



# Power MOSFETS

## DATASHEET

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**LM30026NAK8A**

N-Channel  
Enhancement Mode MOSFET



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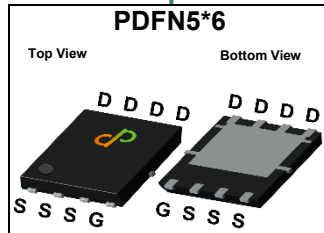


Quality Management Systems

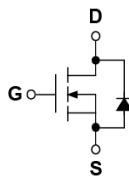
ISO 9001:2015 Certificate

## N-Channel Enhancement Mode MOSFET

### Pin Description



### Symbol



### Product Summary

| Symbol           | N-Channel | Unit       |
|------------------|-----------|------------|
| $V_{DSS}$        | 30        | V          |
| $R_{DS(ON)-Max}$ | 3.4       | m $\Omega$ |
| ID               | 71        | A          |

### Feature

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

### Applications

- DC/DC converter

### Ordering Information

| Orderable Part Number | Package Type | Form        | Shipping           | Marking         |
|-----------------------|--------------|-------------|--------------------|-----------------|
| LM30026NAK8A          | PDFN5*6      | Tape & Reel | 5000 / Tape & Reel | 30026<br>□□□□□□ |

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             | 30                                                             | V    |
| $V_{GSS}$    | Gate-Source Voltage              | ±20                                                            | V    |
| $T_J$        | Maximum Junction Temperature     | 150                                                            | °C   |
| $T_{STG}$    | Storage Temperature Range        | -55 to 150                                                     | °C   |
| $I_S$        | Diode Continuous Forward Current | $T_C=25^\circ\text{C}$<br>29                                   | A    |
| $I_{DM}^{①}$ | Pulse Drain Current Tested       | $T_C=25^\circ\text{C}$<br>226                                  | A    |
| $I_D$        | Continuous Drain Current         | $T_C=25^\circ\text{C}$<br>$T_C=100^\circ\text{C}$<br>71<br>57  | A    |
| $P_D$        | Maximum Power Dissipation        | $T_C=25^\circ\text{C}$<br>$T_C=100^\circ\text{C}$<br>42<br>17  | W    |
| $I_D^{②}$    | Continuous Drain Current         | $T_A=25^\circ\text{C}$<br>$T_A=70^\circ\text{C}$<br>22<br>18   | A    |
| $P_D^{②}$    | Maximum Power Dissipation        | $T_A=25^\circ\text{C}$<br>$T_A=70^\circ\text{C}$<br>2.5<br>1.6 | W    |
| $I_{AS}^{③}$ | Avalanche Current, Single pulse  | L=0.1mH<br>L=0.5mH<br>19<br>9                                  | A    |
| $E_{AS}^{③}$ | Avalanche Energy, Single pulse   | L=0.1mH<br>L=0.5mH<br>18<br>20                                 | mJ   |

### Thermal Characteristics

| Symbol              | Parameter                              | Rating             | Unit |
|---------------------|----------------------------------------|--------------------|------|
| $R_{\theta JC}$     | Thermal Resistance-Junction to Case    | Steady State<br>3  | °C/W |
| $R_{\theta JA}^{②}$ | Thermal Resistance-Junction to Ambient | Steady State<br>50 | °C/W |

Note ① : Max. current is limited by bonding limit

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

Note ③ : UIS tested and pulse width are limited by maximum junction temperature 150°C.

**N-Channel Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  Unless Otherwise Noted)

| Symbol                            | Parameter                        | Test Conditions                                            | Min. | Typ. | Max. | Unit |
|-----------------------------------|----------------------------------|------------------------------------------------------------|------|------|------|------|
| Static Electrical Characteristics |                                  |                                                            |      |      |      |      |
| BV <sub>DSS</sub>                 | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA                | 30   | -    | -    | V    |
| I <sub>DSS</sub>                  | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                  | -    | -    | 1    | uA   |
| V <sub>GS(th)</sub>               | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA  | 1.1  | 1.6  | 2.1  | V    |
| I <sub>GSS</sub>                  | Gate Leakage Current             | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                 | -    | -    | ±100 | nA   |
| R <sub>DS(ON)</sub> ④             | Drain-Source On-state Resistance | V <sub>GS</sub> =10V, I <sub>DS</sub> =25A                 | -    | 2.6  | 3.4  | mΩ   |
|                                   |                                  | V <sub>GS</sub> =4.5V, I <sub>DS</sub> =15A                | -    | 3.8  | 5.0  |      |
| gfs                               | Forward Transconductance         | V <sub>DS</sub> =5V, I <sub>DS</sub> =50A                  | -    | 33   | -    | S    |
| Dynamic Characteristics ⑥         |                                  |                                                            |      |      |      |      |
| R <sub>G</sub>                    | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, Freq.=1MHz       | -    | 1    | -    | Ω    |
| C <sub>iss</sub>                  | Input Capacitance                | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, Freq.=1MHz      | -    | 1518 | -    | pF   |
| C <sub>oss</sub>                  | Output Capacitance               |                                                            | -    | 1067 | -    |      |
| C <sub>rss</sub>                  | Reverse Transfer Capacitance     |                                                            | -    | 59   | -    |      |
| td(ON)                            | Turn-on Delay Time               | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, Id=1A, RGEN=1Ω | -    | 8    | -    | nS   |
| tr                                | Turn-on Rise Time                |                                                            | -    | 12   | -    |      |
| td(OFF)                           | Turn-off Delay Time              |                                                            | -    | 23   | -    |      |
| tf                                | Turn-off Fall Time               |                                                            | -    | 91   | -    |      |
| Qg                                | Total Gate Charge                | VGS=4.5V, VDS=15V Id=25A                                   | -    | 10   | -    | nC   |
| Qg                                | Total Gate Charge                | VGS=10V, VDS=15V, Id=25A                                   | -    | 22   | -    |      |
| Qgs                               | Gate-Source Charge               |                                                            | -    | 4    | -    |      |
| Qgd                               | Gate-Drain Charge                |                                                            | -    | 2    | -    |      |
| Source-Drain Characteristics      |                                  |                                                            |      |      |      |      |
| VSD④                              | Diode Forward Voltage            | ISD=10A, VGS=0V                                            | -    | 0.7  | 1.1  | V    |
| trr                               | Reverse Recovery Time            | IF=12.5A, VR=20V                                           | -    | 35   | -    | nS   |
| Qrr                               | Reverse Recovery Charge          | dIF/dt=100A/μs                                             | -    | 24   | -    | nC   |

Note ④ : Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

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

## N-Channel Typical Characteristics

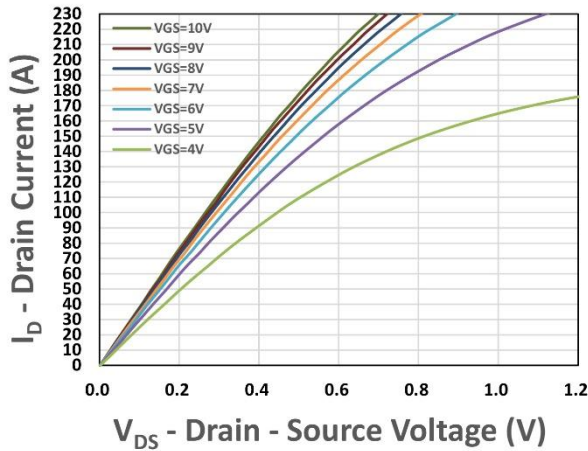


Figure 1. Output Characteristics

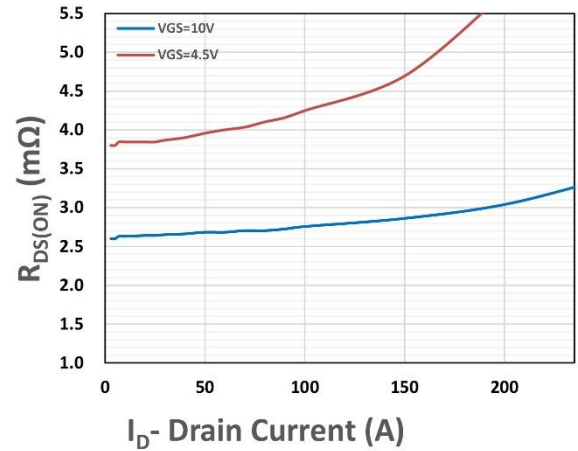


Figure 2. On-Resistance vs.  $I_D$

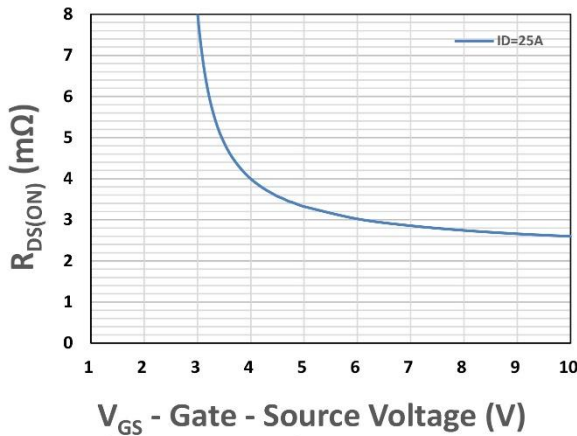


Figure 3. On-Resistance vs.  $V_{GS}$

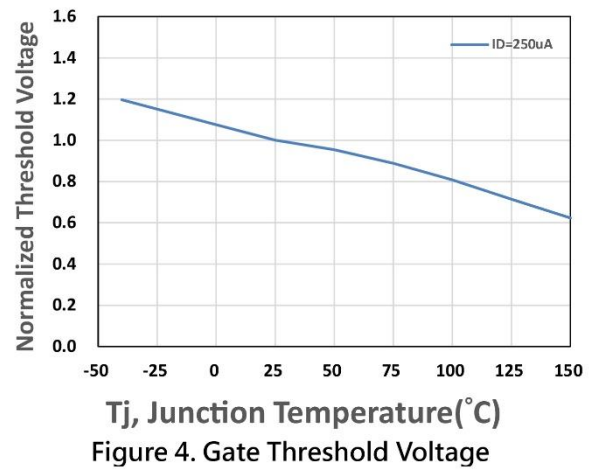


Figure 4. Gate Threshold Voltage

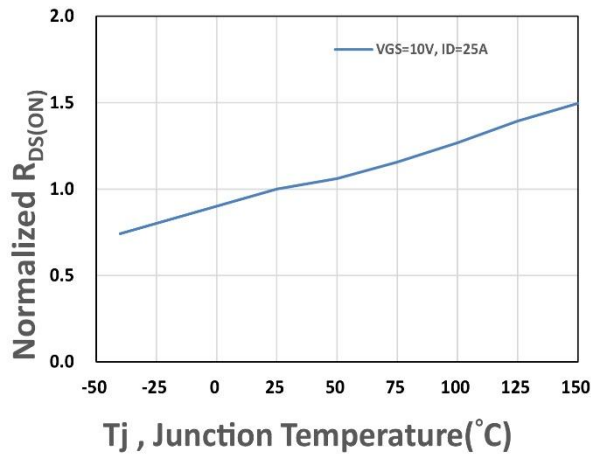


Figure 5. Drain-Source On Resistance

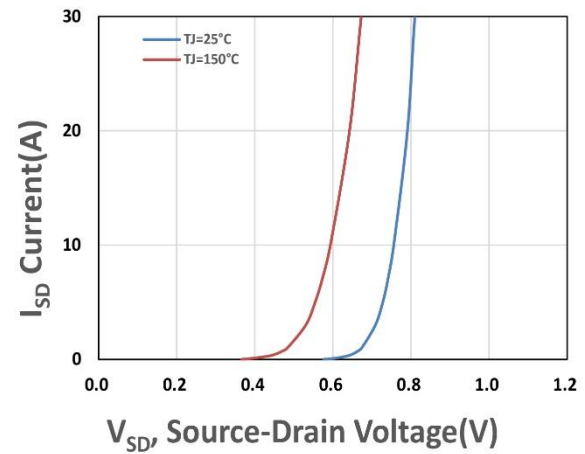
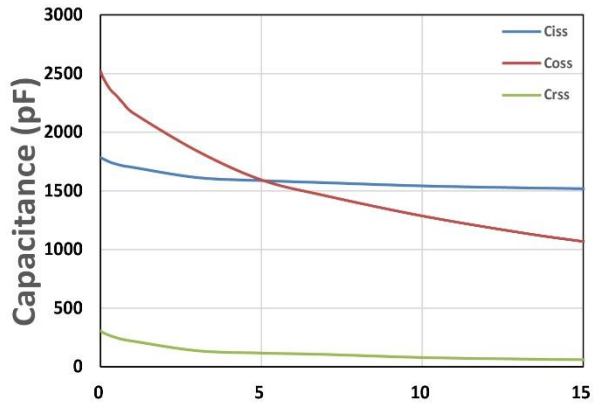
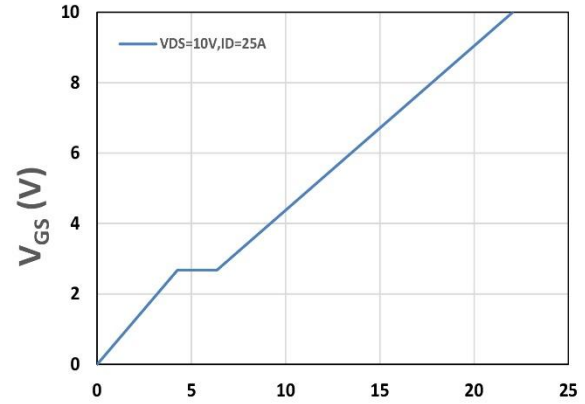


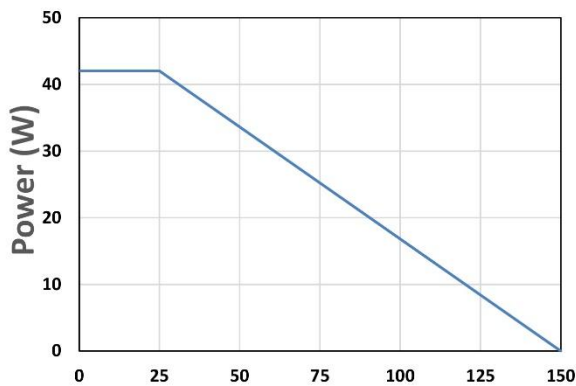
Figure 6. Source-Drain Diode Forward



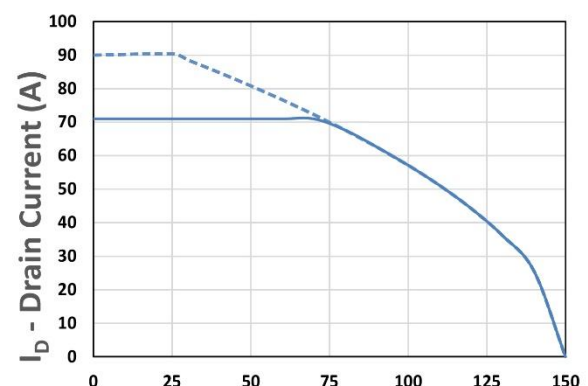
$V_{DS}$  - Drain - Source Voltage (V)  
Figure 7. Capacitance



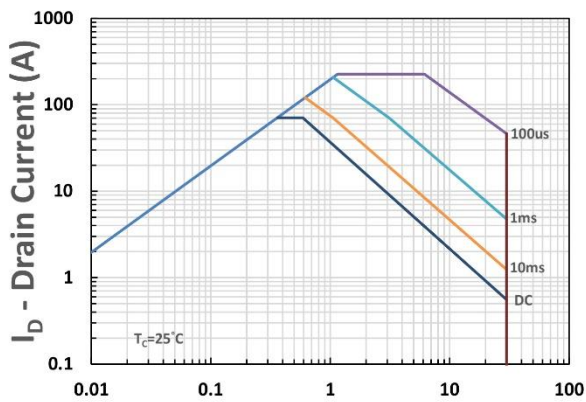
$Q_g$ , Total Gate Charge (nC)  
Figure 8. Gate Charge Characteristics



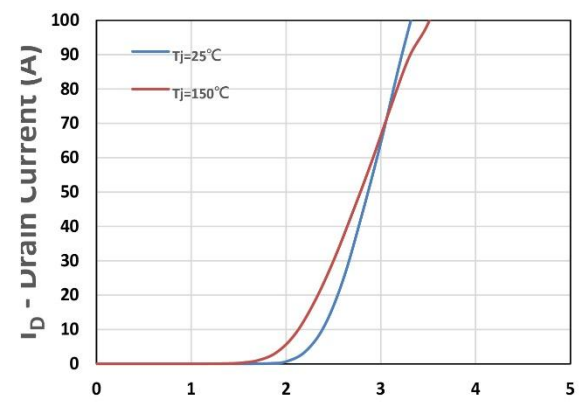
$T_c$ -Case Temperature ( $^{\circ}\text{C}$ )  
Figure 9. Power Dissipation



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



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



$V_{GS}$  - Gate - Source Voltage (V)  
Figure 12. Transfer Characteristics

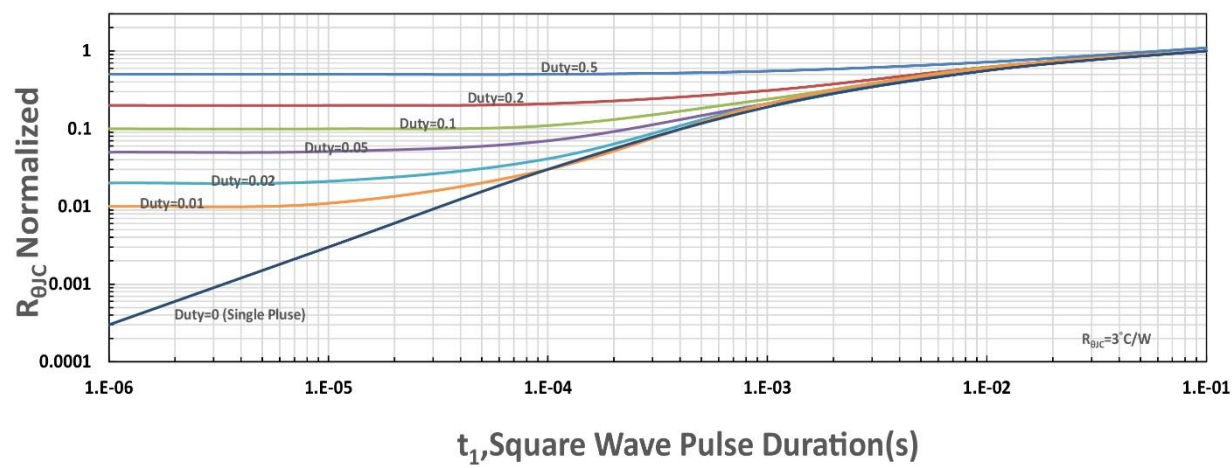


Figure 13.  $R_{\theta JC}$  Transient Thermal Impedance