




# Power MOSFETS


## DATASHEET

---

**LM45015NAM8A**

N-Channel  
Enhancement Mode MOSFET

 Leadpower-semi CO., LTD.

 [sales@leadpower-semi.com](mailto:sales@leadpower-semi.com)

 (03) 6577339 FAX : (03) 6577229

 [www.leadpower-semi.com](http://www.leadpower-semi.com)

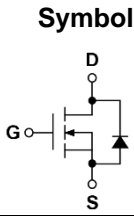
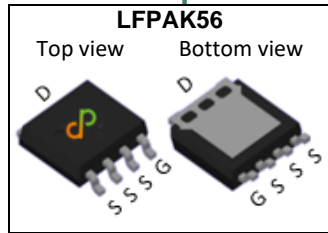


Quality Management Systems

ISO 9001:2015 Certificate

## N-Channel Enhancement Mode MOSFET

### Pin Description



### Product Summary

Symbol	N-Channel	Unit
$V_{DSS}$	45	V
$R_{DS(ON)-Max}$	1.4	m $\Omega$
$I_D$	207	A

### Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested
- Moisture Sensitivity Level MSL1

### Applications

- DC-to-DC converters
- Switch Mode Power Supply
- Brushless DC motor control

### Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM45015NAM8A	LFPAK56	Tape & Reel	4000 / Tape & Reel	45015 □□□□□□

Note : □□□□□□ = Lot Code

### Absolute Maximum Ratings (T<sub>J</sub>=25°C Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit
$V_{DSS}$	Drain-Source Voltage	45	V
$V_{GSS}$	Gate-Source Voltage	±20	
$T_J$	Maximum Junction Temperature	175	°C
$T_{STG}$	Storage Temperature Range	-55 to 175	°C
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ C$ 61	A
$I_{SP}$	Diode Pulse Current	$T_C=25^\circ C$ 400 <sup>①</sup>	A
$I_{DM}$	Pulse Drain Current Tested	$T_C=25^\circ C$ 516	A
$I_D$	Continuous Drain Current	$T_C=25^\circ C$ 207	A
		$T_C=100^\circ C$ 146	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ C$ 94	W
		$T_C=100^\circ C$ 47	
$I_D$	Continuous Drain Current	$T_A=25^\circ C$ 39	A
		$T_A=70^\circ C$ 33	
$P_D$	Maximum Power Dissipation	$T_A=25^\circ C$ 3.3	W
		$T_A=70^\circ C$ 2.3	
$I_{AS}^{②}$	Avalanche Current, Single pulse	L=0.1mH 54	A
		L=0.5mH 30	
$E_{AS}^{②}$	Avalanche Energy, Single pulse	L=0.1mH 146	mJ
		L=0.5mH 225	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	1.6
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	45

Note ① : Max. current is limited by bonding

Note ② : UIS tested and pulse width are limited by maximum junction temperature 175°C

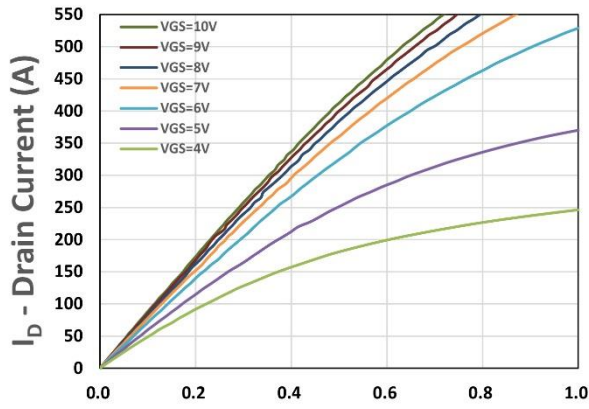
Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz

## N-Channel Electrical Characteristics (T<sub>J</sub>=25°C Unless Otherwise Noted)

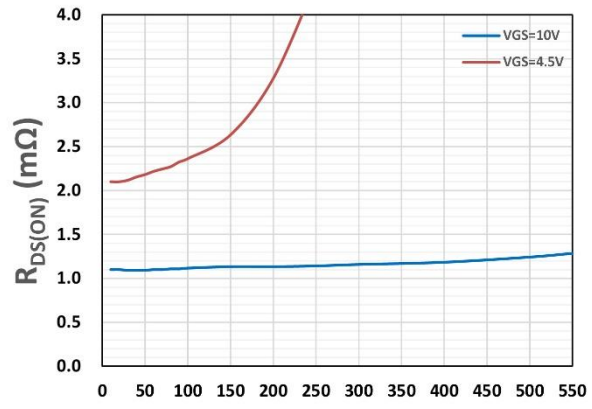
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics</b>						
<b>BV<sub>DSS</sub></b>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA	45	-	-	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =36V, V <sub>GS</sub> =0V	-	-	1	uA
<b>V<sub>GS(th)</sub></b>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	1	1.7	2.3	V
<b>I<sub>GSS</sub></b>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>R<sub>DS(ON)</sub></b> <sup>④</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =25A	-	1.1	1.4	mΩ
		V <sub>GS</sub> =4.5V, I <sub>DS</sub> =15A	-	2.2	2.8	
<b>gfs</b>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>DS</sub> =10A	-	34	-	S
<b>Dynamic Characteristics</b> <sup>⑥</sup>						
<b>R<sub>G</sub></b>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, Freq.=1MHz	-	1	-	Ω
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, Freq.=1MHz	-	3792	-	pF
<b>C<sub>oss</sub></b>	Output Capacitance					
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance					
<b>td(ON)</b>	Turn-on Delay Time	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, I <sub>D</sub> =1A, R <sub>GEN</sub> =1Ω	-	15	-	nS
<b>t<sub>r</sub></b>	Turn-on Rise Time					
<b>t<sub>d(OFF)</sub></b>	Turn-off Delay Time					
<b>t<sub>f</sub></b>	Turn-off Fall Time					
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =20V, I <sub>D</sub> =25A	-	23	-	nC
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, I <sub>D</sub> =25A	-	50	-	nC
<b>Q<sub>gs</sub></b>	Gate-Source Charge					
<b>Q<sub>gd</sub></b>	Gate-Drain Charge					
<b>Source-Drain Characteristics</b>						
<b>V<sub>SD</sub></b> <sup>④</sup>	Diode Forward Voltage	I <sub>SD</sub> =25A, V <sub>GS</sub> =0V	-	0.75	1.1	V
<b>t<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =12.5A, V <sub>R</sub> =30V	-	57	-	nS
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	di <sub>F</sub> /dt=100A/μs	-	81	-	nC

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

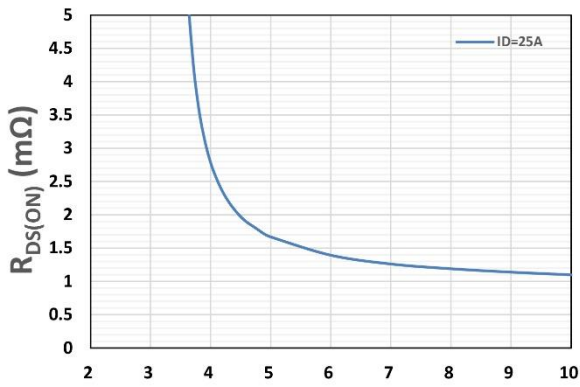
Note ⑤ : Guaranteed by design, not subject to production testing.



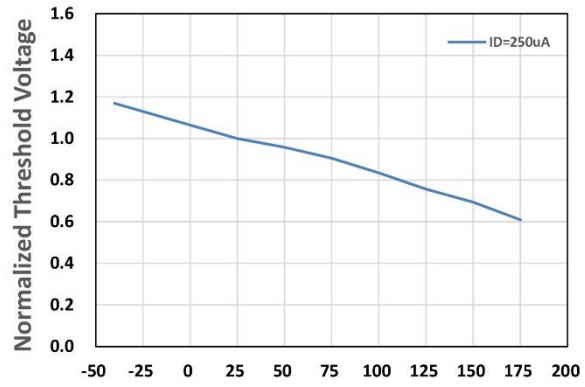
**V<sub>DS</sub> - Drain - Source Voltage (V)**  
**Figure 1. Output Characteristics**



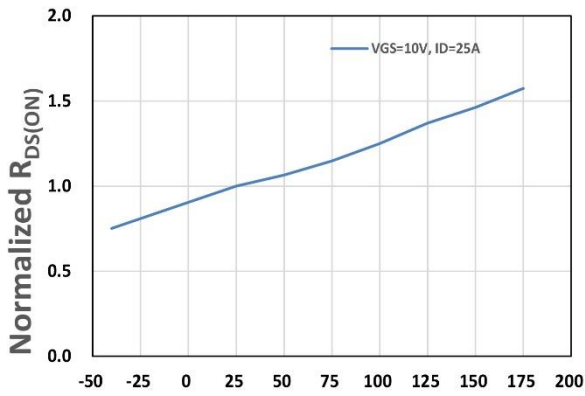
**I<sub>D</sub> - Drain Current (A)**  
**Figure 2. On-Resistance vs. ID**



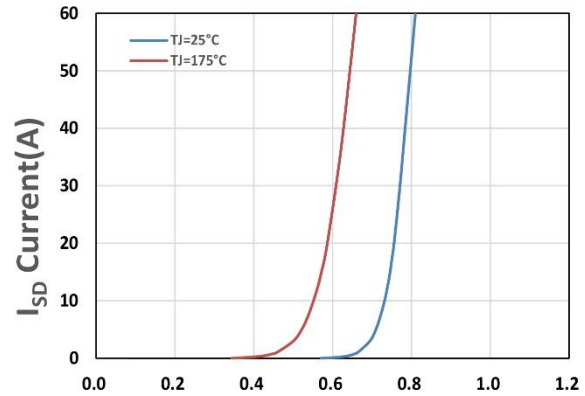
**V<sub>GS</sub> - Gate - Source Voltage (V)**  
**Figure 3. On-Resistance vs. VGS**



**T<sub>J</sub>, Junction Temperature (°C)**  
**Figure 4. Gate Threshold Voltage**



**T<sub>J</sub>, Junction Temperature (°C)**  
**Figure 5. Drain-Source On Resistance**



**V<sub>SD</sub>, Source-Drain Voltage (V)**  
**Figure 6. Source-Drain Diode Forward**

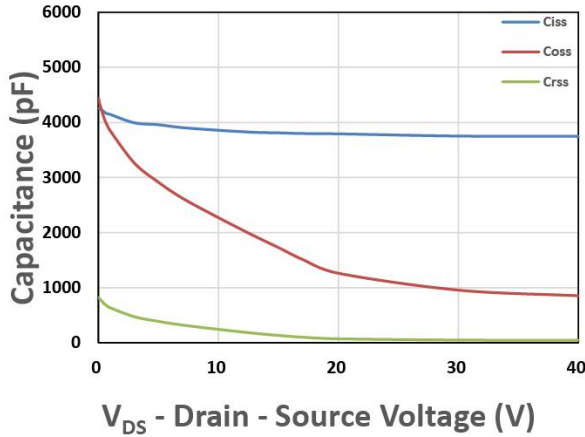


Figure 7. Capacitance

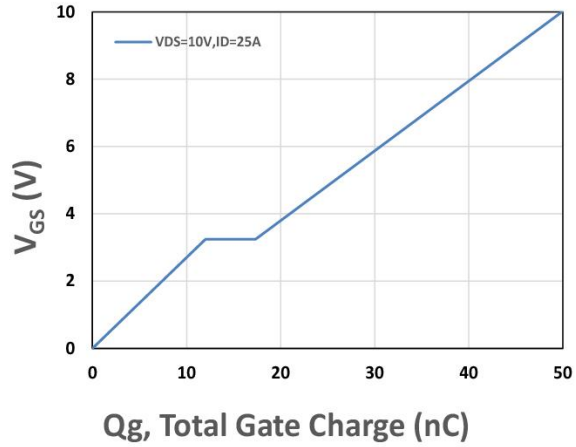


Figure 8. Gate Charge Characteristics

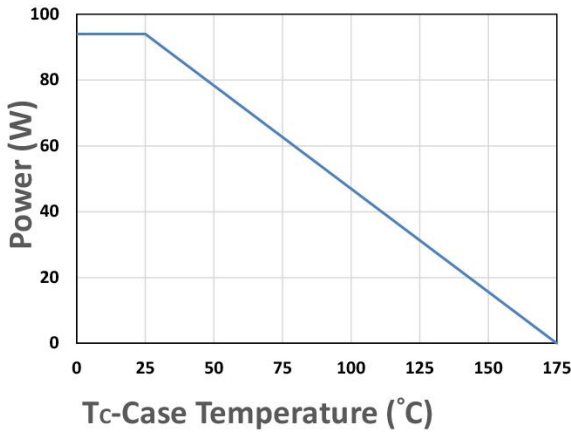


Figure 9. Power Dissipation

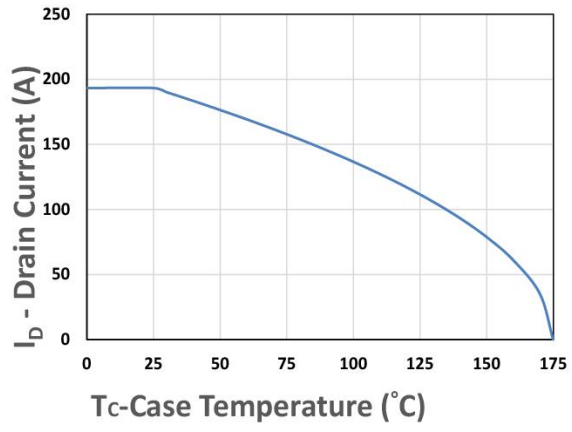


Figure 10. Drain Current

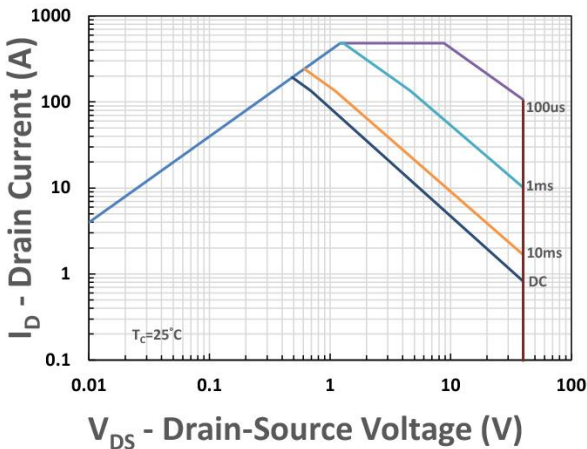


Figure 11. Safe Operating Area

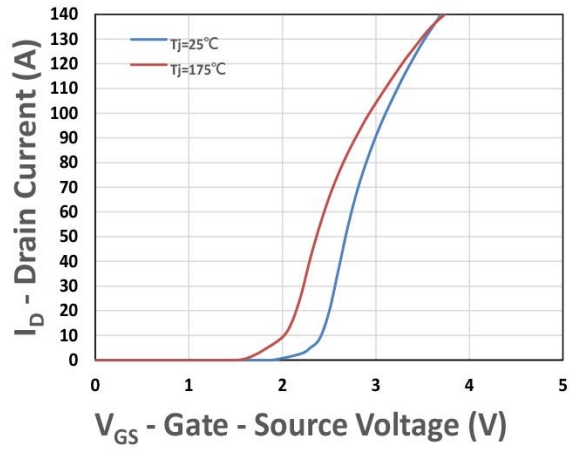


Figure 12. Transfer Characteristics

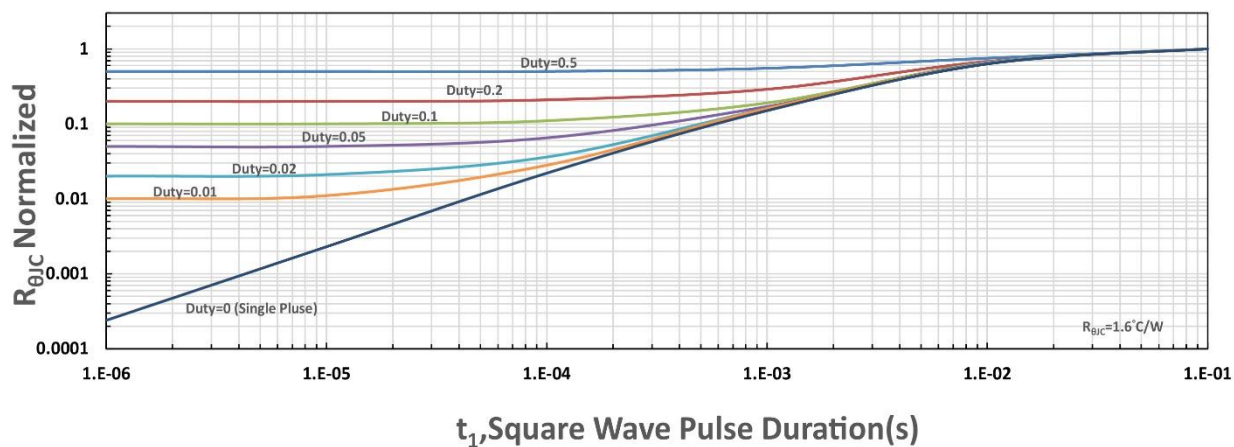


Figure 13.  $R_{\theta JC}$  Transient Thermal Impedance