KST3506W

N&P-Channel complementary Power MOSFET

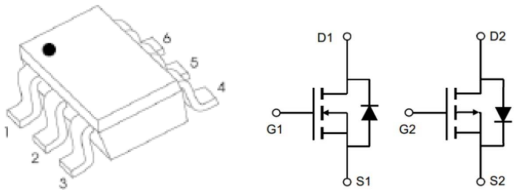
General Description

The KST3506W uses advanced technology and design to provide excellent R_{DS}(ON) with low gate charge. It can be used in a wide variety of applications.

Product Summary

	V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
N-ch	20	370 at V_{GS} = 4.5 V	0.8
		440 at V_{GS} = 2.5 V	0.7
P-ch	-20	500 at V_{GS} = -4.5 V	-0.65
		680 at V_{GS} = -2.5V	-0.6

SOT363 Pin Configuration



Features

- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Applications

- H-bridge
- Inverters

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	N-ch Rating	P-ch Rating	Units
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	±8	±8	V
I_D	Drain Current – Continuous (T_C=25℃)	0.8	-0.65	A
	Drain Current – Continuous (T_C=100℃)	0.4	-0.35	A
I_{DM}	Drain Current – Pulsed[1]	1.8	-1.6	A
P_D	Power Dissipation (T_C=25℃)	0.5		W
	Power Dissipation (T_C=100℃)	0.02		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	---	780	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	8.5	℃/W

N-Channel Electrical Characteristics (TJ=25 ℃, unless otherwisenoted)

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}=12V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=12V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±8V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V , I_D=0.65A	---	370	---	mΩ
		V_{GS}=2.5V , I_D=0.65A	---	440	---	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.4	0.7	1.0	V
gfs	Forward Transconductance	V_{DS}=10V , I_S=0.6A	---	2	---	S

Dynamic and switching Characteristics

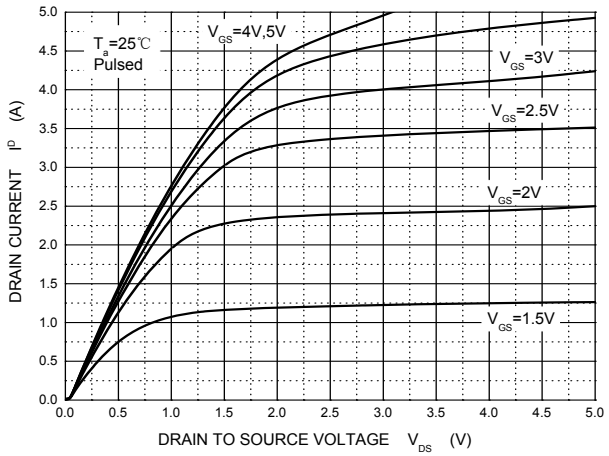
Q_g	Total Gate Charge[2,3]	V_{DS}=10V , V_{GS}=4.5V , I_D=0.3A	---	3.0	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	0.5	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	0.8	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=10V, R_L=2.5Ω V_{GS}=4.5V,R_G=3Ω	---	6.6	---	ns
T_r	Rise Time[2,3]		---	4.3	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	17	---	
T_f	Fall Time[2,3]		---	7	---	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz	---	110	---	pF
C_{oss}	Output Capacitance		---	22	---	
C_{rss}	Reverse Transfer Capacitance		---	16	---	

Drain-Source Diode Characteristics and Maximum Ratings

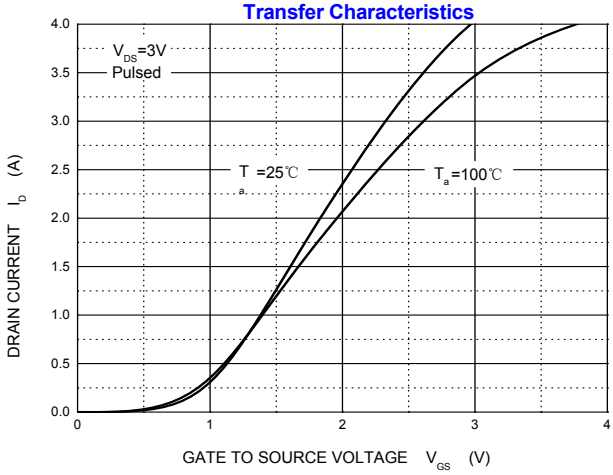
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	0.8	A
I_{SM}	Pulsed Source Current		---	---	1.6	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=0.1A , T_J=25℃	---	---	1.2	V

N-Channel Typical Electrical and Thermal Characteristics (Curves)

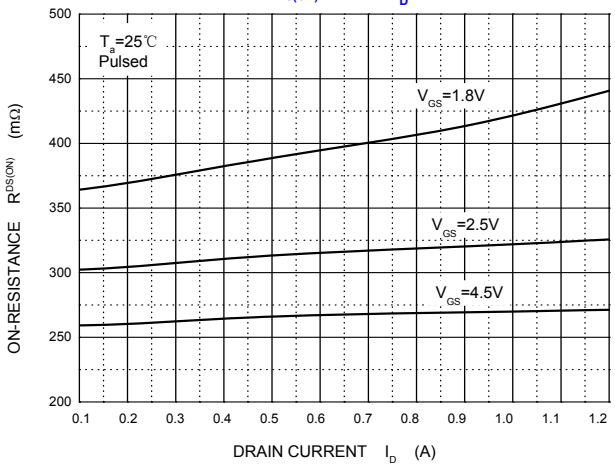
Output Characteristics



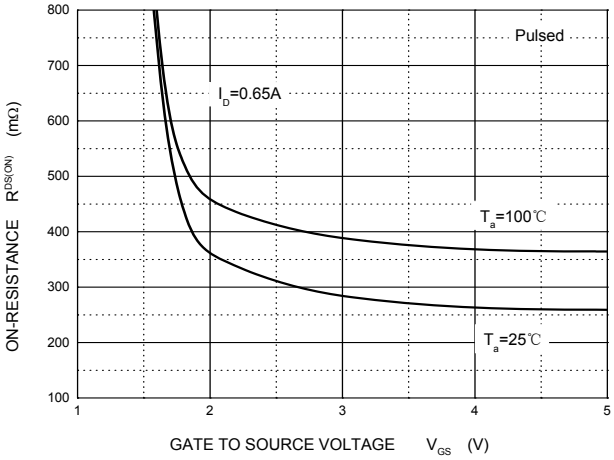
Transfer Characteristics



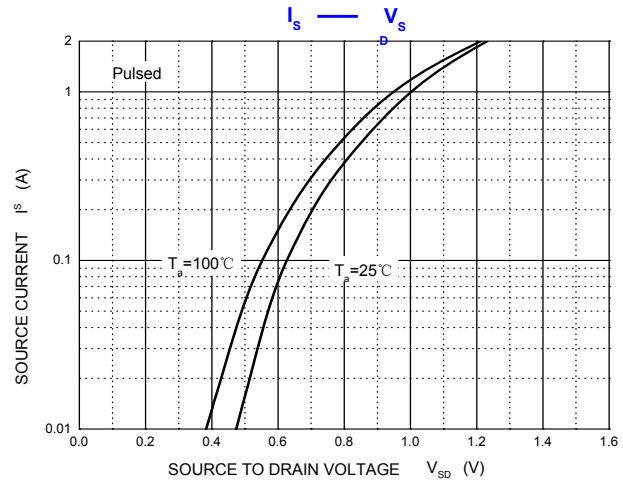
R DS(ON) —— I D



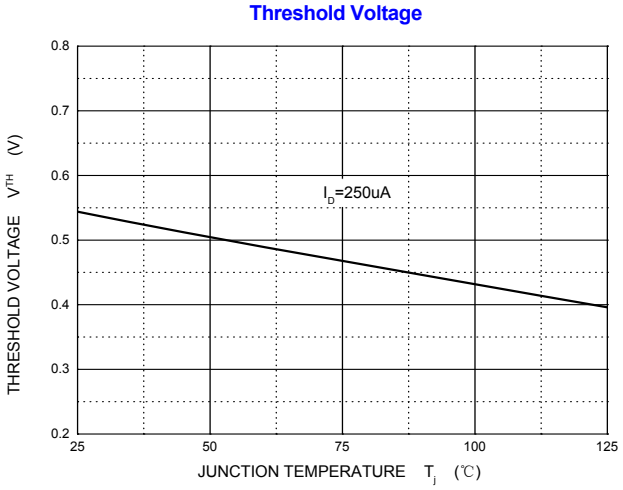
R DS(ON) —— V GS



I S —— V SD



Threshold Voltage



P-Channel Electrical Characteristics (T_J=25℃, unless otherwisenoted)

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}=-12V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-12V , V_{GS}=0V , T_J=125℃	---	---	-10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±8V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V , I_D=-0.5A	---	500	---	mΩ
		V_{GS}=-2.5V , I_D=-0.5A	---	680	---	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	-0.4	-0.68	-1.0	V
gfs	Forward Transconductance	V_{DS}=-5V , I_S=-0.2A	---	20	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-0.3A	---	7.6	---	nC
Q_{gs}	Gate-Source Charge		---	1.6	---	
Q_{gd}	Gate-Drain Charge		---	2.2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=-10V, R_L=3.7Ω V_{GS}=-4.5V,R_G=6Ω	---	9.4	---	ns
T_r	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	33	---	
T_f	Fall Time		---	21	---	
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , F=1MHz	---	190	---	pF
C_{oss}	Output Capacitance		---	30	---	
C_{rss}	Reverse Transfer Capacitance		---	23	---	

Drain-Source Diode Characteristics and Maximum Ratings

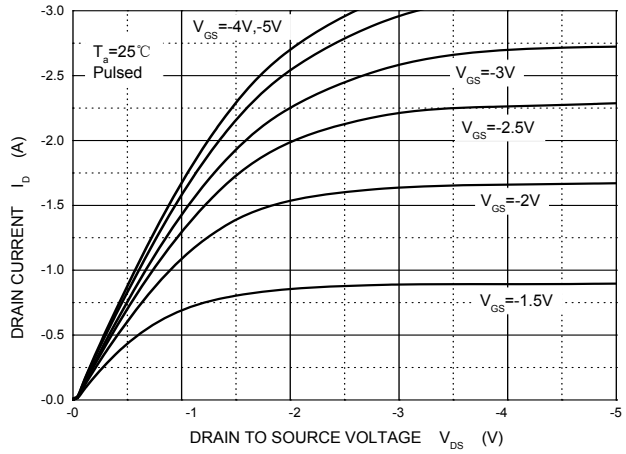
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-0.6	A
I_{SM}	Pulsed Source Current		---	---	-1.2	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-0.1A , T_J=25℃	---	---	-1.0	V

Note :

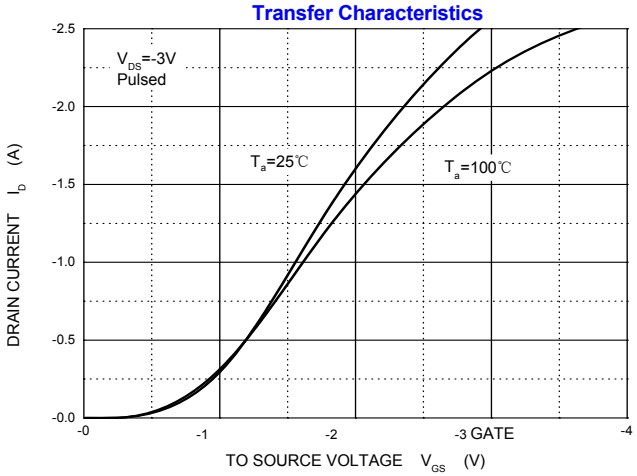
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: Tj=25℃,V_{DD}=-15V,V_G=-10V,L=0.5mH,Rg=25Ω,I_{AS}=-26A

P-Channel Typical Electrical and Thermal Characteristics (Curves)

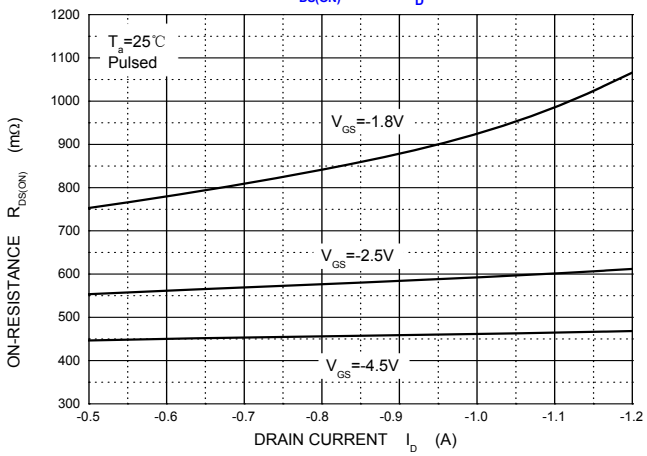
Output Characteristics



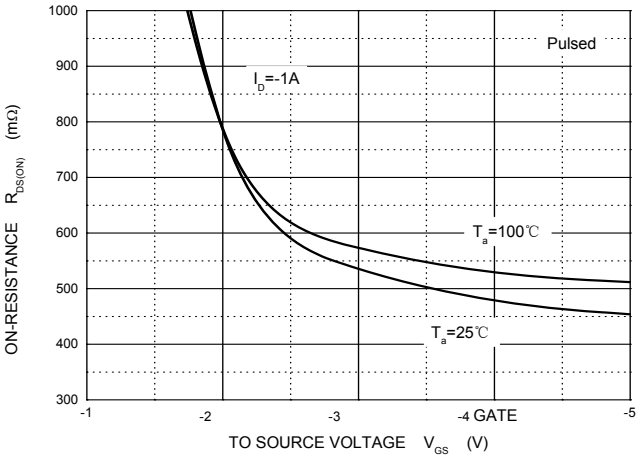
Transfer Characteristics



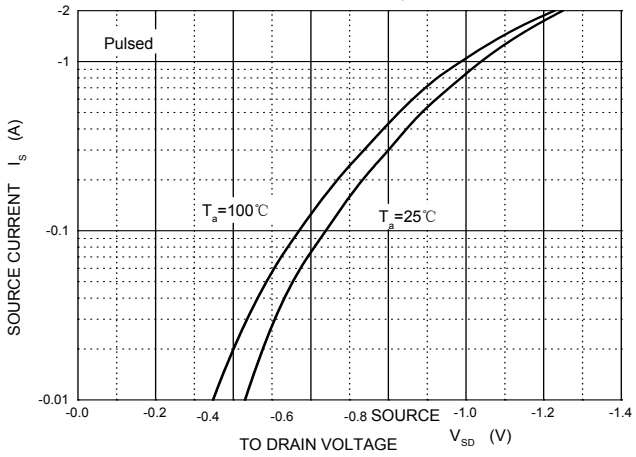
$R_{DS(ON)}$ —— I_D



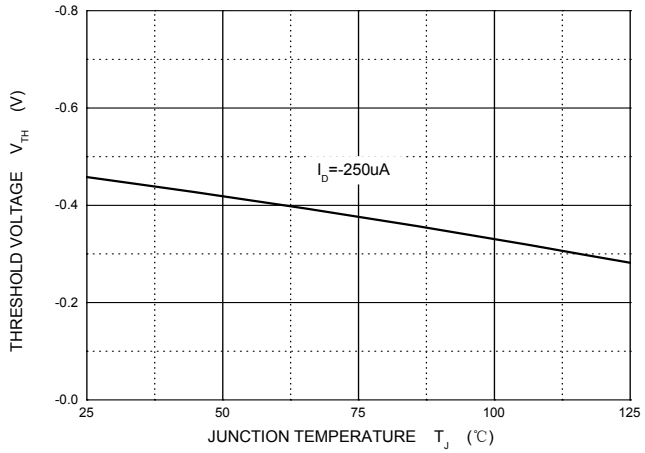
$R_{DS(ON)}$ —— V_{GS}



I_S —— V_{SD}



Threshold Voltage



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