




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

SOT-23 (TOP view) 	Symbol 	Symbol	N-Channel	Unit
		V_{DSS}	20	V
		$R_{DS(ON)-Max}$	230	mΩ
		I_D	0.98	A

Ordering Information

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.

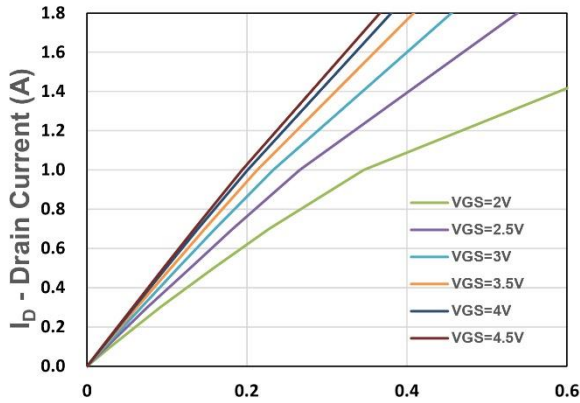
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

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	
g_{fs}	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, V _T =0.8V	-	0.54	-	nC
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =1A, V _T =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	dI _F /dt=100A/μs	-	0.8	-	nC

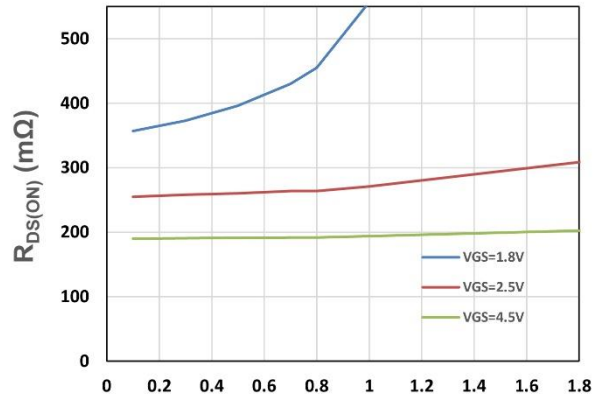
Note ④ : Pulse test (pulse width 300us, duty cycle 2%).

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

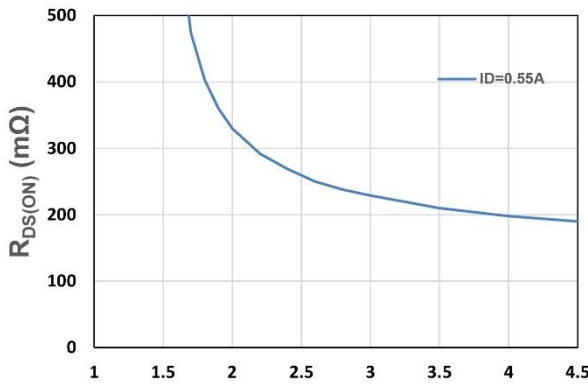
N-Channel Typical Characteristics



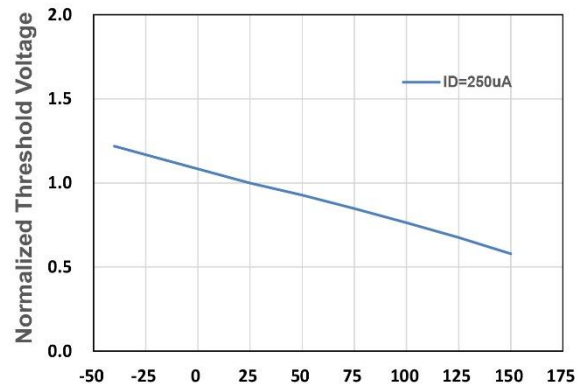
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



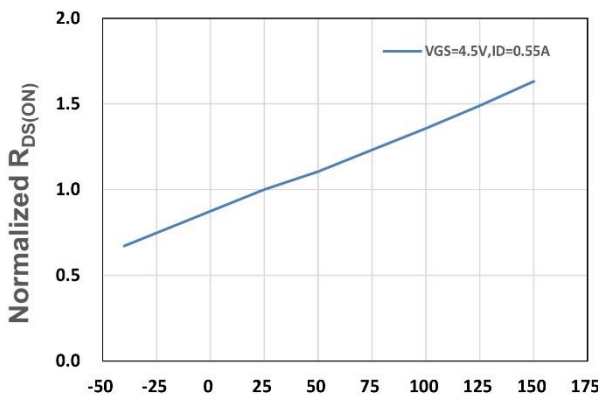
I_D - Drain Current (A)
Figure 2. On-Resistance vs. I_D



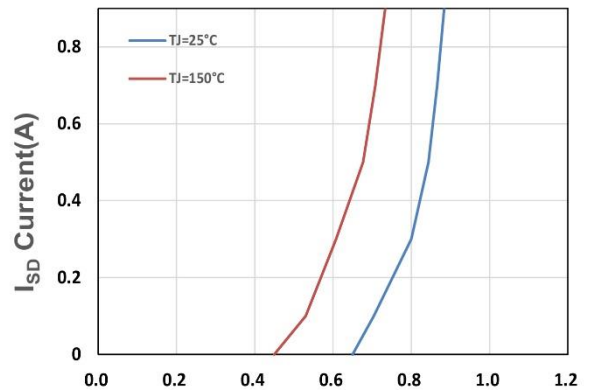
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. V_{GS}



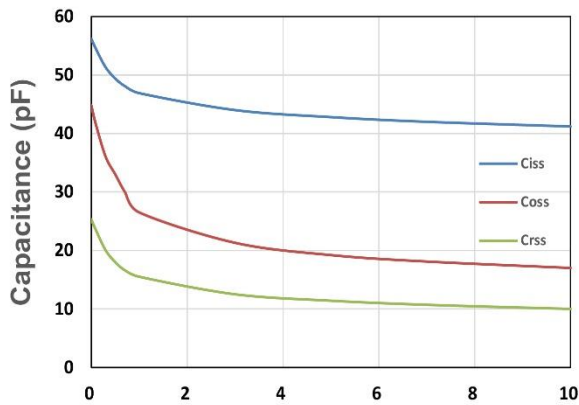
T_j , Junction Temperature(°C)
Figure 4. Gate Threshold Voltage



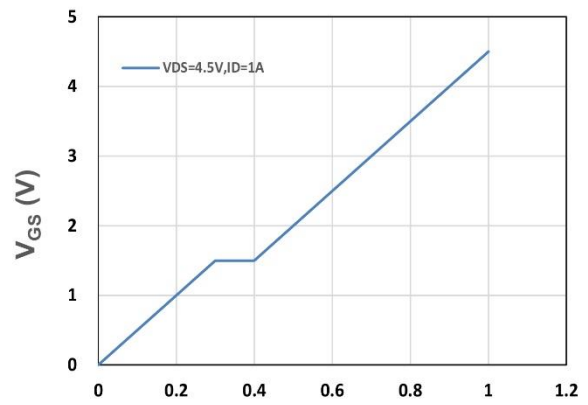
T_j , Junction Temperature(°C)
Figure 5. Drain-Source On Resistance



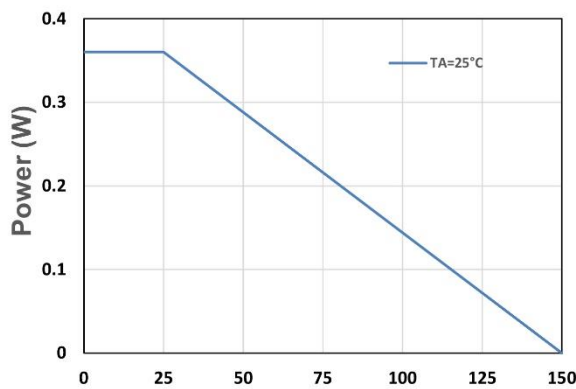
V_{SD} , Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward



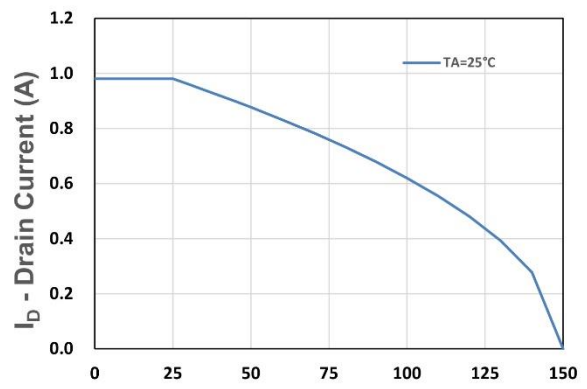
V_{DS} - Drain - Source Voltage (V)
Figure 7. Capacitance



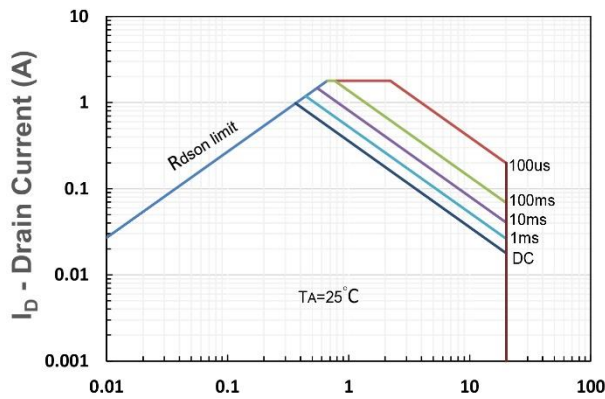
Q_g , Total Gate Charge (nC)
Figure 8. Gate Charge Characteristics



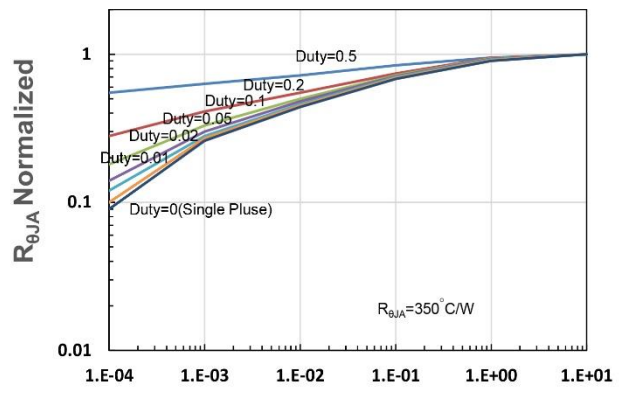
T_j - Junction Temperature ($^{\circ}C$)
Figure 9. Power Dissipation



T_j - Junction Temperature ($^{\circ}C$)
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