Power MOSFETS

DATASHEET

LM50J90NEB3A

N-Channel

Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

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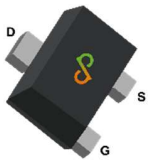
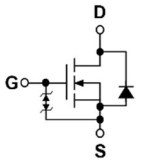
Pin Description

SOT-723 (TOP view)	Symbol
	

Ordering Information

Symbol	N-Channel	Unit
V_{DSS}	50	V
$R_{DS(ON)-Max}$	1.9	Ω
I_D	0.28	A

Feature

- Low Vth low gate drive
- ROHS Compliant & Halogen-Free
- ESD protection

Applications

- Small signal application
- Load switch

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM50J90NEB3A	SOT-723	Tape & Reel	8000 / Tape & Reel	1□

Note：□= Lot Code

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

Symbol	Parameter		N-Channel	Unit
V_{DSS}	Drain-Source Voltage		50	V
V_{GSS}	Gate-Source Voltage		±20	
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°C	0.7	A
I_D	Continuous Drain Current	T_A=25°C	0.28	A
		T_A=70°C	0.22	
P_D	Maximum Power Dissipation	T_A=25°C	0.15	W
		T_A=70°C	0.1	

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JA}$②	Thermal Resistance-Junction to Ambient	Steady State	833	°C/W

Note ①：Max. current is limited by junction temperature.

Note ②：Surface Mounted on 1in^2 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	50	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V, V_{GS}=0V	-	-	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	0.6	1.2	1.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±10	uA
$R_{DS(ON)}$③	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=0.22A	-	1.6	1.9	Ω
		V_{GS}=4.5V, I_{DS}=0.19A	-	1.7	2.2	
		V_{GS}=2.5V, I_{DS}=0.05A	-	2	-	
gfs	Forward Transconductance	V_{DS}=3V, I_{DS}=0.11A	-	0.6	-	S
Dynamic Characteristics ④						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, Freq.=1MHz	-	25	-	pF
C_{oss}	Output Capacitance		-	3.1	-	
C_{rss}	Reverse Transfer Capacitance		-	2.2	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=10V,V_{DS}=50V, I_D=0.23A,R_{GEN}=10Ω	-	0.5	-	nS
t_r	Turn-on Rise Time		-	19.3	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	26.3	-	
t_f	Turn-off Fall Time		-	22.5	-	
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=50V I_D=1A	-	0.92	-	nC
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=50V, I_D=1A	-	1.7	-	
Q_{gs}	Gate-Source Charge		-	0.3	-	
Q_{gd}	Gate-Drain Charge		-	0.3	-	
Source-Drain Characteristics						
V_{SD}③	Diode Forward Voltage	I_{SD}=0.11A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_F=0.11A, V_{GS}=0 dI$_F$/dt=100A/μs	-	7.2	-	nS
Q_{rr}	Reverse Recovery Charge		-	1.9	-	nC

Note ③：Pulse test (pulse width≤300us, duty cycle≤2%).
Note ④：Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

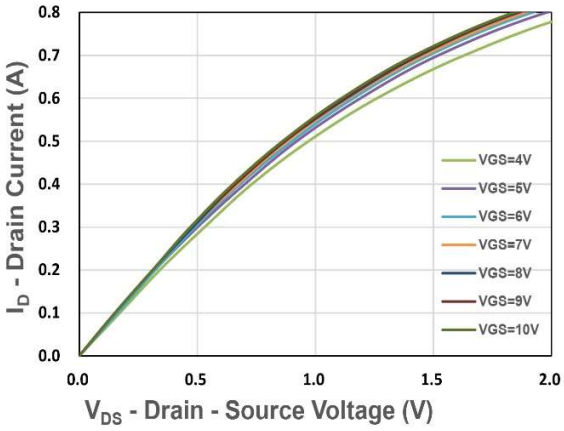


Figure 1. Output Characteristics

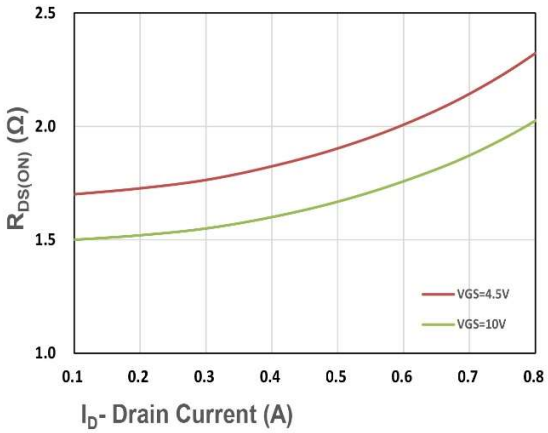


Figure 2. On-Resistance vs. ID

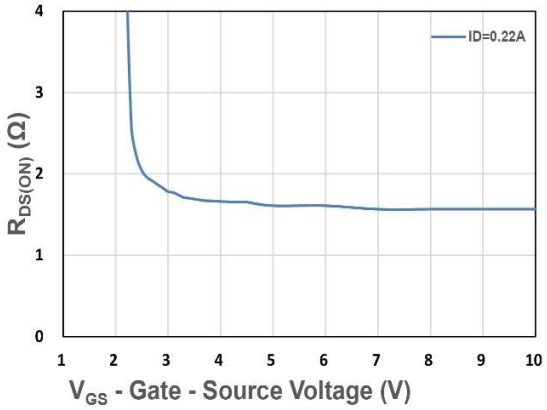


Figure 3. On-Resistance vs. VGS

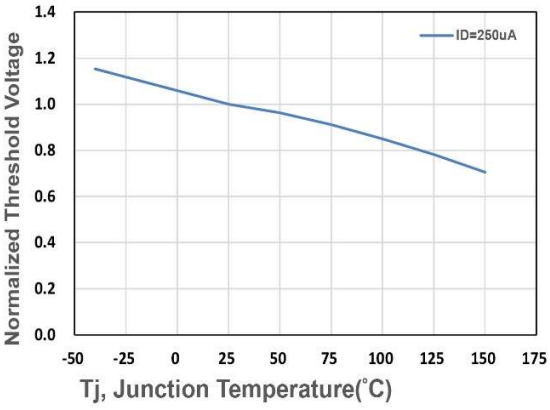


Figure 4. Gate Threshold Voltage

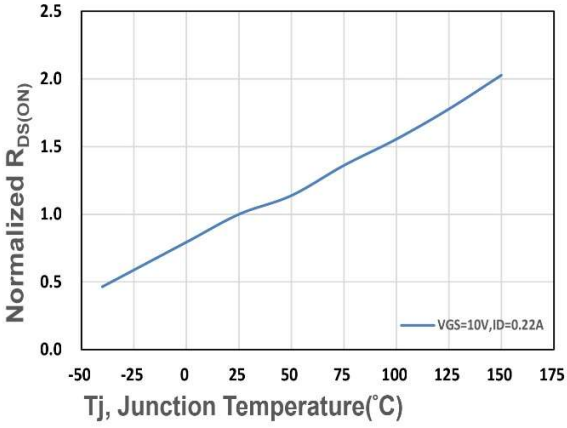


Figure 5. Drain-Source On Resistance

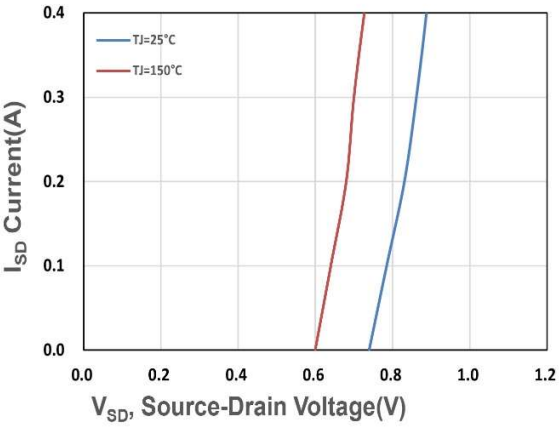


Figure 6. Source-Drain Diode Forward

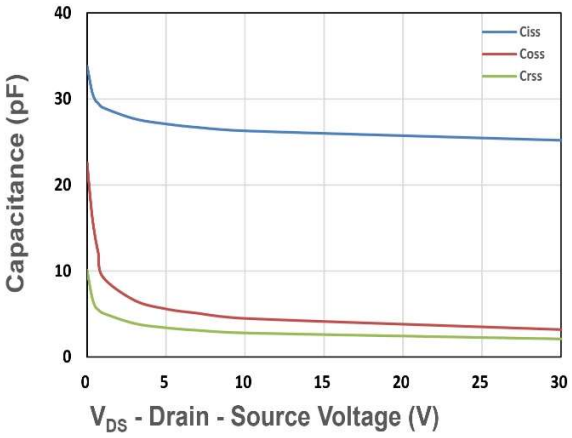


Figure 7. Capacitance

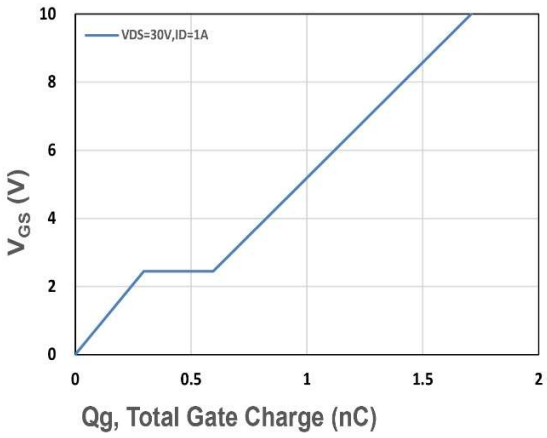


Figure 8. Gate Charge Characteristics

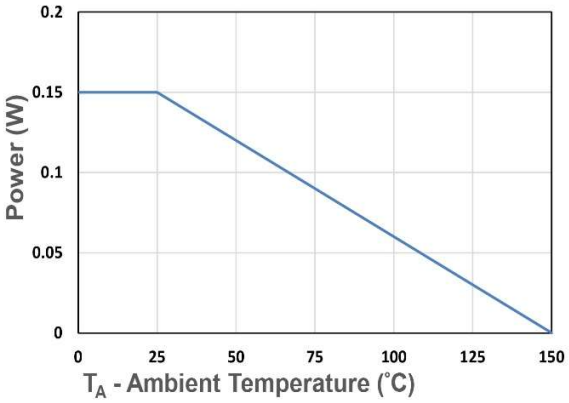


Figure 9. Power Dissipation

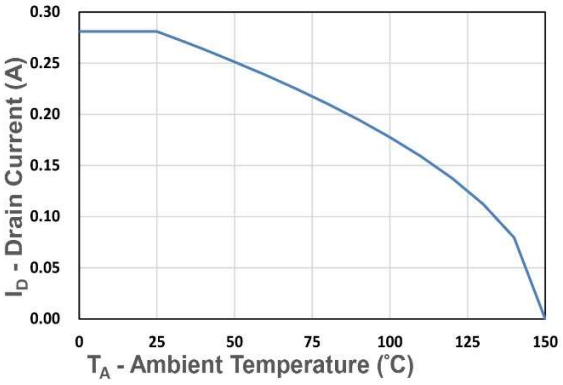


Figure 10. Drain Current

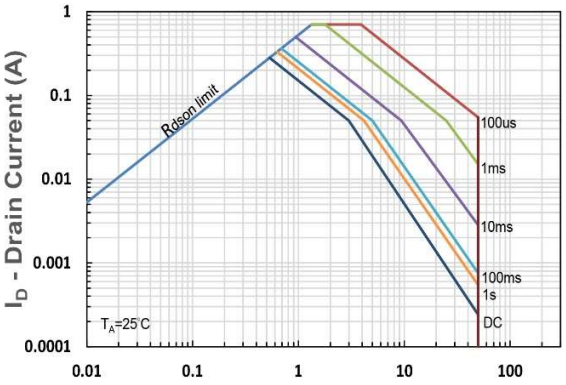


Figure 11. Safe Operating Area

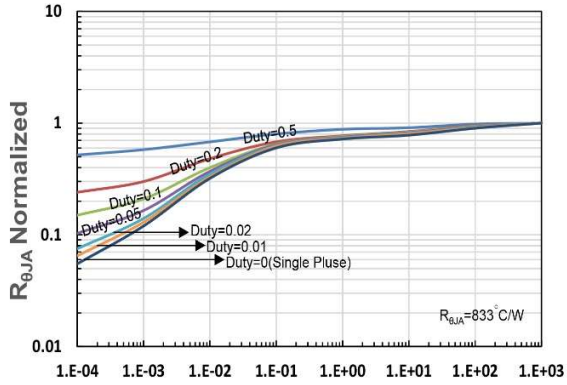


Figure 12. RθJA Transient Thermal Impedance