KSN20P80X

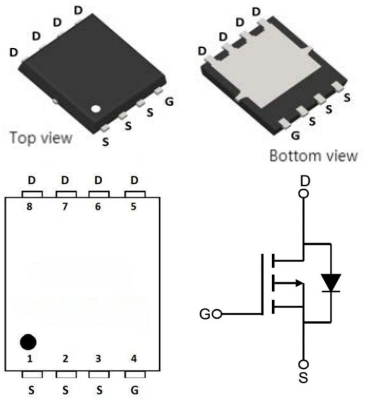
-20V P-Channel MOSFET

General Description

The KSN20P80X combines advanced trench MOSFET technology with a low resistance package to provide extremely low RDS(ON). This device is ideal for load switch and battery protection applications.

BVDSS	RDSON	ID
-20V	2.7mΩ	-70A

PDFN5X6 Pin Configuration



Features

- -20V, - 7 0A, RDS(ON) =2.7 mΩ@VGS =-4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

- Notebook
- Load Switch
- Networking
- Hand-Held Instruments

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current – Continuous (T_C=25℃)	-70	A
	Drain Current – Continuous (T_C=100℃)	-54	A
I_{DM}	Drain Current – Pulsed[1]	-280	A
P_D	Power Dissipation (T_C=25℃)	41.67	W
	Power Dissipation – Derate above 25℃	0.33	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-18	-20	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.008	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-15V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-15V , V_{GS}=0V , T_J=125℃	---	---	-30	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±500	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance					mΩ
		V_{GS}=-4.5V , I_D=-20A	---	2.7	3.5	
		V_{GS}=-2.5V , I_D=-20A	---	3.8	5.0	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.4	-0.6	-1.0	V
$\triangle V_{GS}$	$V_{GS(th)}$ Temperature Coefficient		---	-3.44	---	mV/℃
gfs	Forward Transconductance	V_{DS}=-10V , I_S=-3A	---	30	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-5A	---	149	225	nC
Q_{gs}	Gate-Source Charge[2,3]		---	14.4	22	
Q_{gd}	Gate-Drain Charge[2,3]		---	42.8	65	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-15V , V_{GS}=-4.5V , R_G=25Ω I_D=-1A	---	21.2	42	nS
T_r	Rise Time[2,3]		---	20.6	40	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	26	52	
T_f	Fall Time[2,3]		---	400	600	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz	---	12000	16000	pF
C_{oss}	Output Capacitance		---	1670	2500	
C_{rss}	Reverse Transfer Capacitance		---	730	1100	
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2.6	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-70	A
I_{SM}	Pulsed Source Current		---	---	-130	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

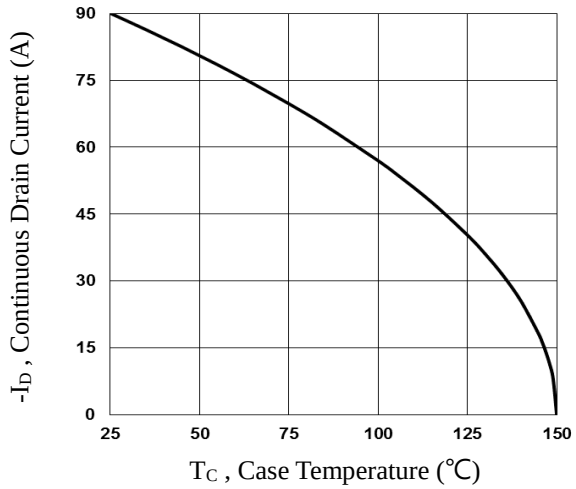


Fig.1 Continuous Drain Current vs. T_C

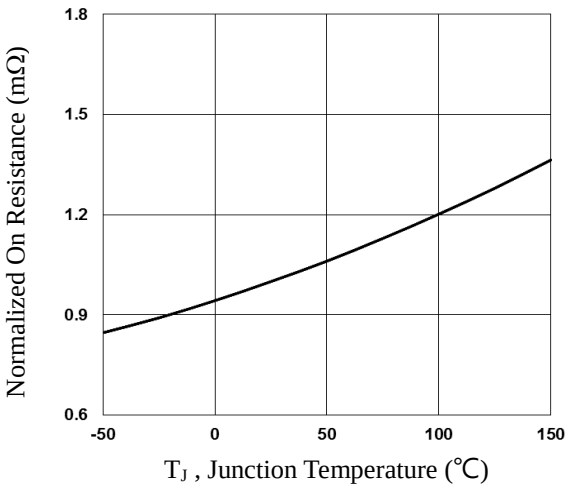


Fig.2 Normalized RDSON vs. T_J

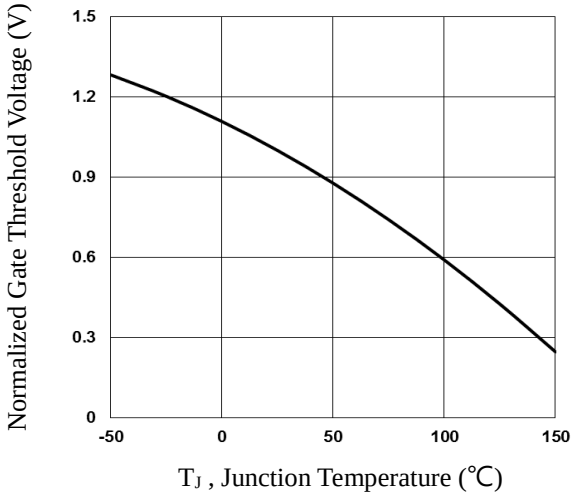


Fig.3 Normalized V_{th} vs. T_J

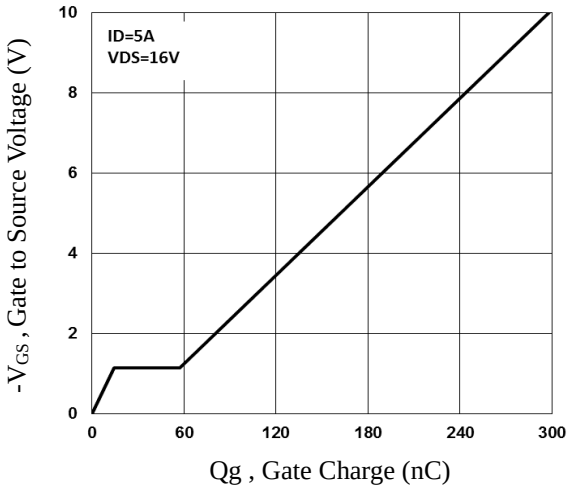


Fig.4 Gate Charge Waveform

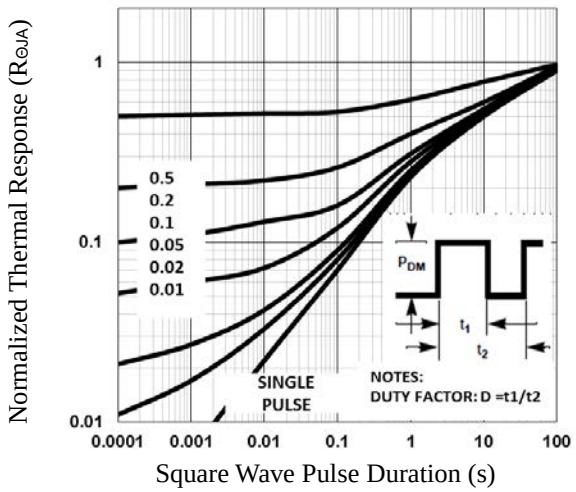


Fig.5 Normalized Transient Response

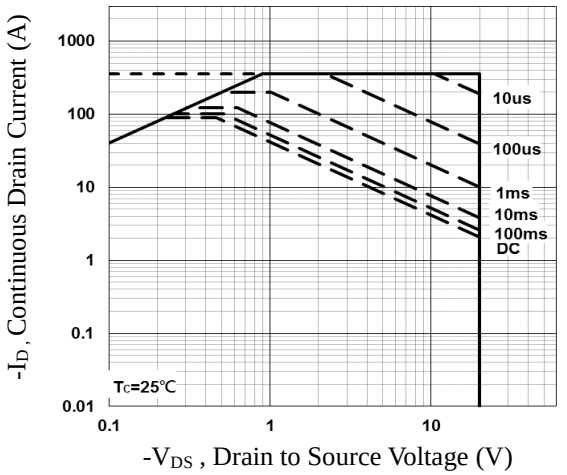


Fig.6 Maximum Safe Operation Area

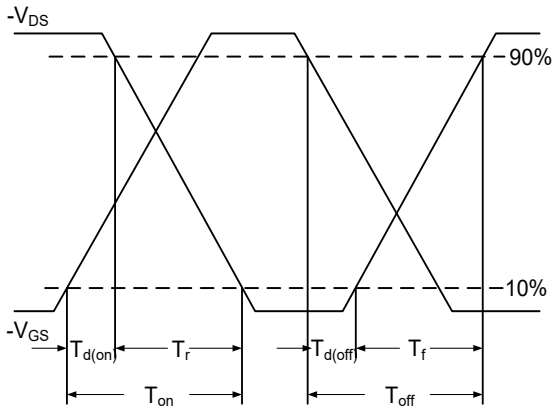


Fig.7 Switching Time Waveform

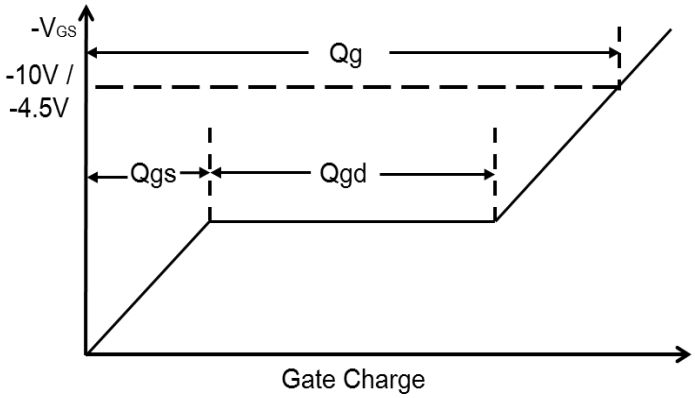
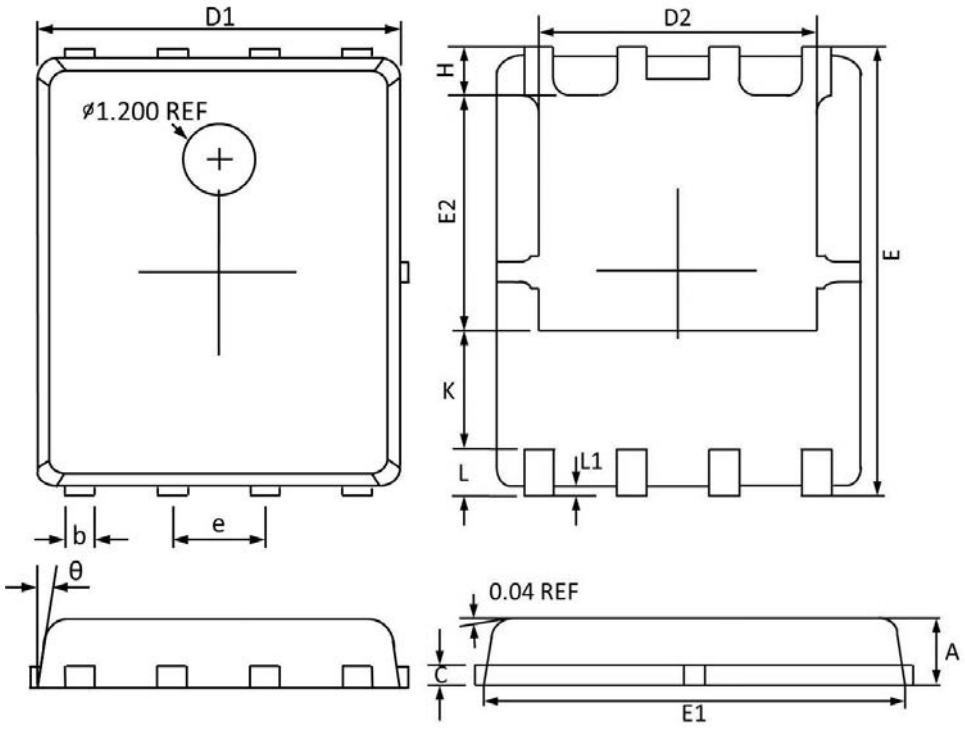


Fig.8 Gate Charge Waveform

PPAK5x6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
θ	12°	0°	12°	0°