



# Power MOSFETS


## DATASHEET

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**LM3415PGI3A**

P-Channel  
Enhancement Mode MOSFET

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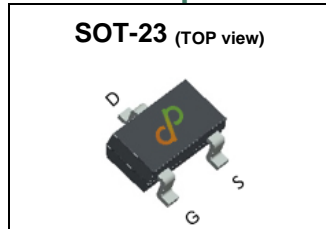


Quality Management Systems

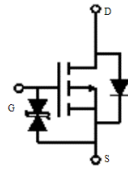
ISO 9001:2015 Certificate

## P-Channel Enhancement Mode MOSFET

### Pin Description



### Symbol



### Product Summary

Symbol	P-Channel	Unit
$V_{DSS}$	-20	V
$R_{DS(ON)-Max}$	39	m $\Omega$
ID	-4.2	A

### Feature

- Low gate charge and operate at  $V_{GS} = -1.8V$
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- ESD Protection

### Applications

- Load switch

### Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM3415PGI3A	SOT-23	Tape & Reel	3000/Tape & Reel	01□□

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

Symbol	Parameter	P-Channel	Unit	
$V_{DSS}$	Drain-Source Voltage	-20	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 8$		
$T_J$	Maximum Junction Temperature	150	$^\circ C$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$	
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_A = 25^\circ C$	-10.5	A
$I_D$	Continuous Drain Current	$T_A = 25^\circ C$	-4.2	A
		$T_A = 70^\circ C$	-3.3	
$P_D$	Maximum Power Dissipation	$T_A = 25^\circ C$	1	W
		$T_A = 70^\circ C$	0.64	
$I_{AS}^{(2)}$	Avalanche Current, Single pulse	$L = 0.1mH$	-11	A
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse	$L = 0.1mH$	6	mJ

### Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	$t \leq 10s$	90	$^\circ C/W$
		Steady State	125	$^\circ C/W$

Note ① : Max. current is limited by junction temperature

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

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

## P-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	-20	-	-	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-16V, 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	-0.3	-0.55	-0.9	V
<b>I<sub>GSS</sub></b>	Gate Leakage Current	V <sub>GS</sub> =±8V, 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> =-4A	-	32	39	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>DS</sub> =-4A	-	39	51	
		V <sub>GS</sub> =-1.8V, I <sub>DS</sub> =-2A	-	50	64	
<b>gfs</b>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>DS</sub> =-4A	-	11	-	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	-	21	-	Ω
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, Freq.=1MHz	-	1029	-	pF
<b>C<sub>OSS</sub></b>	Output Capacitance		-	102	-	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		-	79	-	
<b>td(ON)</b>	Turn-on Delay Time	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A, R <sub>GEN</sub> =3Ω	-	10	-	nS
<b>t<sub>r</sub></b>	Turn-on Rise Time		-	30	-	
<b>t<sub>d(OFF)</sub></b>	Turn-off Delay Time		-	55	-	
<b>t<sub>f</sub></b>	Turn-off Fall Time		-	15	-	
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =-2.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A	-	5.1	-	nC
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-4.5V, I <sub>D</sub> =-4A	-	6.8	-	
<b>Q<sub>gs</sub></b>	Gate-Source Charge		-	1.9	-	
<b>Q<sub>gd</sub></b>	Gate-Drain Charge		-	2.2	-	
<b>Source-Drain Characteristics</b>						
<b>V<sub>SD</sub></b> <sup>④</sup>	Diode Forward Voltage	I <sub>SD</sub> =-4A, V <sub>GS</sub> =0V	-	-0.85	-1.1	V
<b>t<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =-4A, V <sub>R</sub> =0V	-	9.1	-	nS
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	diF/dt=100A/μs	-	2.7	-	nC

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

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

## P-Channel Typical Characteristics

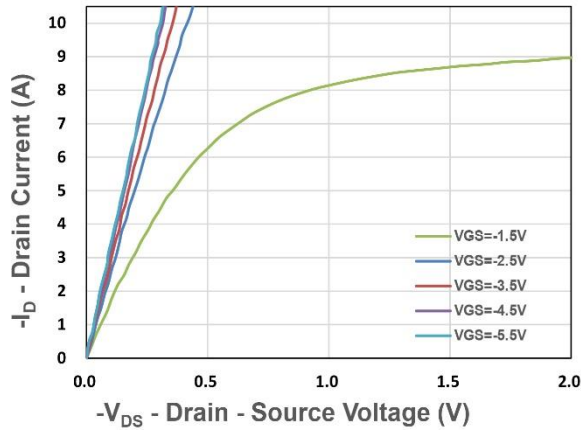


Figure 1. Output Characteristics

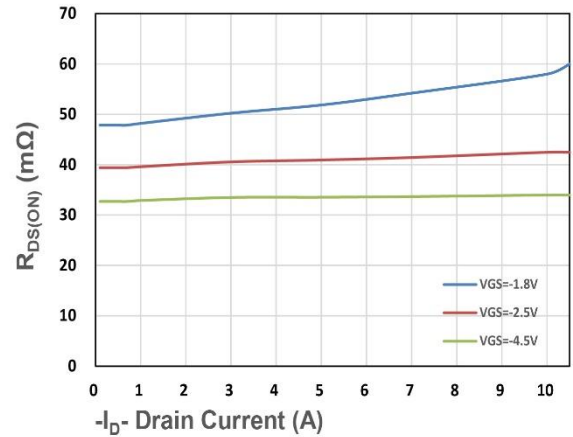


Figure 2. On-Resistance vs. ID

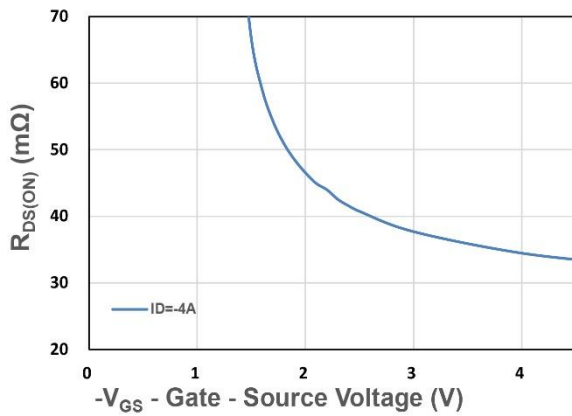


Figure 3. On-Resistance vs. VGS

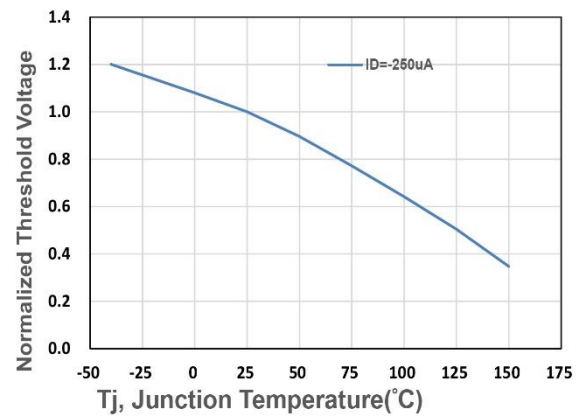


Figure 4. Gate Threshold Voltage

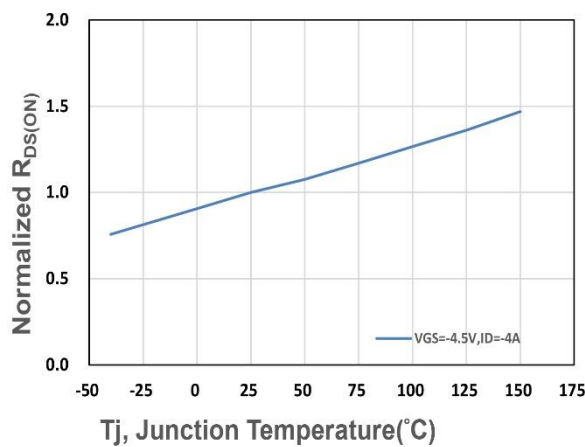


Figure 5. Drain-Source On Resistance

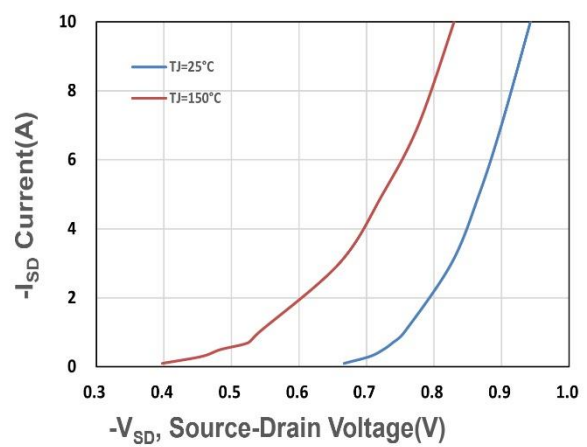
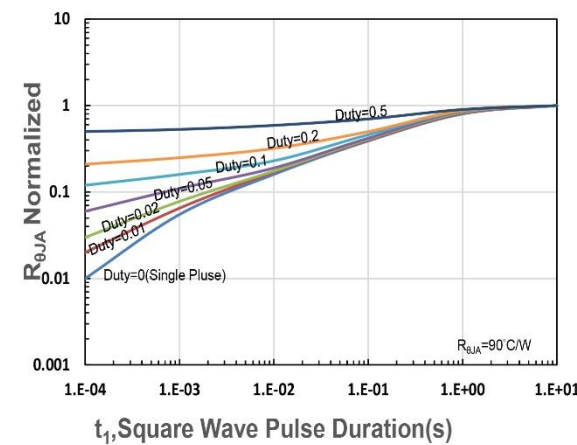
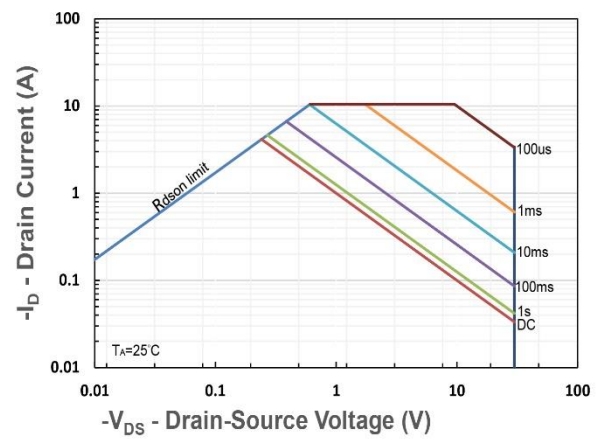
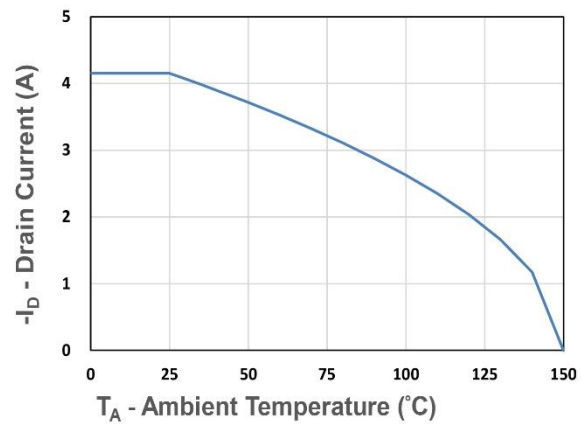
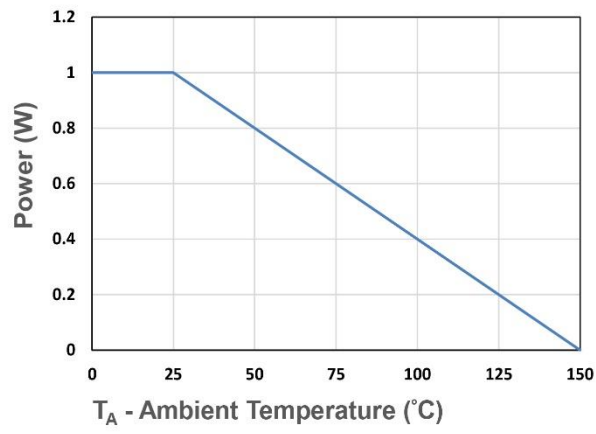
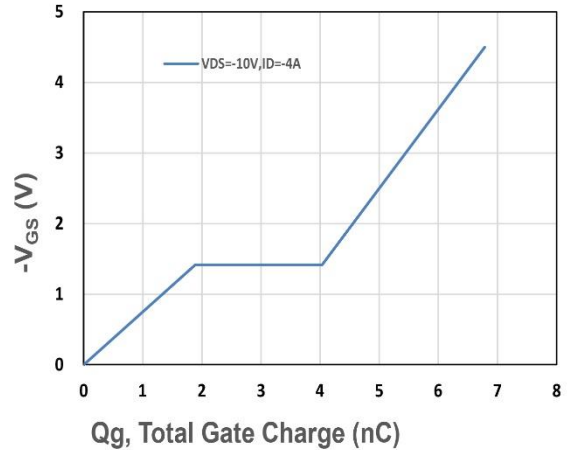
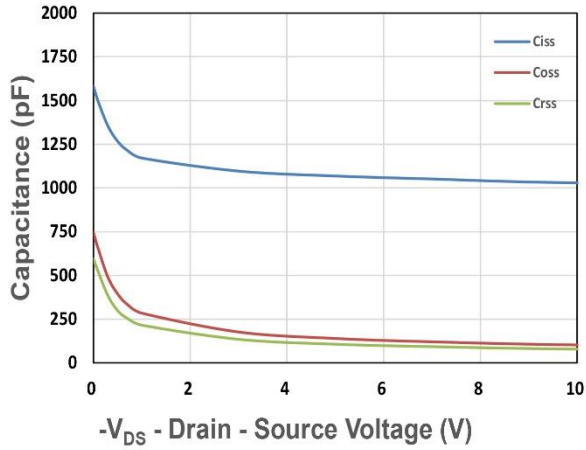


Figure 6. Source-Drain Diode Forward



单击下面可查看定价，库存，交付和生命周期等信息

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