

Description

The NK-10P06 is the new generation trench P-ch MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications

Features

- High - speed switching
- Excellent gate charge x $R_{DS(ON)}$ product (FOM)
- for extremely low $R_{DS(ON)}$
- Lead-Free, Halogen-Free; RoHS Compliant

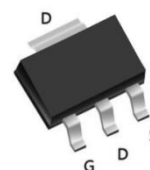
Applications

- Load Switch
- Motor Drive
- Power Tools
- LED Lighting

V_{DSS}	-60V
I_D	-8A
$R_{DS(ON)}$	57mΩ @ $V_{GS} = -10V$

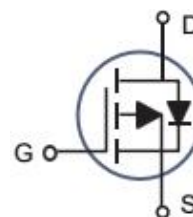
Outline

SOT-223 Pin Configuration



Equivalent

- (1) Gate
(3) Source
(2) Drain



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
NK-10P06	SOT-223	NK-10P06	2500

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous ^(Note2)	$T_C = 25^\circ C$	I_D	8	A
	$T_C = 70^\circ C$		6.3	A
-Pulsed ^(Note 1- Note 2)		I_{DM}	40	A
Maximum Power Dissipation	$T_C = 25^\circ C$	P_D	2.5	W
	$T_C = 70^\circ C$		1.9	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	62	°C /W
Thermal Resistance Junction to Case		$R_{\theta JC}$	23	°C /W

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D = -250uA	-60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-48V , V _{GS} =0V			-1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =-250uA	-1.0	-1.6	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V , I _D =-4A		57	70	mΩ
		V _{GS} =-4.5V , I _D =-3A		75	87	mΩ
Forward Transconductance	g _{FS}	V _{gs} =-10V , I _D =-3A		6.5		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =-25V , V _{GS} =0 V , f =1.0MHz		1150		pF
Output Capacitance	C _{OSS}			85		pF
Reverse Transfer Capacitance	C _{RSS}			70		pF
Total Gate Charge	Q _g	V _{DS} =-30V , I _D =-2A , V _{GS} =-10V		20.1		nC
Gate-Source Charge	Q _{gs}			4.1		nC
Gate-Drain Charge	Q _{gd}			5.2		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =-30V , I _D =-2A , V _{GS} =-10V , R _{GEN} =5Ω		13		ns
Rise Time	tr			41.4		ns
Turn-Off Delay Time	t _{D(OFF)}			60.2		ns
Fall Time	tf			16.8		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =-2A			-1.2	V

Notes:

- 1、Pulse Test Width < 300 μs , Duty Cycle < 2%
- 2、Drain current limited by maximum junction temperature.
- 3、Starting $T_j=25^{\circ}\text{C}$, $L=0.5\text{mH}$, $V_{DD}=-25V$, $V_{GS}=-10V$, $R_G=25\Omega$
- 4、Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. T_C

T_C , Case Temperature ($^{\circ}\text{C}$)

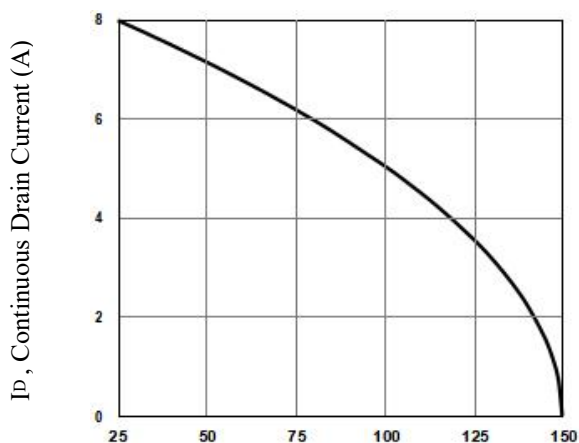


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

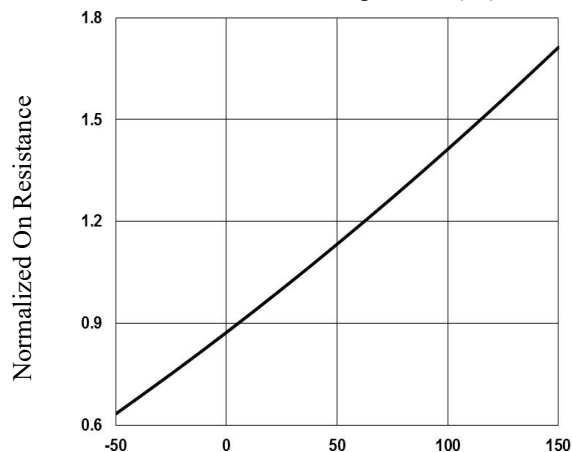


Fig.3 Normalized V_{th} vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

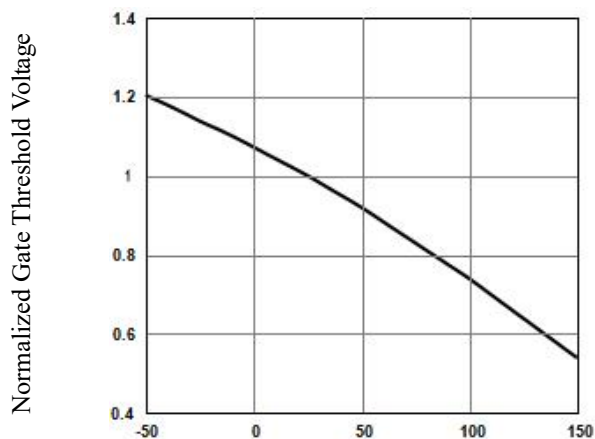


Fig.4 Gate Charge Waveform

Q_g , Gate Charge (nC)

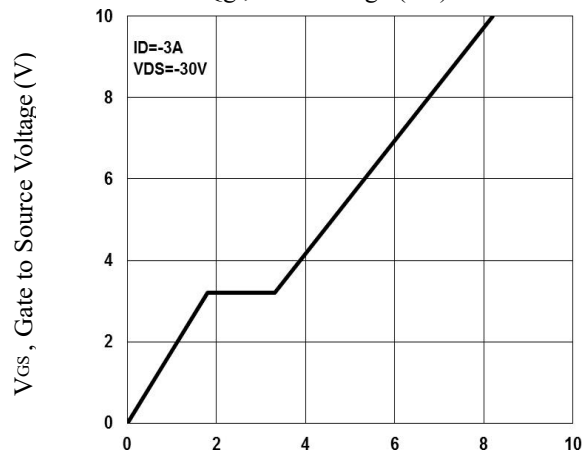


Fig.4 Normalized Transient Impedance

Square Wave Pulse Duration (s)

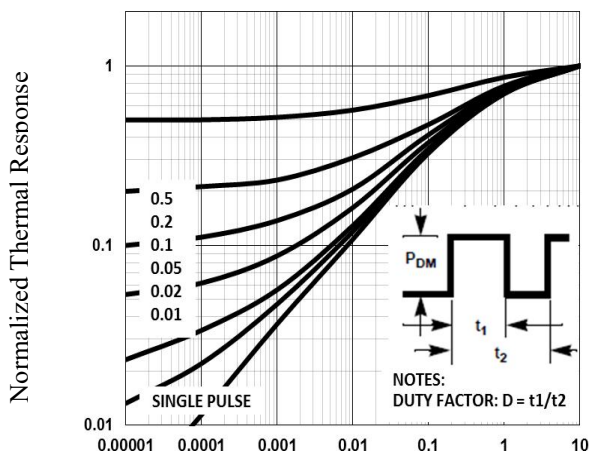


Fig.6 Maximum Safe Operation Area

$-V_{DS}$, Drain to Source Voltage (V)

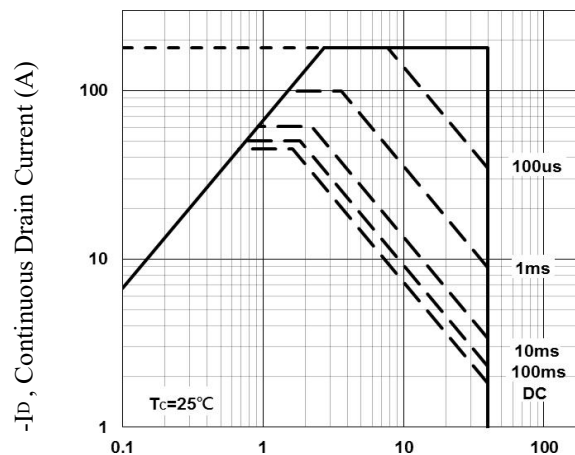


Figure 11a. Switching Test Circuit

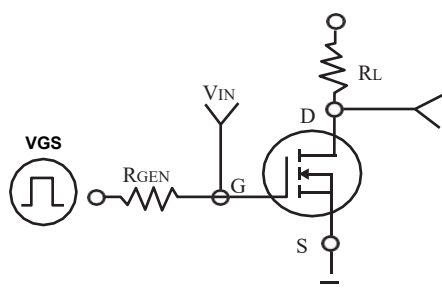


Figure 11b. Switching Waveforms

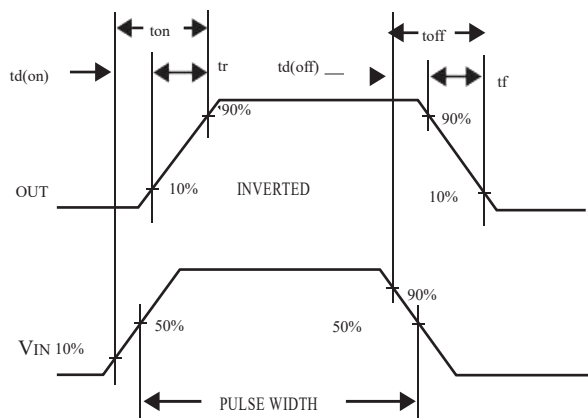


Figure 12a. Unclamped Inductive Test Circuit

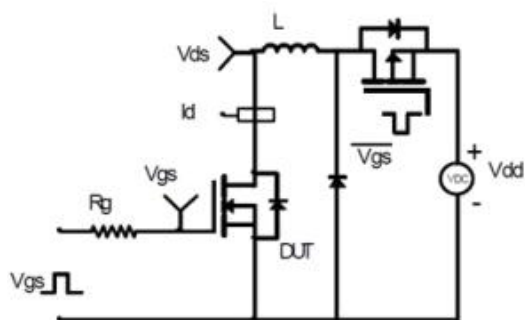
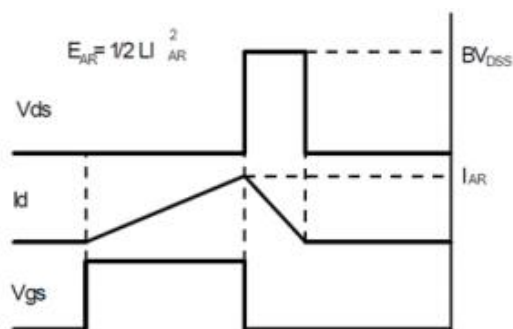


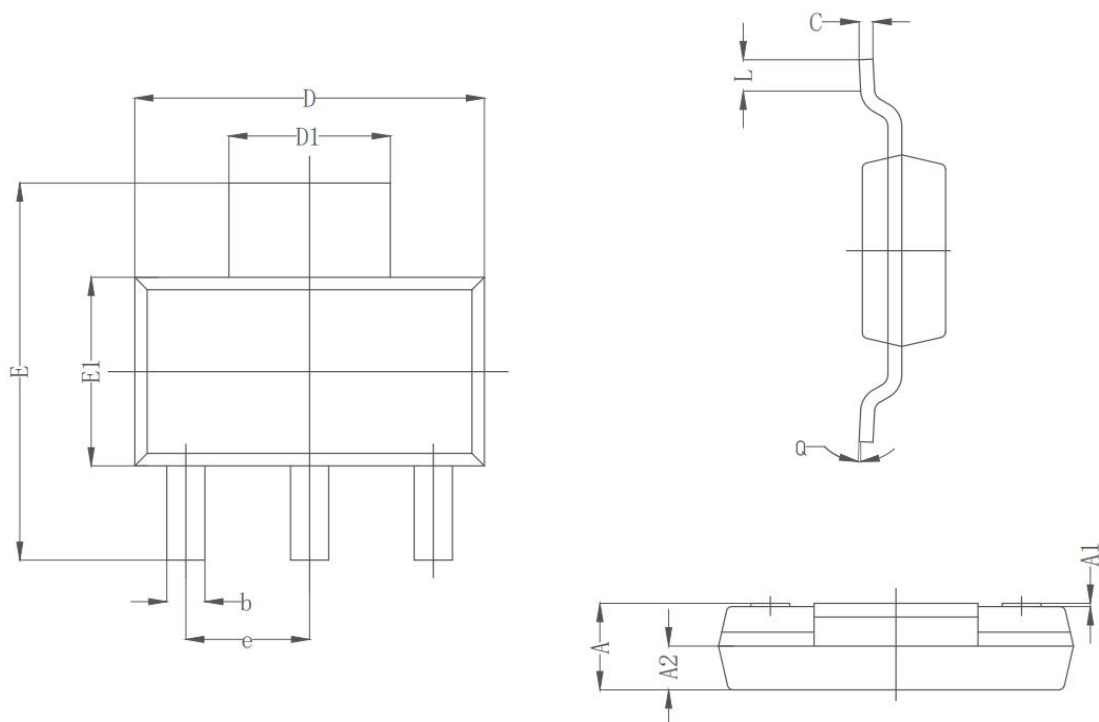
Figure 12b. Unclamped Inductive Waveforms



NOTICE

NKSEMI reserves the to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein.NKSEMI does not assume any liability arsing out of the application or use of any product described herein.

SOT-223 Package Information



COMMON DIMENSION(MM)

PKG		SOT-223	
SYMBOL	MIN	TYP	MAX
A	1.520	1.580	1.720
A1	0.010	0.060	0.150
A2	0.770	0.800	0.830
b	0.660	0.710	0.800
c	0.250	0.280	0.350
D	6.500	6.600	6.750
D1	2.900	3.000	3.100
E	6.700	7.000	7.300
E1	3.300	3.500	3.700
L		0.750 REF	
e	2.275	2.300	2.325
Q	0°	4°	10°