KSD50N04

40V N-Channel MOSFET

General Description

The KSD50N04 eries are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

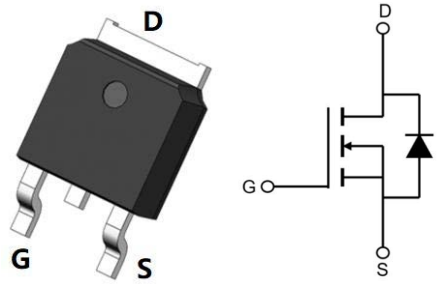
Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
40	10 at V_{GS} = 10 V	50
	17 at V_{GS} = 4.5 V	43

Features

- High density cell design for ultra low Rdson
- Super Low Gate Charge
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

TO-252 Pin Configuration



Applications

- Simple Drive Requirement
- Fast Switching Characteristic

Absolute Maximum Ratings **Tc=25℃ unless otherwise noted**

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	50	A
	Drain Current – Continuous (T_C=100℃)	25	A
I_{DM}	Drain Current – Pulsed[1]	130	A
P_D	Power Dissipation (T_C=25℃)	23	W
	Power Dissipation (T_C=100℃)	0.65	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 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	---	1.8	℃/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	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=40V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=8A	---	10	14	mΩ
		V_{GS}=4.5V , I_D=5A	---	17	22	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.3	1.8	2.6	V
gfs	Forward Transconductance	V_{DS}=10V , I_S=5A	---	20	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	VDS=20V, ID=5A, VGS=10V	---	19	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	4	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	3.5	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V DD=20V, ID=5A, RL=2.5Ω, RGEN=3Ω, VGS=10V	---	8.3	---	ns
T_r	Rise Time[2,3]		---	12	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	22	---	
T_f	Fall Time[2,3]		---	10	---	
C_{iss}	Input Capacitance	VDS=20V, VG S=0V, f=1.0MHz	---	945	---	pF
C_{oss}	Output Capacitance		---	114	---	
C_{rss}	Reverse Transfer Capacitance		---	83	---	

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	---	---	40	A
I_{SM}	Pulsed Source Current		---	---	90	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=5A , T_J=25℃	---	---	1.0	V

Note :

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Starting T_j=25°C , V_{DD}=30V , L=0.1mH , R_G=25Ω, V_{GS}=10V
4. Surface mounted on 1 in^2 copper pad of FR4 board

Typical Electrical and Thermal Characteristics (Curves)

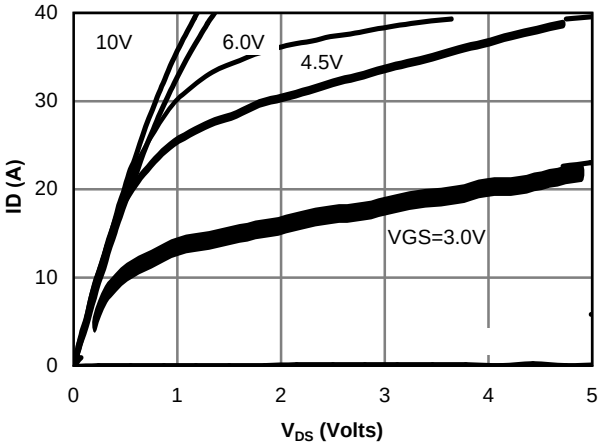


Figure 1: On-Region Characteristics

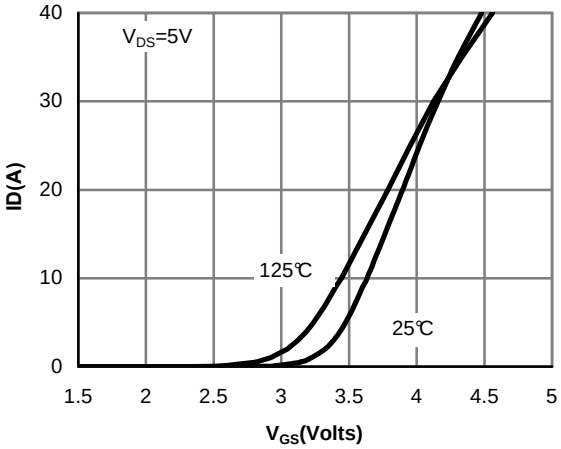


Figure 2: Transfer Characteristics

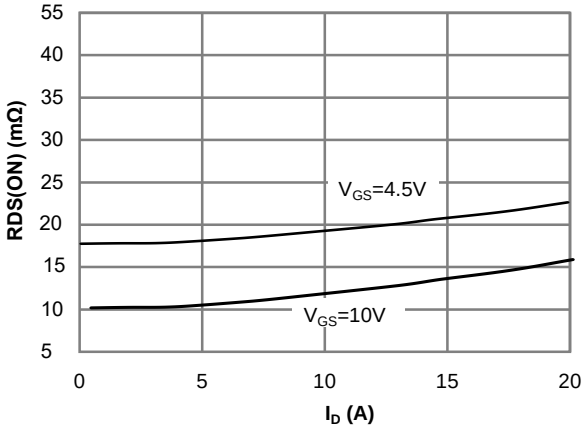


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

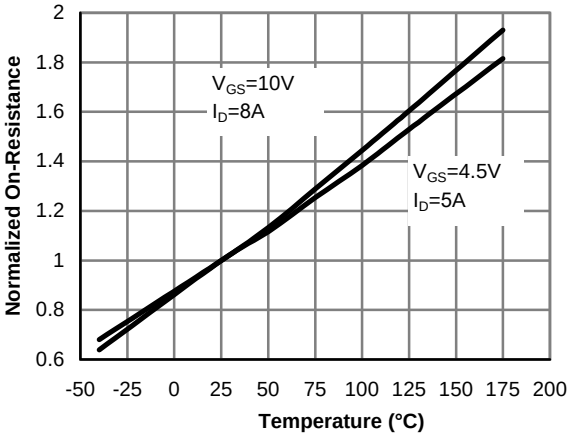


Figure 4: On-Resistance vs. Junction Temperature

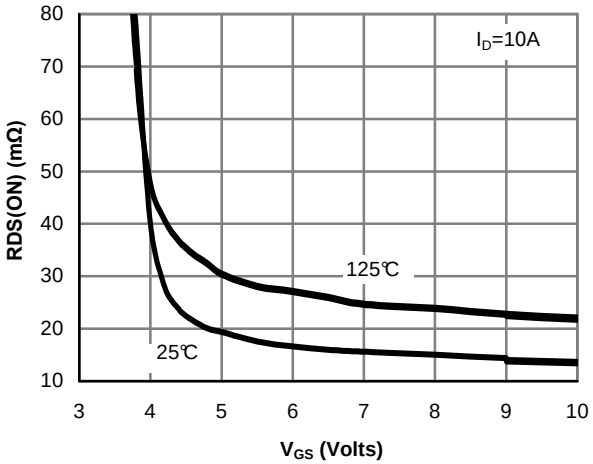


Figure 5: On-Resistance vs. Gate-Source Voltage

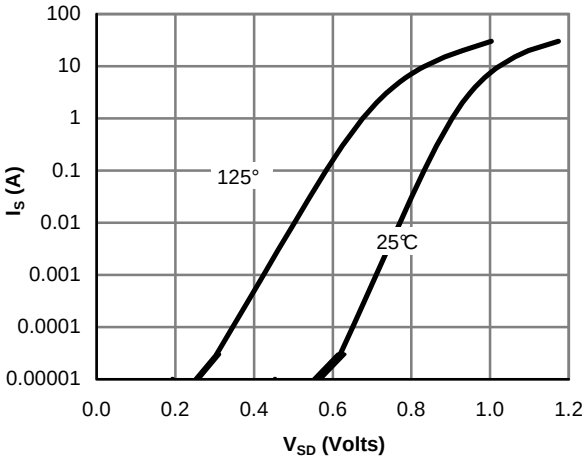


Figure 6: Body-Diode Characteristics

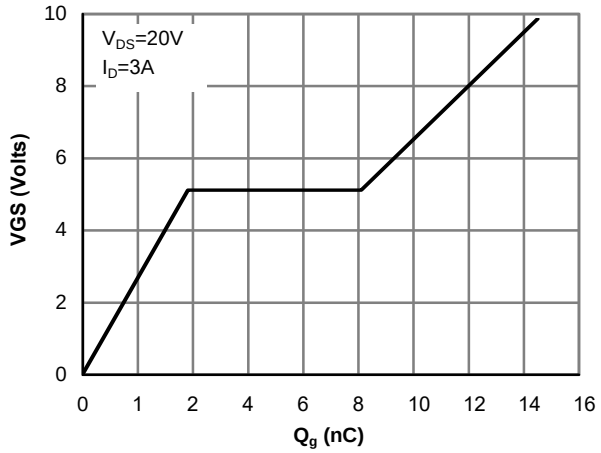


Figure 7: Gate-Charge Characteristics

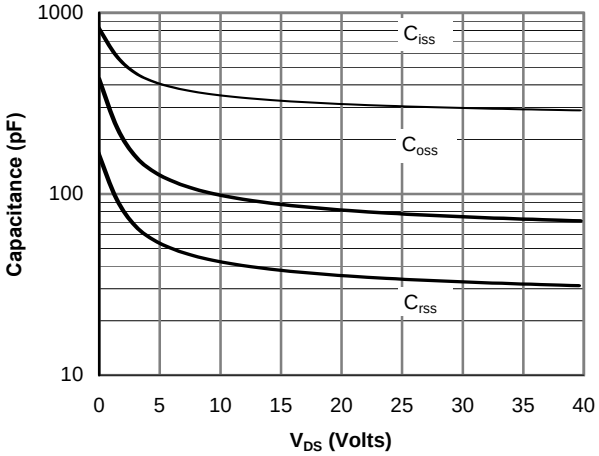


Figure 8: Capacitance Characteristics

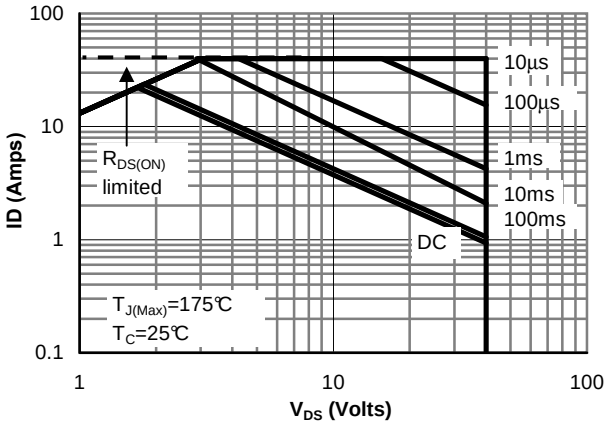


Figure 9: Maximum Forward Biased Safe Operating Area

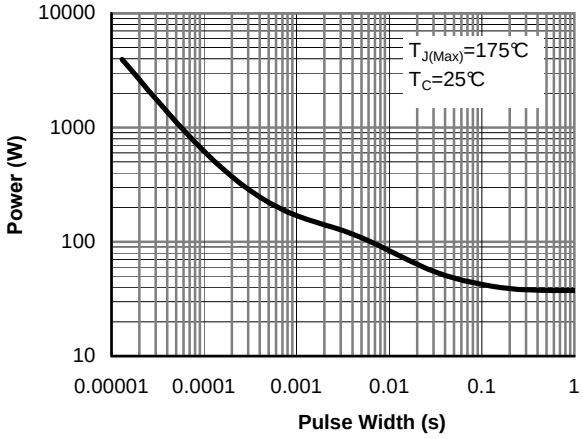


Figure 10: Single Pulse Power Rating Junction-to-Case

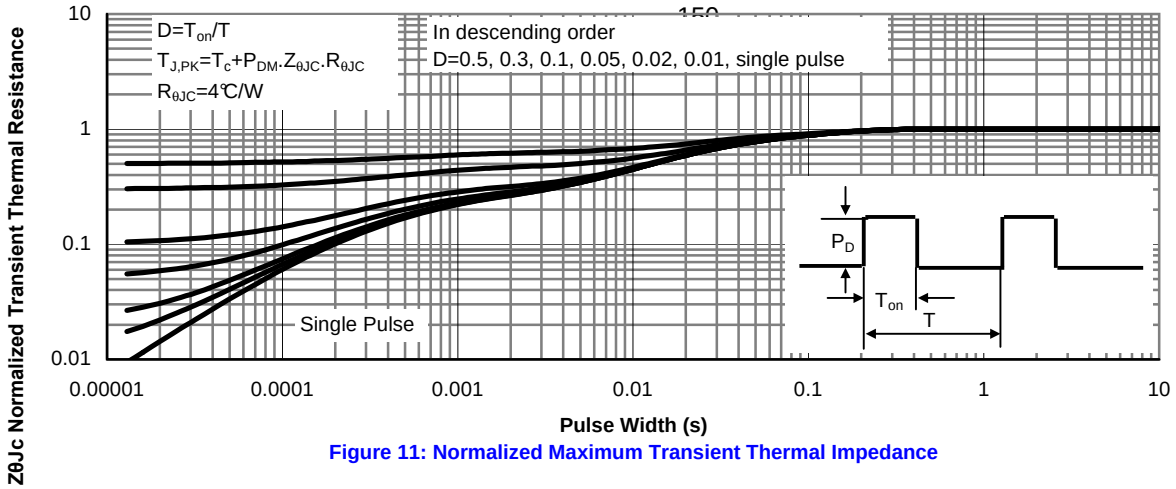


Figure 11: Normalized Maximum Transient Thermal Impedance

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