KST20P07A

-20V P-Channel MOSFET

General Description

The KST20P07A is the high cell density trenched P-ch MOSFET, which provides excellent $R_{DS}ON$ and efficiency for most of the small power switching and load switch applications

The KST20P07 meet the RoHS and Green Product requirement with full function reliability approved.

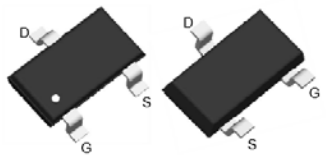
Product Summary

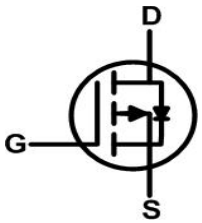
V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
-20	16.5 at V_{GS} = 4.5 V	-8.5
	19.5 at V_{GS} = 2.5 V	-7.5

Features

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

SOT-23-3 Pin Configuration





Applications

- Battery protection
- Load switch
- Power management

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℃)	-8.5	A
	Drain Current – Continuous (T_C=100℃)	-5.0	A
I_{DM}	Drain Current – Pulsed[1]	-25	A
P_D	Power Dissipation (T_C=25℃)	1.0	W
	Power Dissipation (T_C=100℃)	0.03	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	---	61	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.3	℃/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	-20	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=-20V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V , I_D=-6.5A	---	16.5	20	mΩ
		V_{GS}=-2.5V , I_D=-5A	---	19.5	23	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	-0.5	-0.8	-1.2	V
gfs	Forward Transconductance	V_{DS}=-5V , I_S=-4A	---	10	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-4A	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	1.6	---	
Q_{gd}	Gate-Drain Charge		---	4.2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V,I_D=-4A V_{GS}=-4.5V,R_G=3.3Ω	---	17	---	ns
T_r	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21	---	
T_f	Fall Time		---	31	---	
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , F=1MHz	---	1287	---	pF
C_{oss}	Output Capacitance		---	213	---	
C_{rss}	Reverse Transfer Capacitance		---	78	---	

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	---	---	-8.0	A
I_{SM}	Pulsed Source Current		---	---	-20	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V

Note :

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics (Curves)

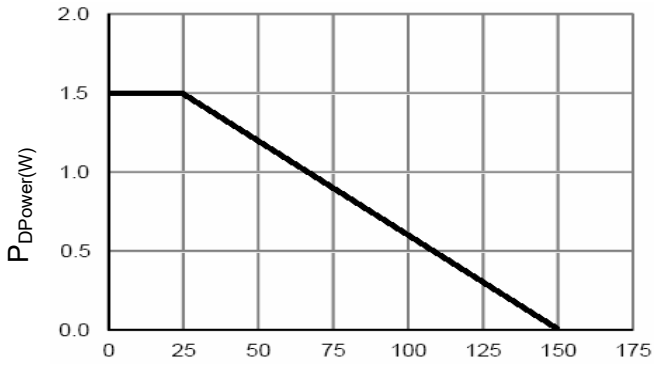


Figure 1 Power Dissipation

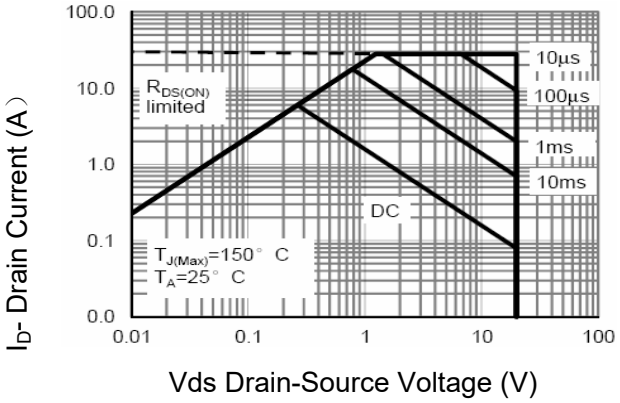


Figure 2 Safe Operation Area

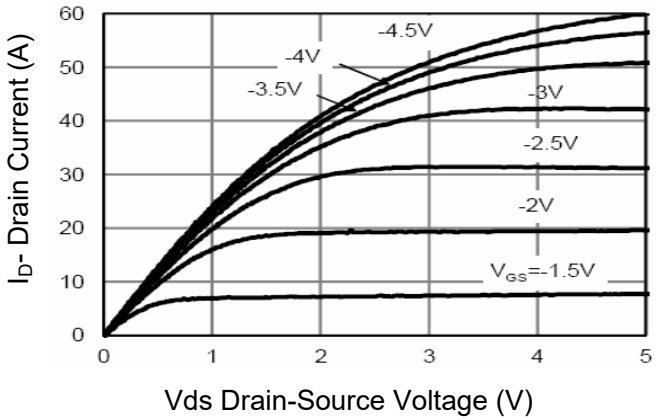


Figure 3 Output Characteristics

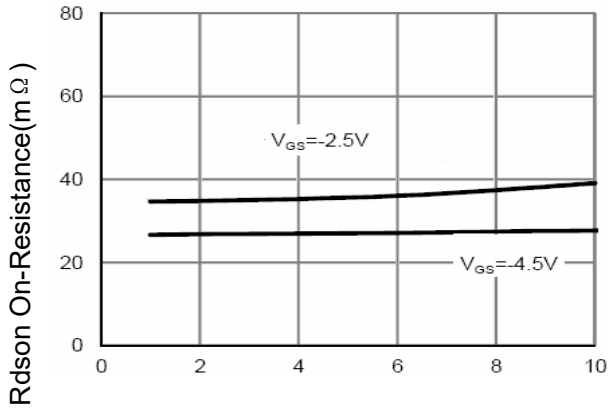


Figure 4 Drain-Source On-Resistance

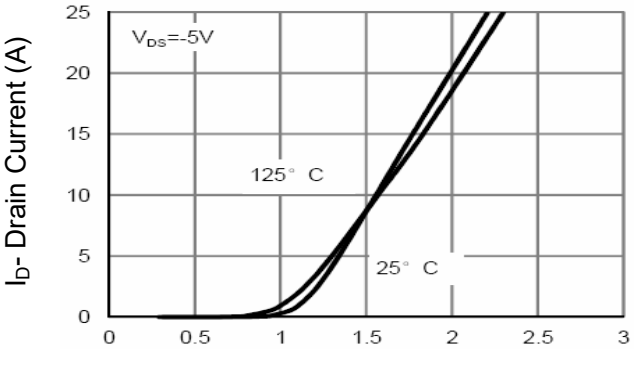


Figure 5 Transfer Characteristics

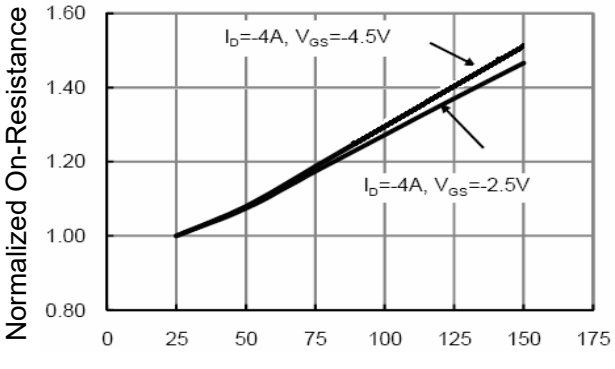


Figure 6 Drain-Source On-Resistance

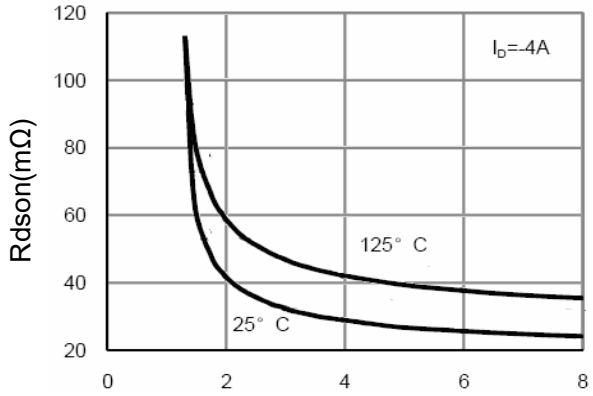


Figure 9 Rdson vs Vgs

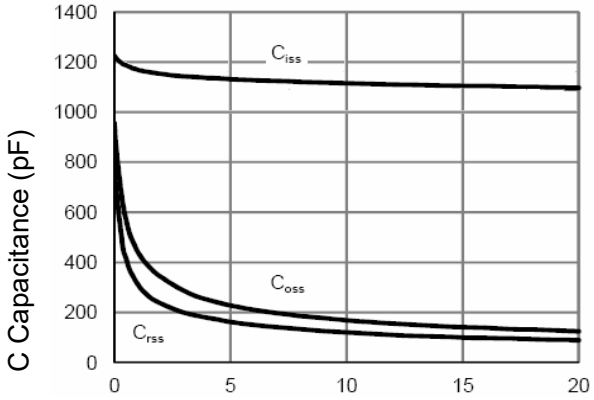


Figure 10 Capacitance vs Vds

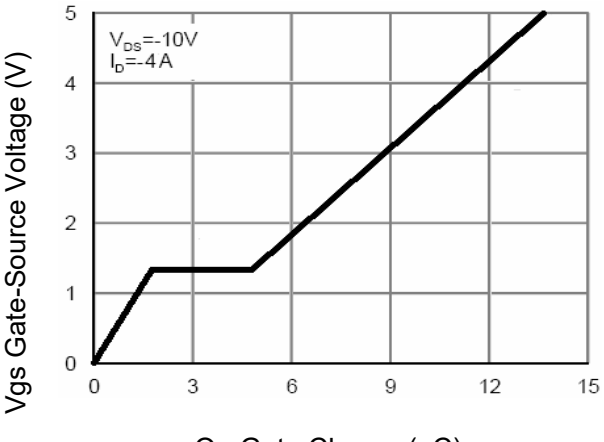


Figure 11 Gate Charge

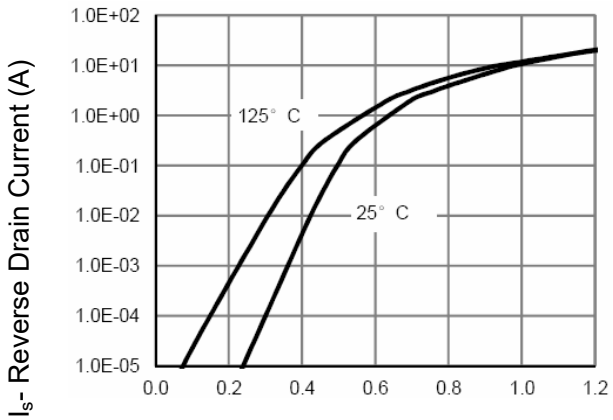


Figure 12 Source- Drain Diode Forward

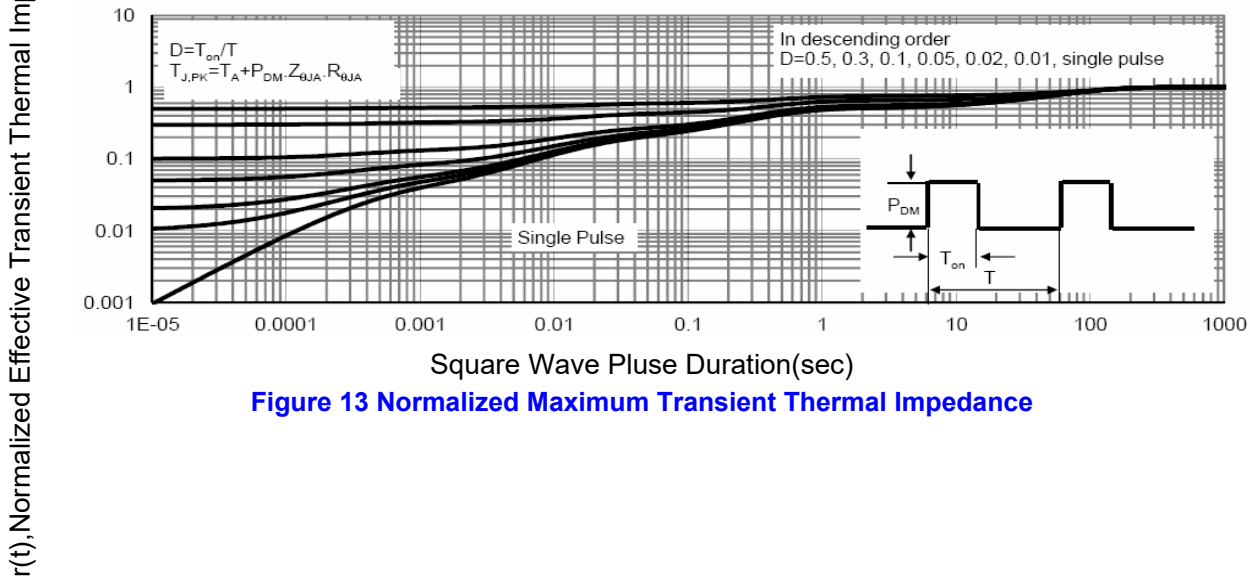


Figure 13 Normalized Maximum Transient Thermal Impedance

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