



# Power MOSFETS


## DATASHEET


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**LM30350NGJ3A**

N-Channel  
Enhancement Mode MOSFET

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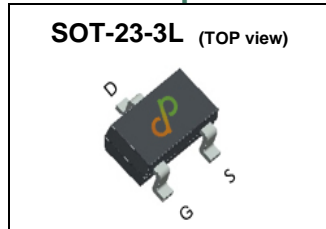


Quality Management Systems

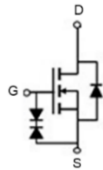
ISO 9001:2015 Certificate

## N-Channel Enhancement Mode MOSFET

### Pin Description



### Symbol



### Product Summary

Symbol	N-Channel	Unit
$V_{DSS}$	30	V
$R_{DS(ON)-Max}$	31	m $\Omega$
$I_D$	4.9	A

### Feature

- Suitable for Low Gate Drive
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- ESD Protection

### Applications

- Portable Equipment
- Load Switches

### Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30350NGJ3A	SOT-23-3L	Tape & Reel	3000 / Tape & Reel	04□□□

### Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit	
$V_{DSS}$	Drain-Source Voltage	30	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 12$		
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_A=25^\circ\text{C}$	11.2	A
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	4.9	A
		$T_A=70^\circ\text{C}$	3.9	
$P_D$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	1.25	W
		$T_A=70^\circ\text{C}$	0.8	
$I_{AS}^{(2)}$	Avalanche Current, Single pulse	$L=0.1\text{mH}$	11	A
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse	$L=0.1\text{mH}$	6	mJ

### Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	Steady State	100	$^\circ\text{C}/\text{W}$

Note ① : Max. current is limited by bonding wire

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$

Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.

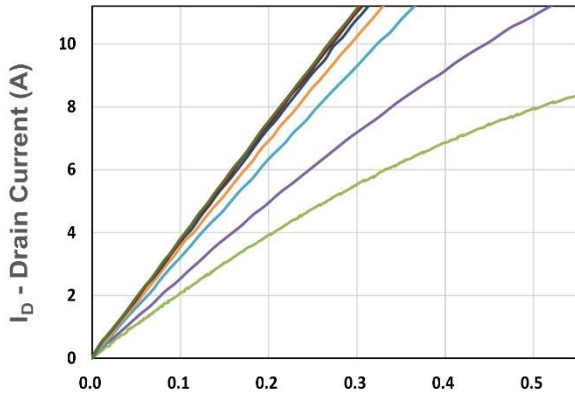
## N-Channel Electrical Characteristics (T<sub>J</sub>=25°C Unless Otherwise Noted)

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	30	-	-	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, 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	0.4	0.8	1.3	V
<b>I<sub>GSS</sub></b>	Gate Leakage Current	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±10	uA
<b>R<sub>DS(ON)</sub></b> <sup>④</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =4.5V, I <sub>DS</sub> =2A	-	26	31	mΩ
		V <sub>GS</sub> =2.5V, I <sub>DS</sub> =1A	-	32	42	
		V <sub>GS</sub> =1.8V, I <sub>DS</sub> =0.5A	-	45	68	
<b>gfs</b>	Forward Transconductance	V <sub>DS</sub> =3V, I <sub>DS</sub> =1A	-	8	-	S
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
<b>R<sub>G</sub></b>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, Freq.=1MHz	-	3	-	Ω
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, Freq.=1MHz	-	632	-	pF
<b>C<sub>OSS</sub></b>	Output Capacitance		-	58	-	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		-	40	-	
<b>td(ON)</b>	Turn-on Delay Time	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =25V, I <sub>D</sub> =1A, R <sub>GEN</sub> =6Ω	-	8	-	nS
<b>t<sub>r</sub></b>	Turn-on Rise Time		-	7.2	-	
<b>t<sub>d(OFF)</sub></b>	Turn-off Delay Time		-	25.5	-	
<b>t<sub>f</sub></b>	Turn-off Fall Time		-	18.2	-	
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =2.5V, V <sub>DS</sub> =15V, I <sub>D</sub> =2A	-	4.1	-	nC
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =15V, I <sub>D</sub> =2A	-	7.25	-	
<b>Q<sub>gs</sub></b>	Gate-Source Charge		-	1.61	-	
<b>Q<sub>gd</sub></b>	Gate-Drain Charge		-	1.35	-	
<b>Source-Drain Characteristics</b>						
<b>V<sub>SD</sub></b> <sup>④</sup>	Diode Forward Voltage	I <sub>SD</sub> =1A, V <sub>GS</sub> =0V	-	0.65	1.1	V
<b>t<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =1A, V <sub>R</sub> =15V	-	8.1	-	nS
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	dI <sub>F</sub> /dt=100A/μs	-	2.5	-	nC

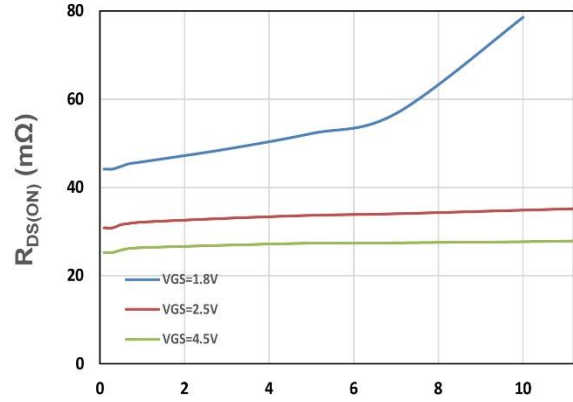
Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

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

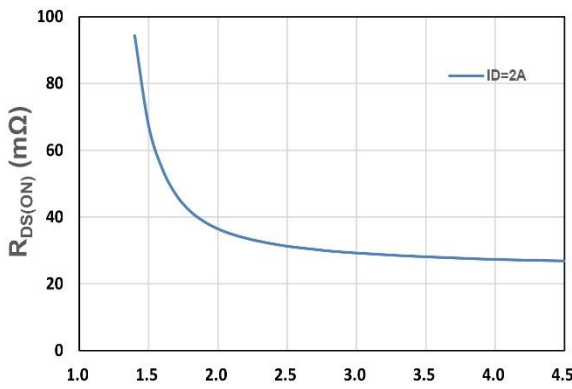
## N-Channel Typical Characteristics



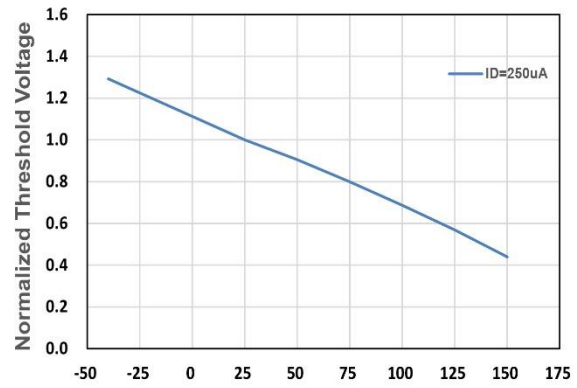
$V_{DS}$  - Drain - Source Voltage (V)  
Figure 1. Output Characteristics



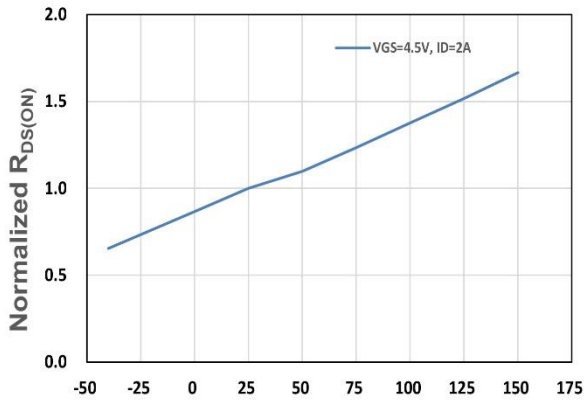
$I_D$  - Drain Current (A)  
Figure 2. On-Resistance vs.  $I_D$



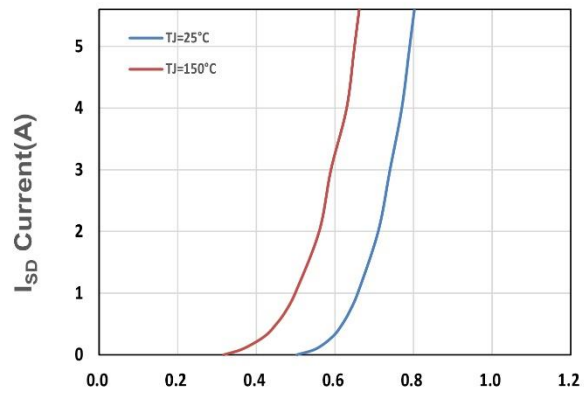
$V_{GS}$  - Gate - Source Voltage (V)  
Figure 3. On-Resistance vs.  $V_{GS}$



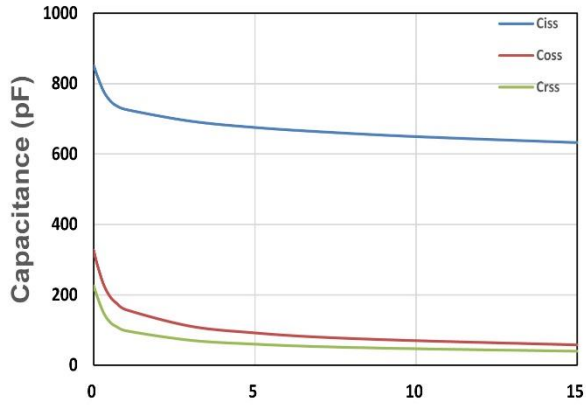
$T_j$ , Junction Temperature(°C)  
Figure 4. Gate Threshold Voltage



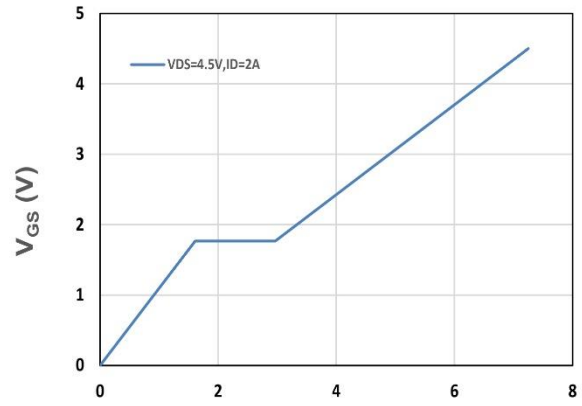
$T_j$ , Junction Temperature(°C)  
Figure 5. Drain-Source On Resistance



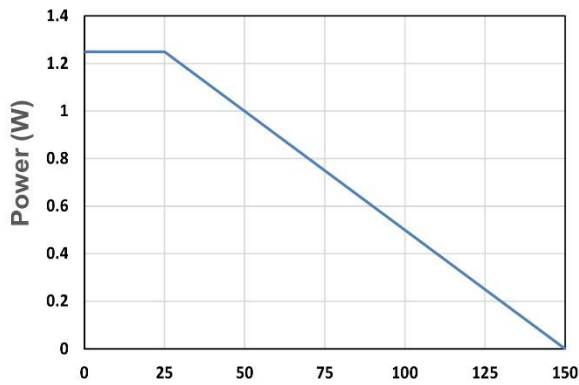
$V_{SD}$ , Source-Drain Voltage(V)  
Figure 6. Source-Drain Diode Forward



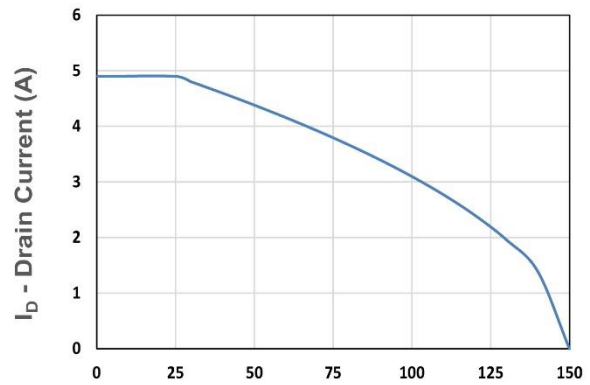
$V_{DS}$  - Drain - Source Voltage (V)  
Figure 7. Capacitance



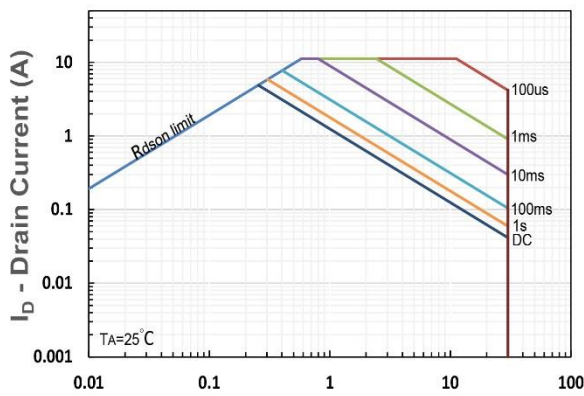
$Q_g$ , Total Gate Charge (nC)  
Figure 8. Gate Charge Characteristics



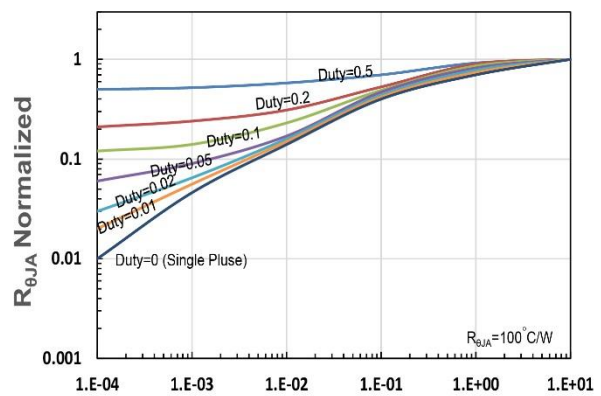
$T_A$  - Ambient Temperature (°C)  
Figure 9. Power Dissipation



$T_A$  - Ambient Temperature (°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.  $R_{\theta JA}$  Transient Thermal Impedance