Power MOSFETS

DATASHEET

LM20A10NGI3A

N-Channel

Enhancement Mode MOSFET

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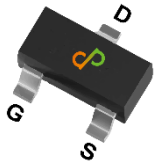
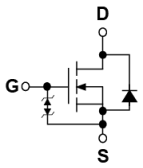
Quality Management Systems

ISO 9001:2015 Certificate

LM20A10NGI3A

-Channel Enhancement Mode MOSFET

Pin Description

SOT-23 (TOP view)	Symbol
	

Product Summary

Symbol	N-Channel	Unit
V_{DSS}	20	V
$R_{DS(ON)-Max}$	85	mΩ
ID	2.6	A

Feature

- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- ESD Protected

Applications

- Load Switch

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM20A10NGI3A	SOT-23	Tape & Reel	3000 / Tape & Reel	20A10 □□□□□□

Note: □□□□□□ = Lot code

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

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±8	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_A=25°C	0.7	A
I_{DM}①	Pulse Drain Current Tested	T_A=25°C	6.5	A
I_D②	Continuous Drain Current	T_A=25°C	2.6	A
		T_A=70°C	2.1	
P_D②	Maximum Power Dissipation	T_A=25°C	0.9	W
		T_A=70°C	0.6	
I_{AS}③	Avalanche Current, Single pulse	L=0.1mH	4	A
		L=0.5mH	2	A
E_{AS}③	Avalanche Energy, Single pulse	L=0.1mH	0.8	mJ
		L=0.5mH	1	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R\theta_{JA}$②	Thermal Resistance-Junction to Ambient	Steady State	140	°C/W

Note ① : Max. current is limited by junction temperature.
Note ② : Surface Mounted on 1in^2 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°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	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	-	-	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	0.3	0.7	1	V
I_{GSS}	Gate Leakage Current	V_{GS}=±8V, V_{DS}=0V	-	-	±10	uA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=4.5V, I_{DS}=2A	-	70	85	mΩ
		V_{GS}=2.5V, I_{DS}=1.5A		85	110	
		V_{GS}=1.8V, I_{DS}=0.5A	-	100	150	
gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=1.6A	-	4.5	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1Mz	-	4	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, Freq.=1MHz	-	141	-	pF
C_{oss}	Output Capacitance		-	27	-	
C_{rss}	Reverse Transfer Capacitance		-	22	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=4.5V,V_{DS}=10V, I_D=1A,R_{GEN}=1Ω	-	4.3	-	nS
t_r	Turn-on Rise Time		-	27	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	8	-	
t_f	Turn-off Fall Time		-	2.5	-	
Q_g	Total Gate Charge	V_{GS}=2.5V,V_{DS}=10V I_D=2A	-	1.1	-	nC
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=10V, I_D=2A	-	1.88	-	
Q_{gs}	Gate-Source Charge		-	0.42	-	
Q_{gd}	Gate-Drain Charge		-	0.34	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=1.6A, V_{GS}=0V	-	0.7	1.1	V
t_{rr}	Reverse Recovery Time	I_F=3A, V_R=20V dI$_F$/dt=100A/μs	-	4.3	-	nS
Q_{rr}	Reverse Recovery Charge		-	0.9	-	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

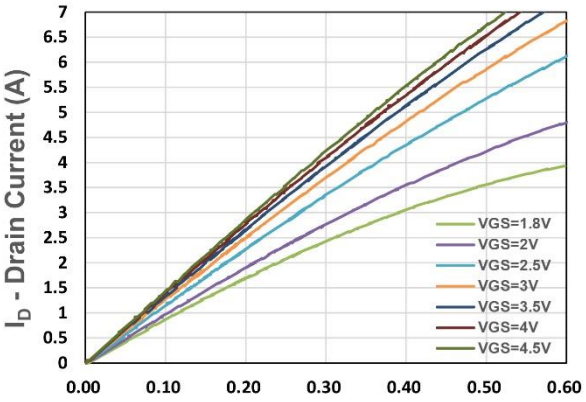


Figure 1. Output Characteristics

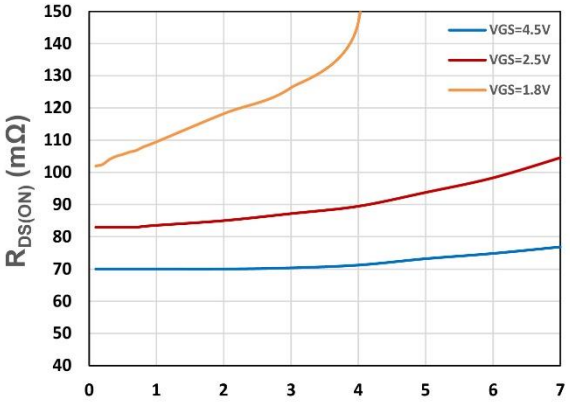


Figure 2. On-Resistance vs. ID

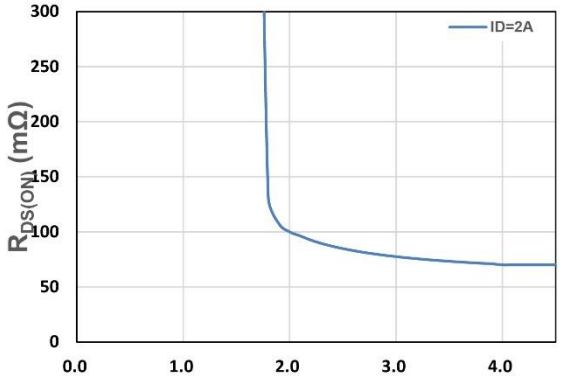


Figure 3. On-Resistance vs. VGS

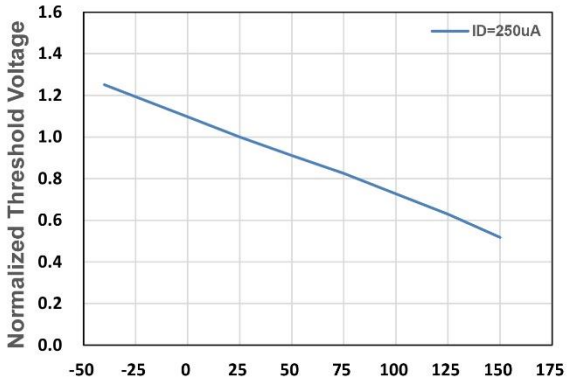


Figure 4. Gate Threshold Voltage

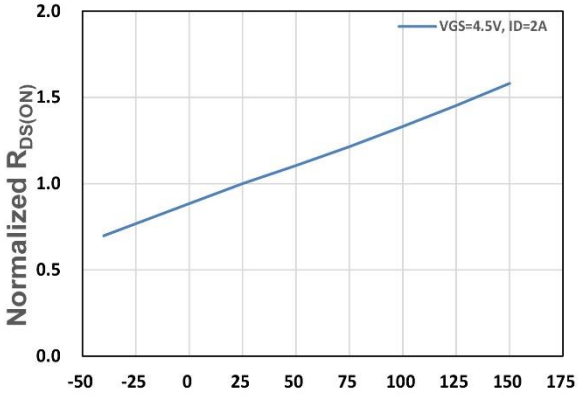


Figure 5. Drain-Source On Resistance

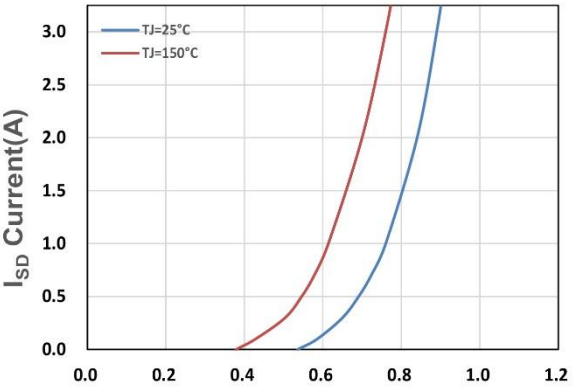
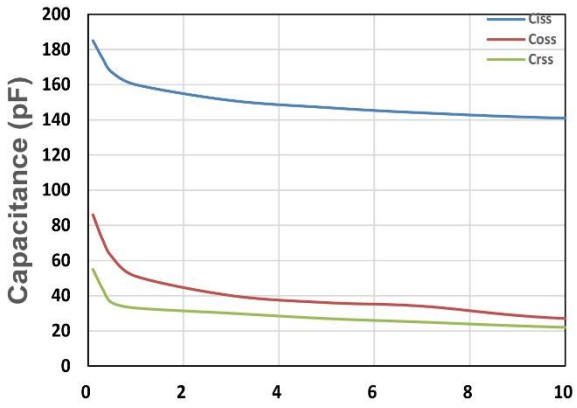
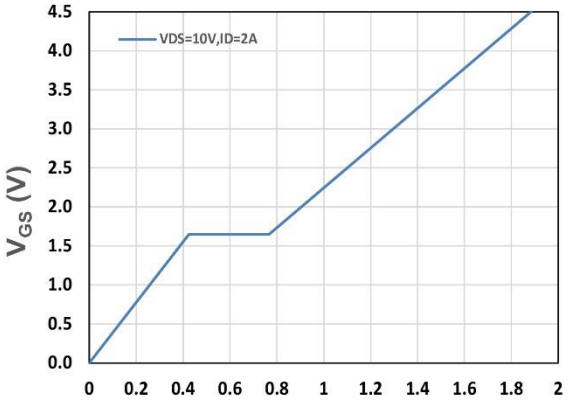


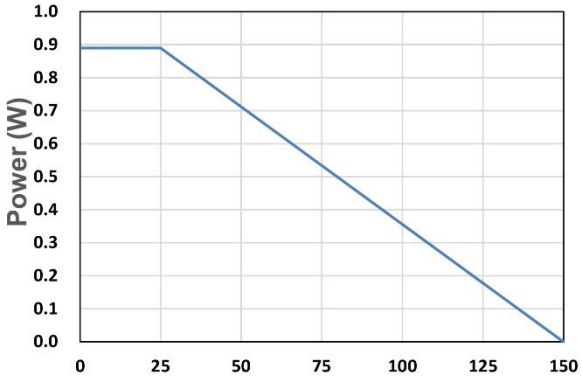
Figure 6. Source-Drain Diode Forward



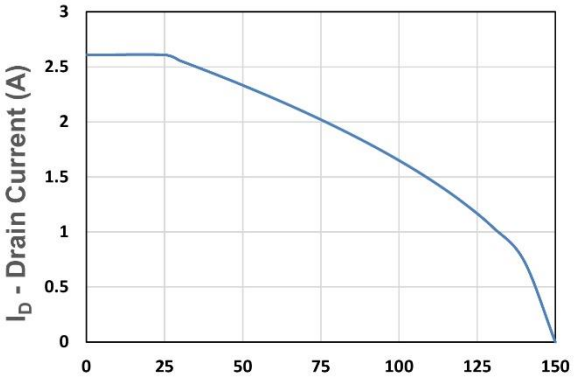
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



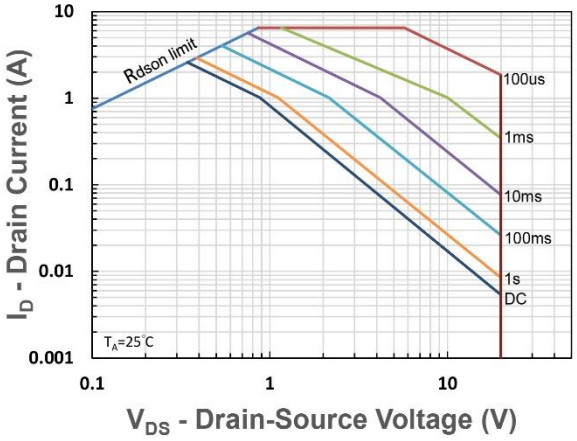
Qg, Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



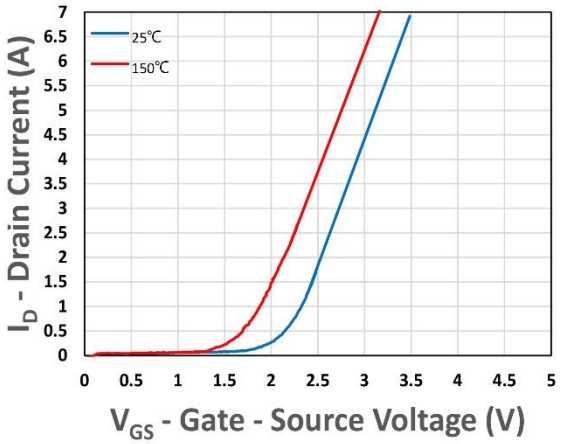
T_A - Ambient Temperature (˚C)
Figure 9. Power Dissipation



T_A - Ambient Temperature (˚C)
Figure 10. Drain Current



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



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

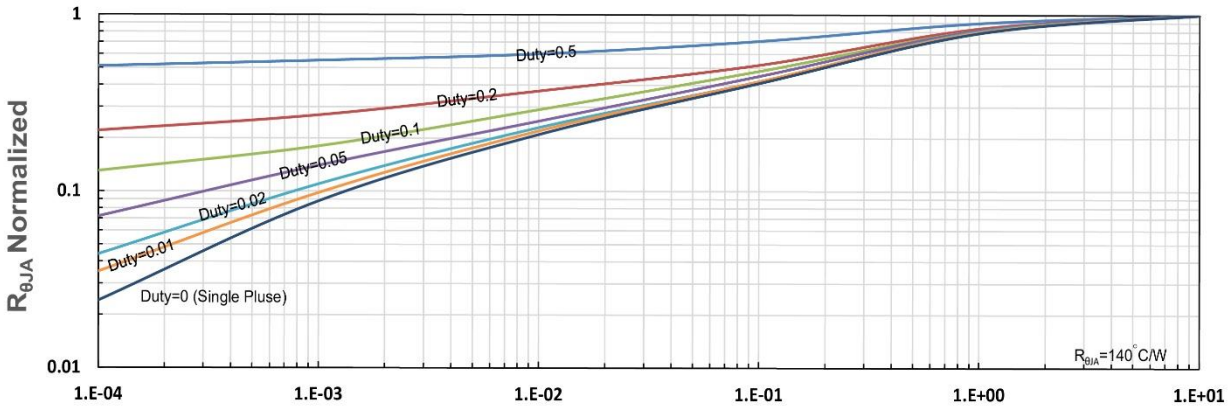


Figure 13. RθJA Transient Thermal Impedance