





Power MOSFETS

DATASHEET

LM30C50NGB3A

N-Channel
Enhancement Mode MOSFET

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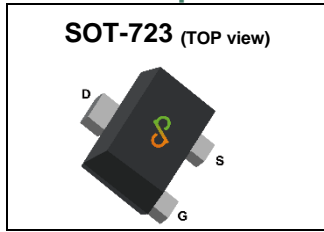


Quality Management Systems

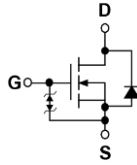
ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Symbol



Product Summary

Symbol	N-Channel	Unit
V_{DSS}	30	V
$R_{DS(ON)-Max}$	420	m Ω
I_D	0.6	A

Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- ESD Protection

Applications

- Portable Equipment
- Battery Powered System
- Load Switch

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM30C50NGB3A	SOT-723	Tape & Reel	8000 / Tape & Reel	3□

Note : □ = Lot Code

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

Symbol	Parameter	N-Channel	Unit	
V_{DSS}	Drain-Source Voltage	30	V	
V_{GSS}	Gate-Source Voltage	±12		
T_J	Maximum Junction Temperature	150	°C	
T_{STG}	Storage Temperature Range	-55 to 150	°C	
I_S	Diode Continuous Forward Current	$T_A=25^\circ\text{C}$	0.14	A
$I_{DM}^{(1)}$	Pulse Drain Current Tested	$T_A=25^\circ\text{C}$	1.5	A
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$	0.6	A
		$T_A=70^\circ\text{C}$	0.48	
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	0.15	W
		$T_A=70^\circ\text{C}$	0.1	
$I_{AS}^{(2)}$	Avalanche Current, Single pulse	L=0.1mH	1.8	A
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse	L=0.1mH	0.16	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit	
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	Steady State	833	°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°C

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

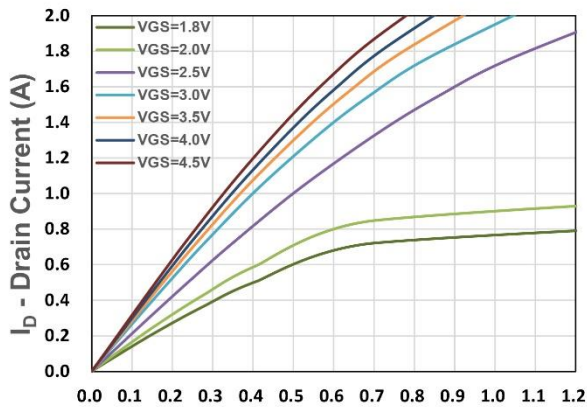
N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	uA
V_{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	0.6	0.95	1.3	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} =0.5A	-	350	420	mΩ
		V _{GS} =2.5V, I _{DS} =0.3A	-	435	565	
		V _{GS} =1.8V, I _{DS} =0.1A	-	740	850	
gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =0.25A	-	5.7	-	S
Dynamic Characteristics^⑤						
R_G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Freq.=1MHz	-	195	-	Ω
C_{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Freq.=1MHz	-	38.2	-	pF
C_{oss}	Output Capacitance		-	4.8	-	
C_{rss}	Reverse Transfer Capacitance		-	3.3	-	
t_{d(ON)}	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =15V, I _D =1A, R _{GEN} =6Ω	-	5.4	-	nS
t_r	Turn-on Rise Time		-	20.2	-	
t_{d(OFF)}	Turn-off Delay Time		-	34.4	-	
t_f	Turn-off Fall Time		-	30.3	-	
Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V, I _D =1A	-	0.86	-	nC
Q_{gs}	Gate-Source Charge		-	0.29	-	
Q_{gd}	Gate-Drain Charge		-	0.16	-	
Source-Drain Characteristics						
V_{SD}^④	Diode Forward Voltage	I _{SD} =0.25A, V _{GS} =0V	-	0.9	1.1	V
t_{rr}	Reverse Recovery Time	I _F =0.25A, V _R =20V	-	24.2	-	nS
Q_{rr}	Reverse Recovery Charge	dI _F /dt=100A/μs	-	3.2	-	nC

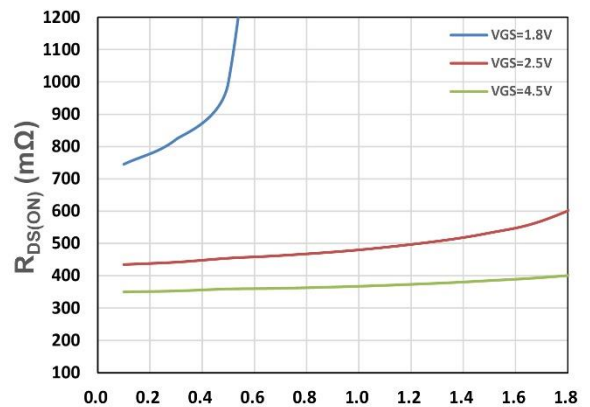
Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).

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

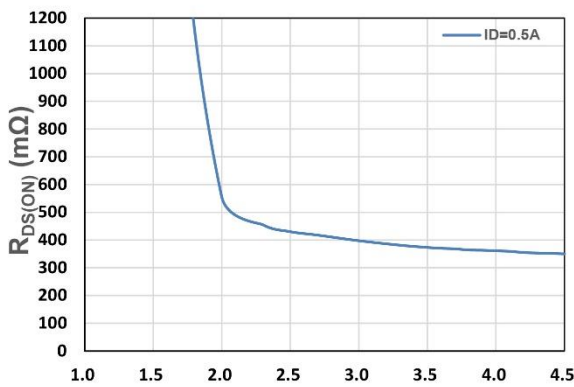
N-Channel Typical Characteristics



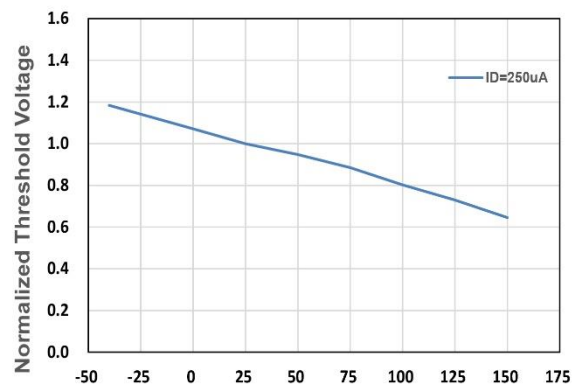
V_{DS} - Drain - Source Voltage (V)
Figure 1. Output Characteristics



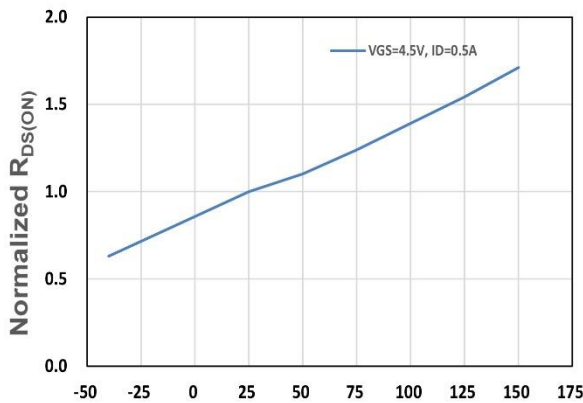
I_D - Drain Current (A)
Figure 2. On-Resistance vs. ID



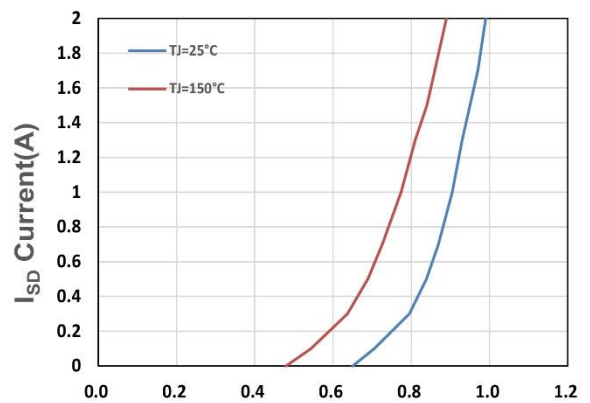
V_{GS} - Gate - Source Voltage (V)
Figure 3. On-Resistance vs. VGS



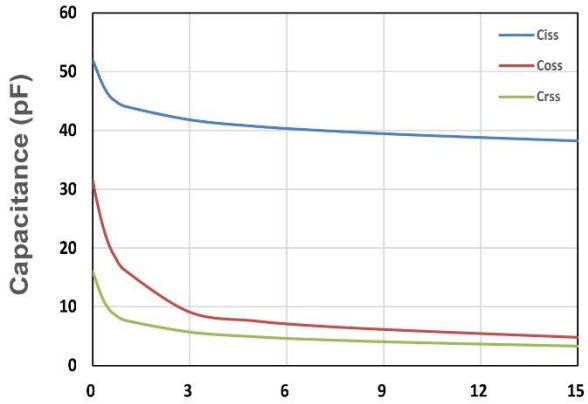
T_j, Junction Temperature(°C)
Figure 4. Gate Threshold Voltage



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

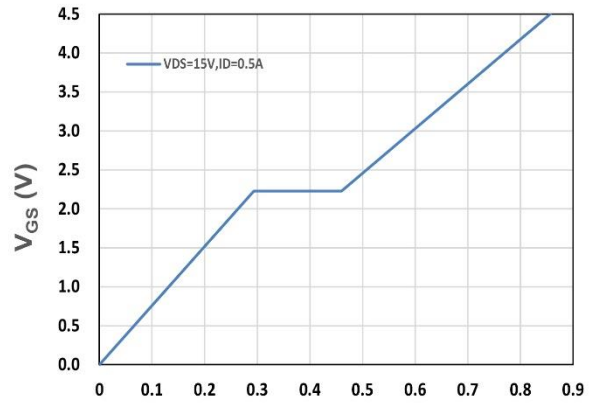


V_{SD}, Source-Drain Voltage(V)
Figure 6. Source-Drain Diode Forward



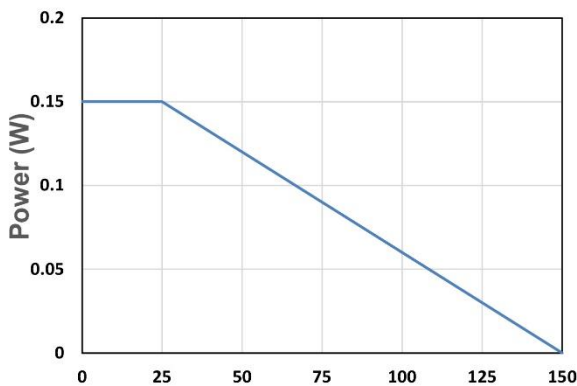
V_{DS} - Drain - Source Voltage (V)

Figure 7. Capacitance



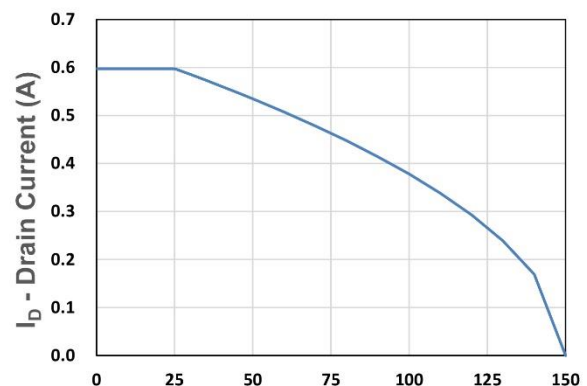
Q_g , Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



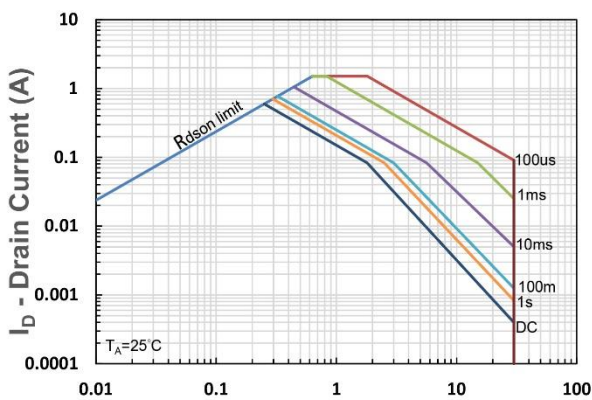
T_A - Ambient Temperature (°C)

Figure 9. Power Dissipation



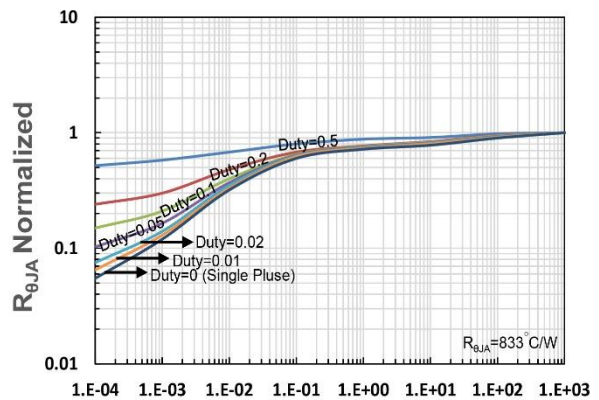
T_A - Ambient Temperature (°C)

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