

N-ch 200V Fast Switching MOSFETs

Features:

- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ 100% EAS Guaranteed
- ★ Green Device Available

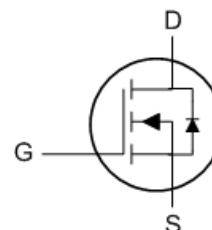
Description:

The KL03N20 is the high cell density trench N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The KL03N20 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.



SOT223 Pin Configuration



Product Summary

BVDSS	RDSON	ID
200V	1.0Ω	1.5A

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	1.5	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	1.3	A
I_{DM}	Pulsed Drain Current ²	8	A
EAS	Single Pulse Avalanche Energy ³	8	mJ
I_{AS}	Avalanche Current	4	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	42	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

*Drain current limited by maximum junction temperature

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	---	85	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	30	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=1A$	---	0.6	1.0	Ω
		$V_{GS}=4.5V, I_D=1A$	---	0.7	1.1	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	2	3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=200V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=1A$	---	10	---	S
Q_g	Total Gate Charge (10V)	$V_{DS}=160V, V_{GS}=10V, I_D=1A$	---	15		nC
Q_{gs}	Gate-Source Charge		---	3.0		
Q_{gd}	Gate-Drain Charge		---	5.2		
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=100V, V_{GS}=10V, R_G=3\Omega, I_D=1A$	---	22		ns
T_r	Rise Time		---	34		
$T_{d(off)}$	Turn-Off Delay Time		---	45		
T_f	Fall Time		---	11		
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	900		pF
C_{oss}	Output Capacitance		---	130		
C_{rss}	Reverse Transfer Capacitance		---	4.6		

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	1	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time	$I_F=1A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	85	---	nS
Q_{rr}	Reverse Recovery Charge		---	257	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=50V, V_{GS}=10V, L=1mH, I_{AS}=4A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The Min. value is 100% EAS tested guarantee.
- 6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

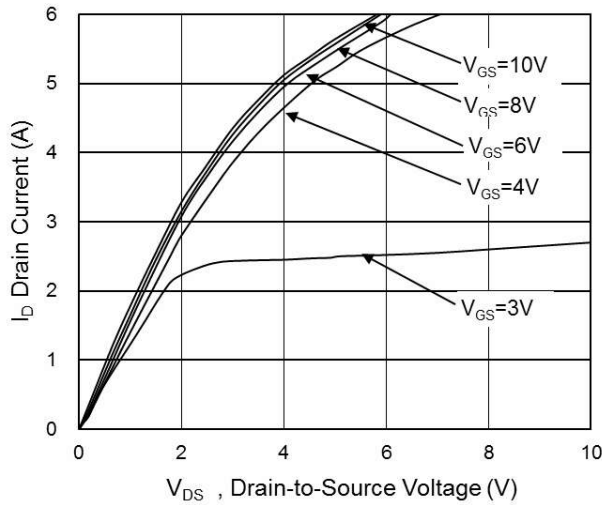


Fig.1 Typical Output Characteristics

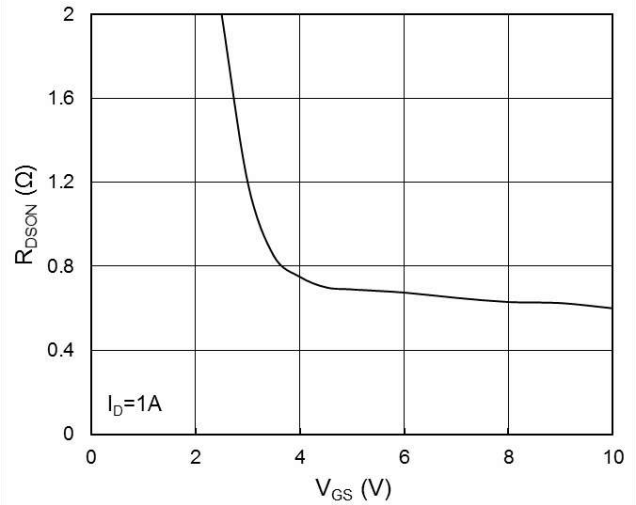


Fig.2 On-Resistance vs. G-S Voltage

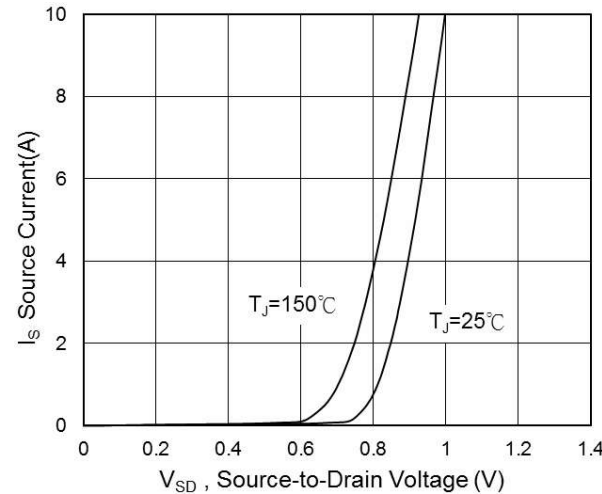


Fig.3 Forward Characteristics of Reverse

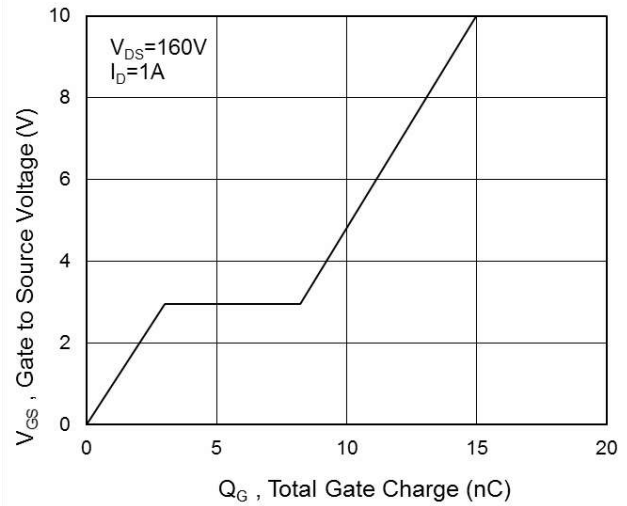


Fig.4 Gate-Charge Characteristics

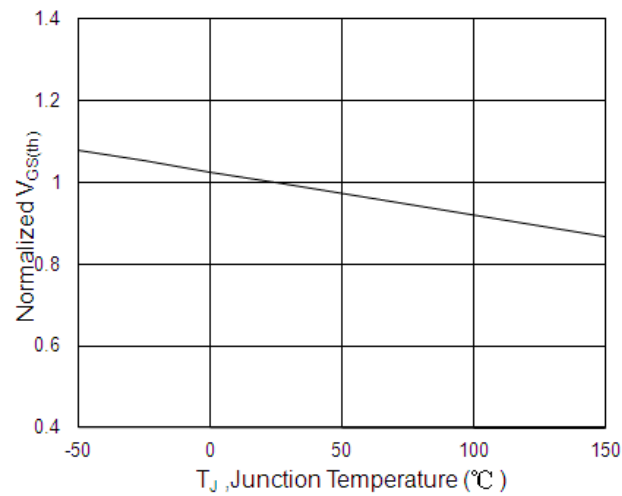


Fig.5 $V_{GS(th)}$ vs. T_J

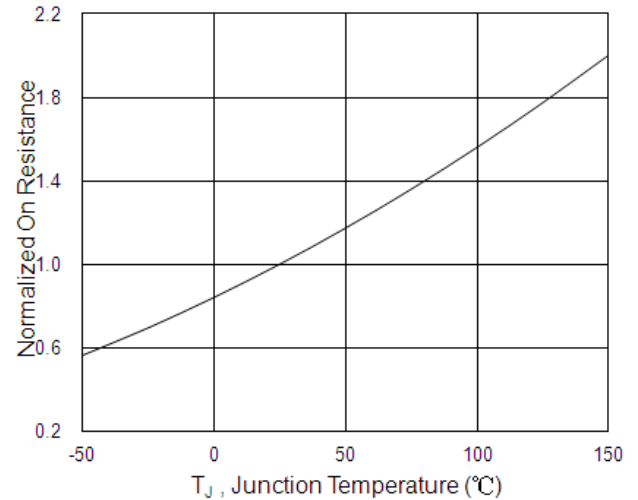


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

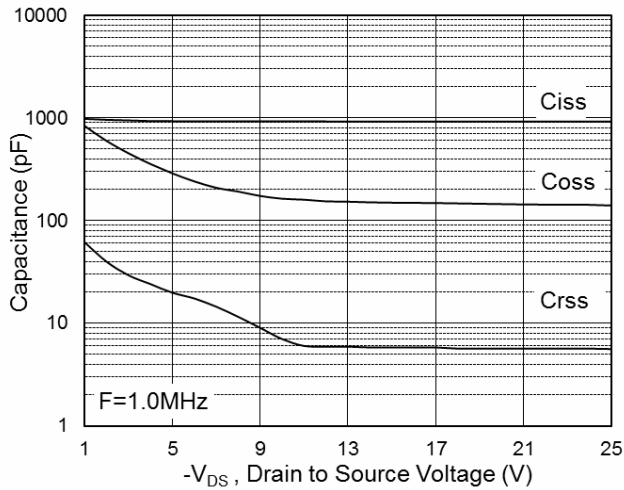


Fig.7 Capacitance

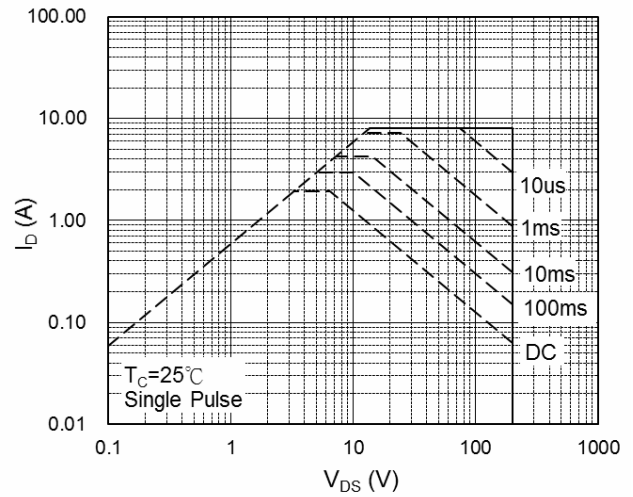


Fig.8 Safe Operating Area

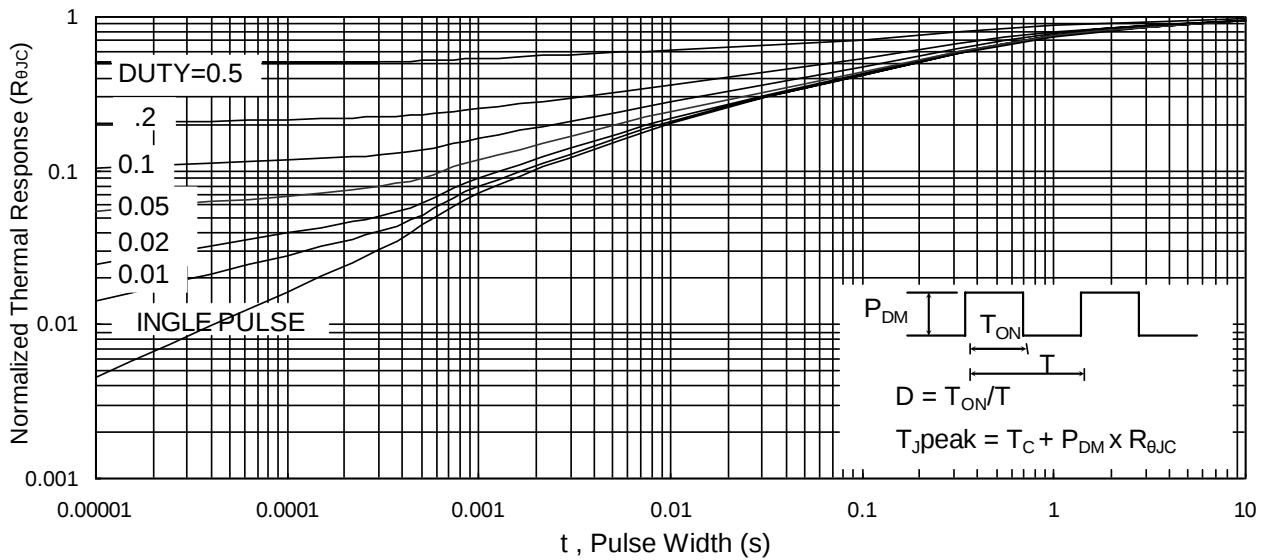


Fig.9 Normalized Maximum Transient Thermal Impedance

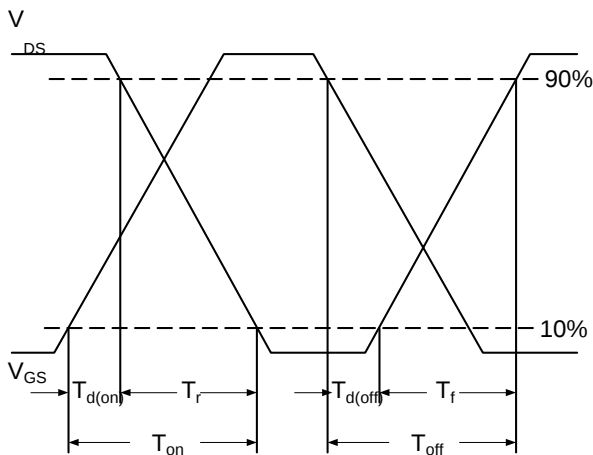


Fig.10 Switching Time Waveform

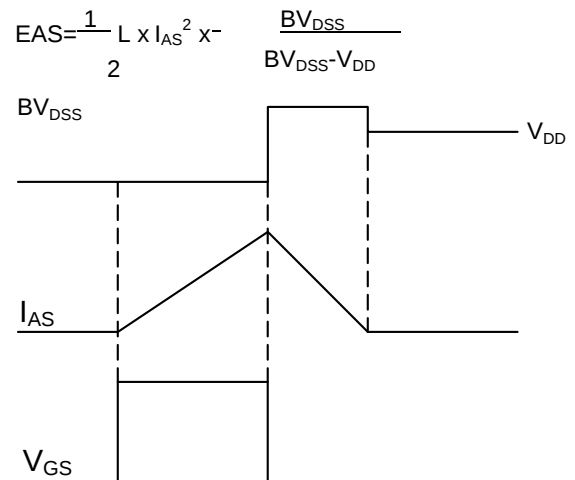
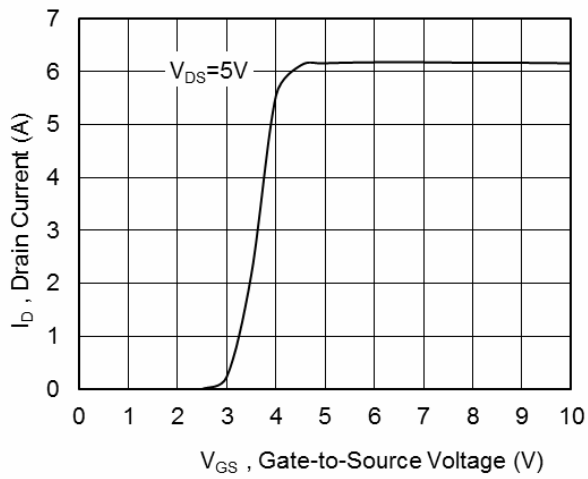


Fig.11 Unclamped Inductive Switching Waveform

**Fig.11 Transfer Characteristics**