



Power MOSFETS

DATASHEET

LM20B50NGI3A

N-Channel
Enhancement Mode MOSFET

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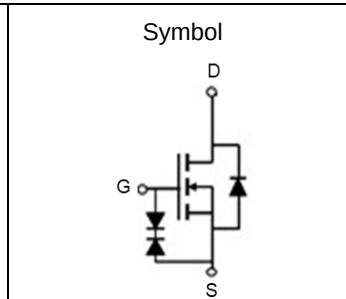
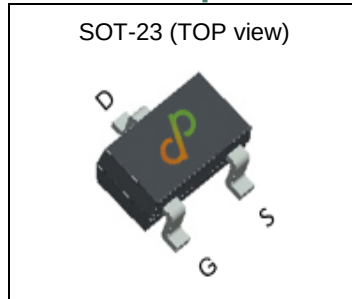


Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Ordering Information

Symbol	N-Channel	Unit
V_{DSS}	20	V
$R_{DS(ON)-Max}$	230	mΩ
I_D	0.98	A

Feature

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

Applications

- Power Management in DC/DC Converters
- Power Load Switch
- Notebook Battery Management

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM20B50NGI3A	SOT-23	Tape & Reel	3000 / Reel(7")	06□□□

Note : □□□ = Lot Code

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

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±12	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
$I_{DM}^{①}$	Pulse Drain Current Tested	$T_A=25^{\circ}C$	1.8	A
$I_D^{①}$	Continuous Drain Current	$T_A=25^{\circ}C$	0.98	A
		$T_A=70^{\circ}C$	0.78	
P_D	Maximum Power Dissipation	$T_A=25^{\circ}C$	0.36	W
		$T_A=70^{\circ}C$	0.23	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	Steady State	350	°C/W

Note ① : Max. current is limited by Bonding wire

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150°C

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

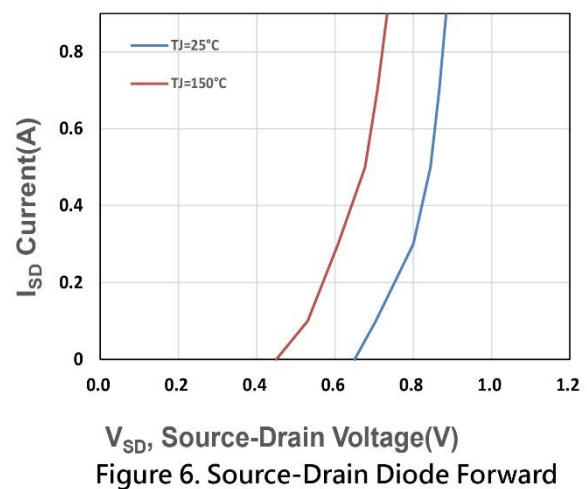
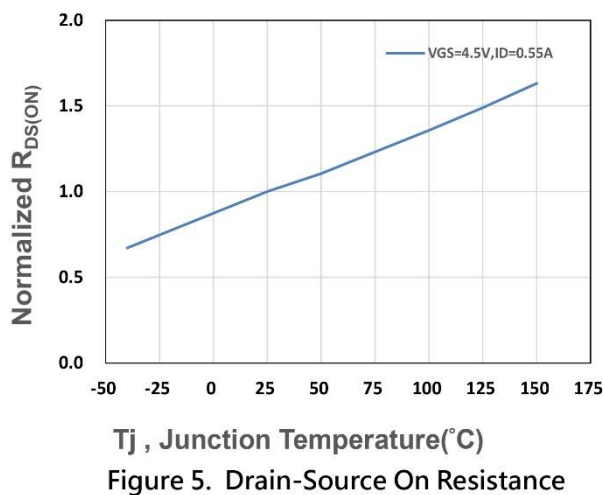
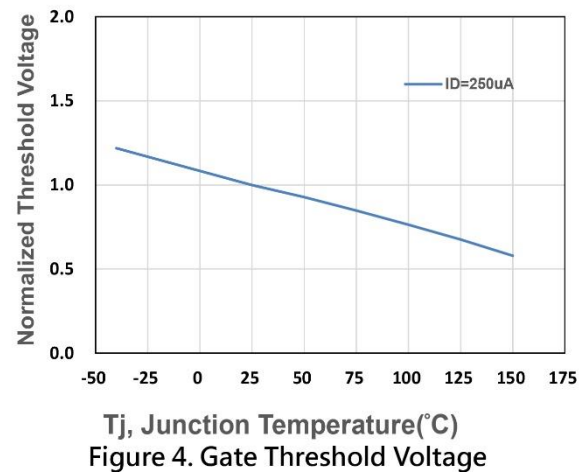
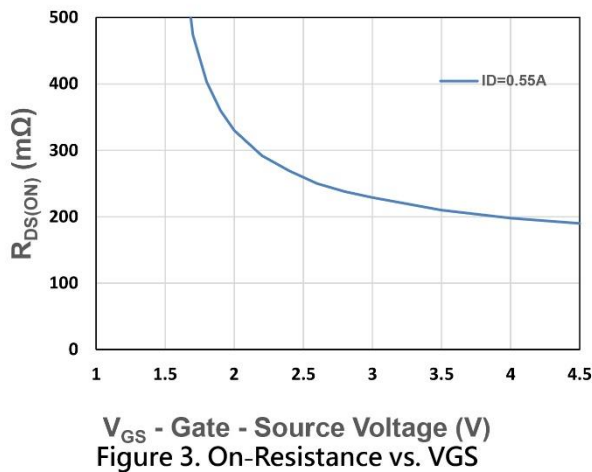
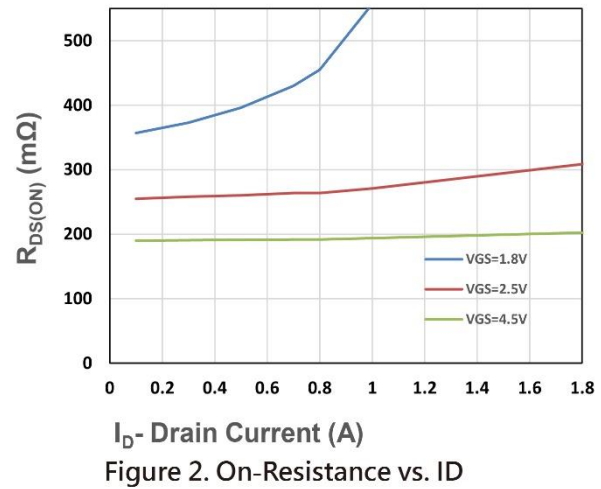
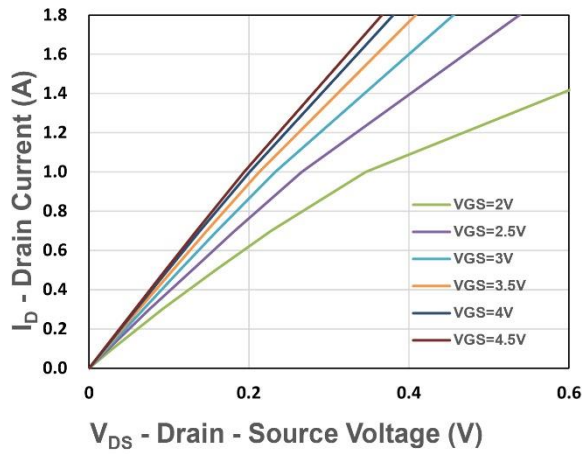
N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

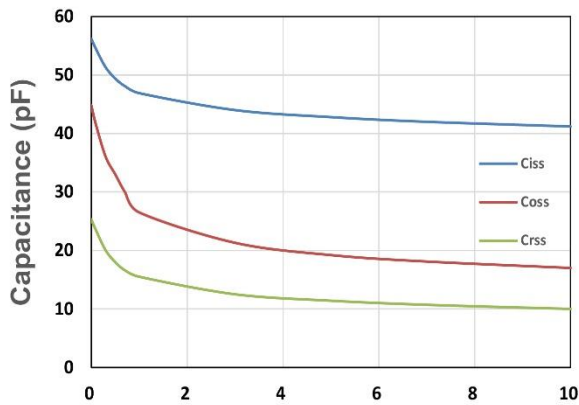
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V	-	-	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	0.5	0.75	1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±10	uA
R _{DS(ON)} ④	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =0.55A	-	190	230	mΩ
		V _{GS} =2.5V, I _{DS} =0.45A	-	255	330	
		V _{GS} =1.8V, I _{DS} =0.35A		365	550	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =0.55A	-	1.8	-	S
Dynamic Characteristics ⑤						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V, Freq.=1MHz	-	198	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, Freq.=1MHz	-	41	-	pF
C _{oss}	Output Capacitance		-	17	-	
C _{rss}	Reverse Transfer Capacitance		-	10	-	
t _{d(ON)}	Turn-on Delay Time	V _{GS} =4.5V,V _{DS} =10V, I _D =2A,R _{GEN} =6Ω	-	1.2	-	nS
t _r	Turn-on Rise Time		-	24.7	-	
t _{d(OFF)}	Turn-off Delay Time		-	13.6	-	
t _f	Turn-off Fall Time		-	14.8	-	
Q _g	Total Gate Charge	V _{GS} =2.5V,V _{DS} =10V I _D =1A,VT=0.8V	-	0.54	-	nC
Q _g	Total Gate Charge	V _{GS} =4.5V,V _{DS} =10V, I _D =1A,VT=0.8V	-	1	-	
Q _{gs}	Gate-Source Charge		-	0.3	-	
Q _{gd}	Gate-Drain Charge		-	0.1	-	
Source-Drain Characteristics						
V _{SD} ④	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.85	1.1	V
t _{rr}	Reverse Recovery Time	I _F =1A, V _R =10V	-	9.2	-	nS
Q _{rr}	Reverse Recovery Charge	dl _F /dt=100A/μs	-	0.8	-	nC

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

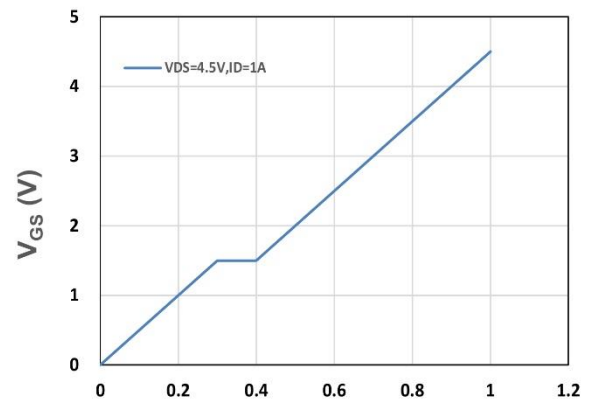
Note ⑤ : Guaranteed by design, not subject to production testing

N-Channel Typical Characteristics

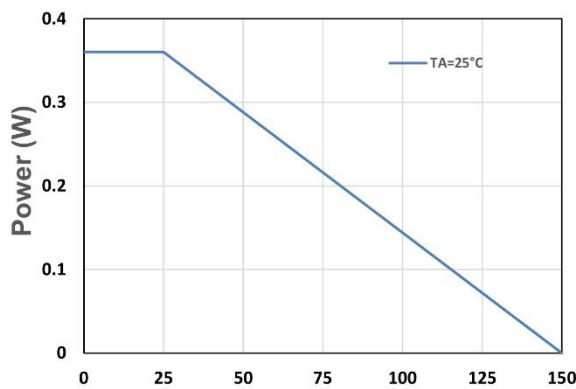




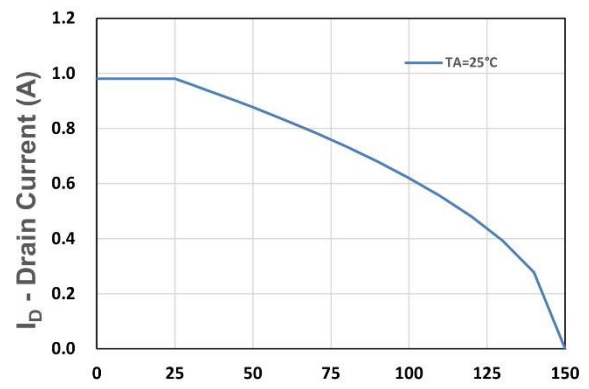
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



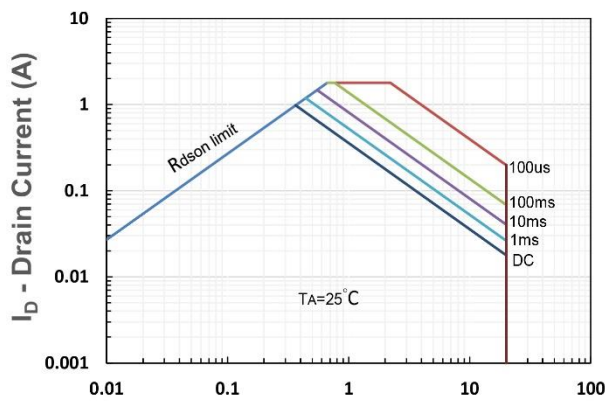
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



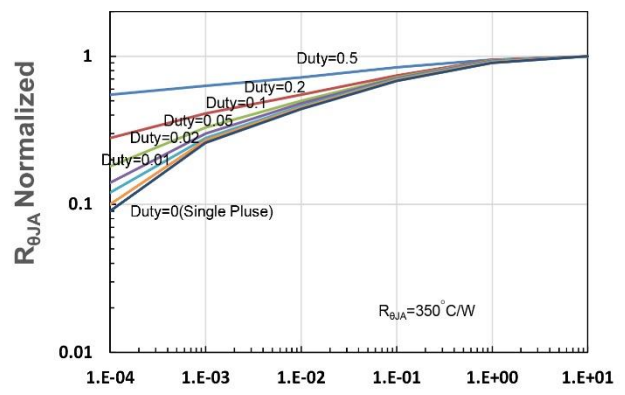
T_j - Junction Temperature (°C)
Figure 9. Power Dissipation



T_j - Junction 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