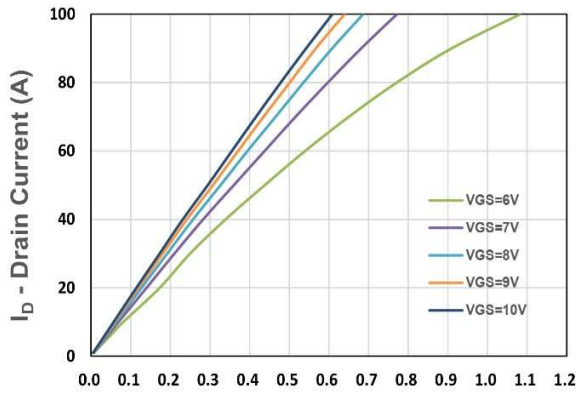
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =80V, V _{GS} =0V	-	-	1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	2	3	4	V
I_{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R_{DS(ON)} ^④	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A	-	5.5	6.6	mΩ
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	21.8	-	S
Dynamic Characteristics ^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	0.5	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Freq.=1MHz	-	2868	-	pF
C_{oss}	Output Capacitance		-	925	-	
C_{rss}	Reverse Transfer Capacitance		-	57	-	
t_{d(ON)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =25V, I _D =1A, R _{GEN} =3Ω	-	14.3	-	nS
t_r	Turn-on Rise Time		-	4.3	-	
t_{d(OFF)}	Turn-off Delay Time		-	32.1	-	
t_f	Turn-off Fall Time		-	90.8	-	
Q_g	Total Gate Charge	V _{GS} =6V, V _{DS} =50V I _D =20A	-	35	-	nC
Q_g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A	-	53.1	-	
Q_{gs}	Gate-Source Charge		-	15.8	-	
Q_{gd}	Gate-Drain Charge		-	15.2	-	
Source-Drain Characteristics						
V_{SD} ^④	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I _F =10A, V _R =50V	-	47.8	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	66.6	-	nC

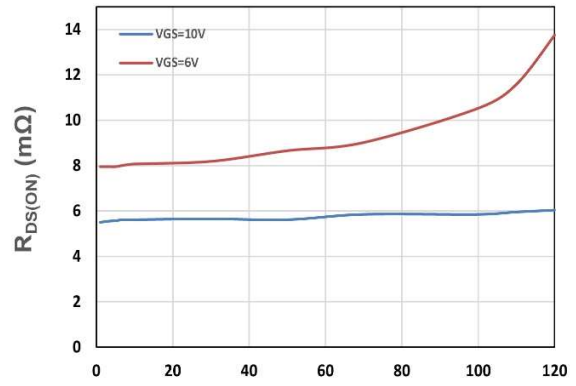
Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

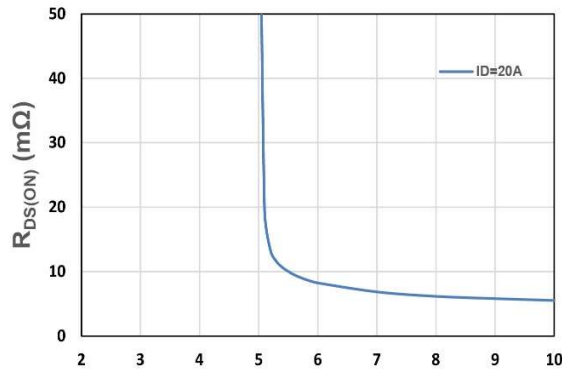
N-Channel Typical Characteristics



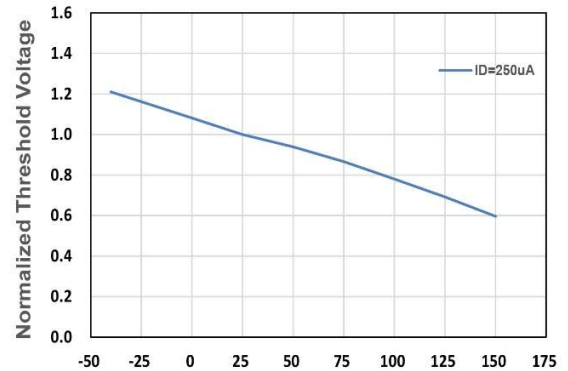
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



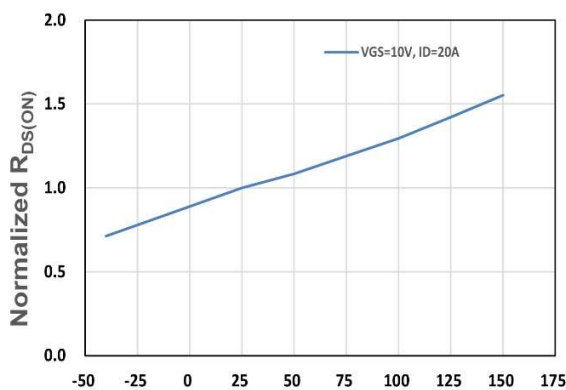
I_D - Drain Current (A)
Figure 2. On-Resistance vs. I_D



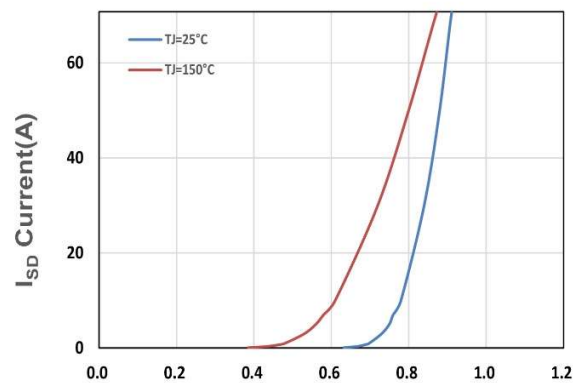
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. V_{GS}



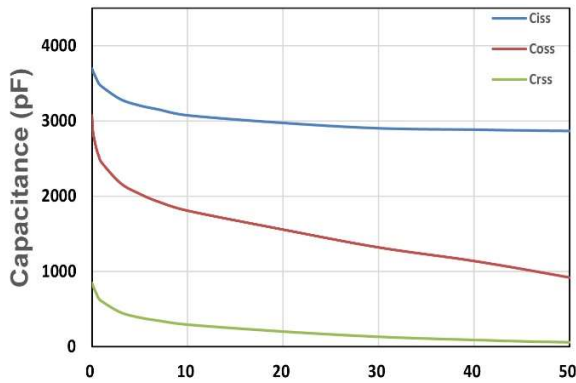
T_j , Junction Temperature ($^\circ C$)
Figure 4. Gate Threshold Voltage



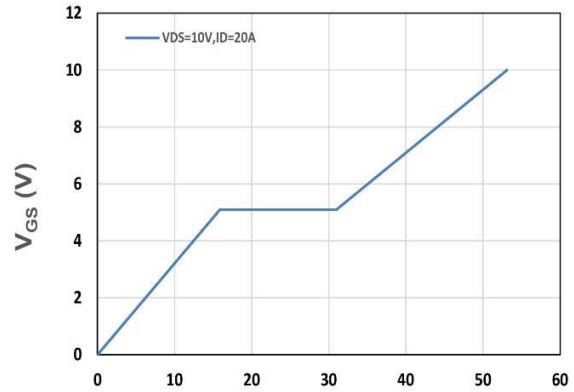
T_j , Junction Temperature ($^\circ C$)
Figure 5. Drain-Source On Resistance



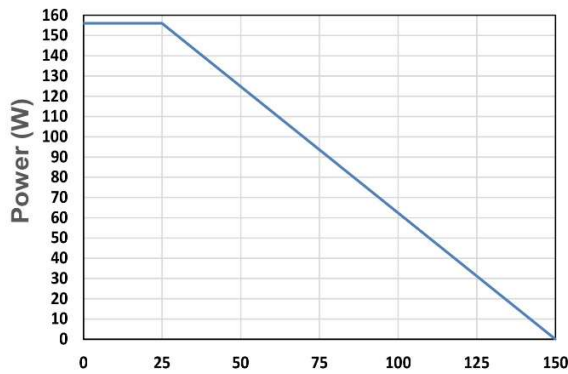
V_{SD} , Source-Drain Voltage (V)
Figure 6. Source-Drain Diode Forward



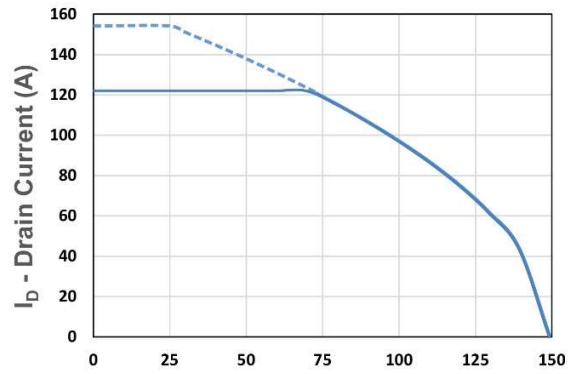
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



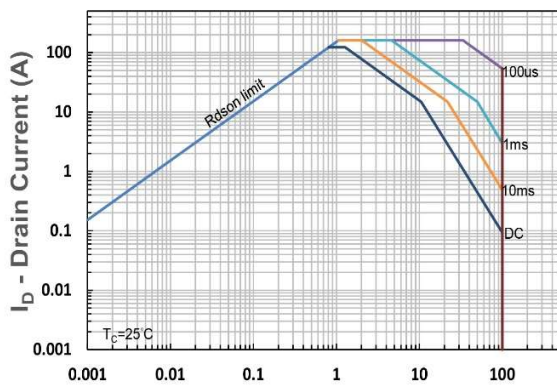
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



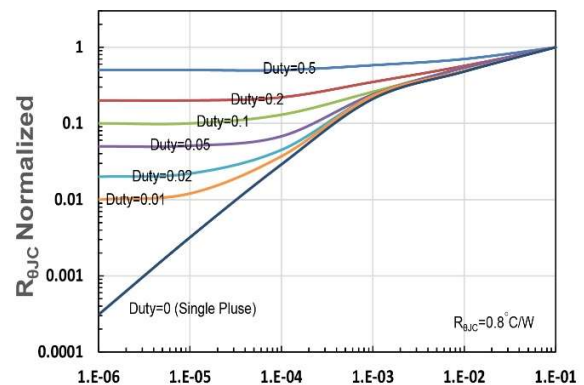
T_c - Case Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



T_c - Case Temperature ($^{\circ}C$)
Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)
Figure 11. Safe Operating Area



t_1 , Square Wave Pulse Duration (s)
Figure 12. $R_{\theta JC}$ Transient Thermal Impedance