KSD60N04

40V N-Channel MOSFET

General Description

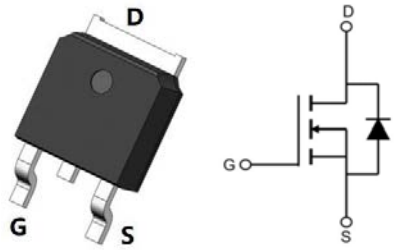
The KSD60N04 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The KSD60N04 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full f unction reliability approved.

Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
40	7.7 at V_{GS} =10 V	60
	10 at V_{GS} = 4.5V	54

TO-252 Pin Configuration



Features

- 40V,60A, RDS(ON) =7.7mΩ @VGS = 10V
- Improved dv/dt capability
- 100% EAS Guaranteed
- Green Device Available

Applications

- Motor control and drive
- Power Tools
- Quick Charger

Absolute Maximum Ratings Tc=2 5 ℃ 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 (Tc=25℃)	60	A
	Drain Current – Continuous (Tc=100℃)	40	A
I_{DM}	Drain Current – Pulsed[1]	160	A
E_{AS}	Single Pulse Avalanche Energy[2]	46.1	mJ
I_{AS}	Single Pulse Avalanche Energy[2]	28	A
P_D	Power Dissipation (Tc=25℃)	34.6	W
	Power Dissipation (Tc=100℃)	0.29	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	---	3.8	℃/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}=20V , 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=30A	---	7.7	9.5	mΩ
		V_{GS}= 4.5V, I_D=20A	---	10	12	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	1	1.5	2.5	V
gfs	Forward Transconductance	V_{DS}=10V , I_S=3A	---	15	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=20V V_{GS}=4.5V , I_D=15A	---	16	---	nC
Q_{gs}	Gate-Source Charge		---	5	---	
Q_{gd}	Gate-Drain Charge		---	7	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=20V,ID=1A V_{GS}=10V, R_G=6.2Ω	---	10	---	ns
T_r	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	50	---	
T_f	Fall Time		---	26	---	
C_{iss}	Input Capacitance	VDS=20V VGS=0V , F=1MHz	---	1639	---	pF
C_{oss}	Output Capacitance		---	148	---	
C_{rss}	Reverse Transfer Capacitance		---	122	---	

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	---	---	60	A
I_{SM}	Pulsed Source Current		---	---	180	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=30A , 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
5. EAS condition:Tj=25℃,V_{DD}=30V,V_G=10V,L=0.5mH,Rg=25Ω

Typical Electrical and Thermal Characteristics (Curves)

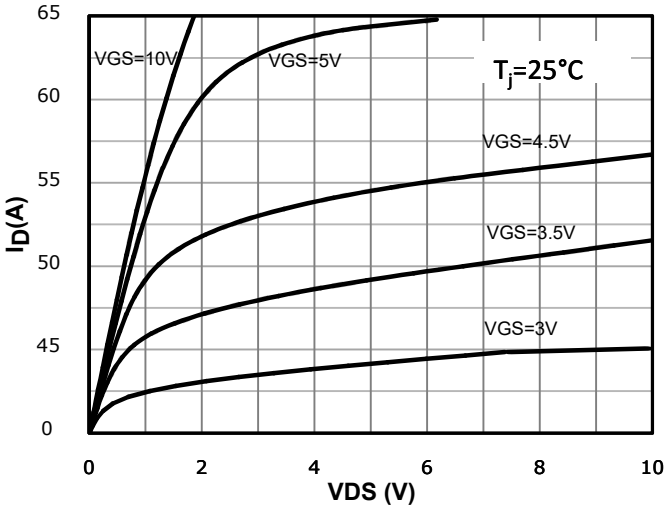


Fig1:Output Characteristics

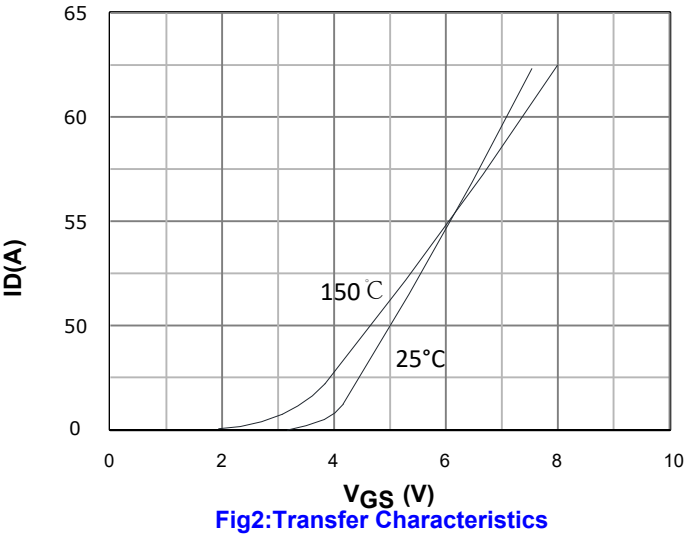


Fig2:Transfer Characteristics

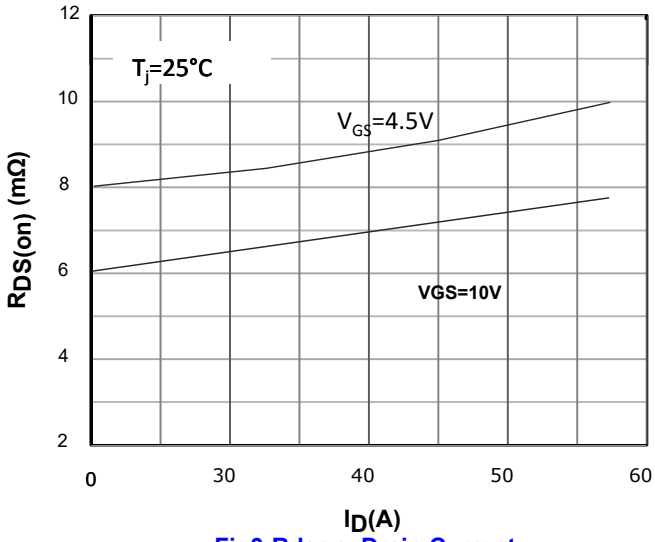


Fig3:Rdson- Drain Current

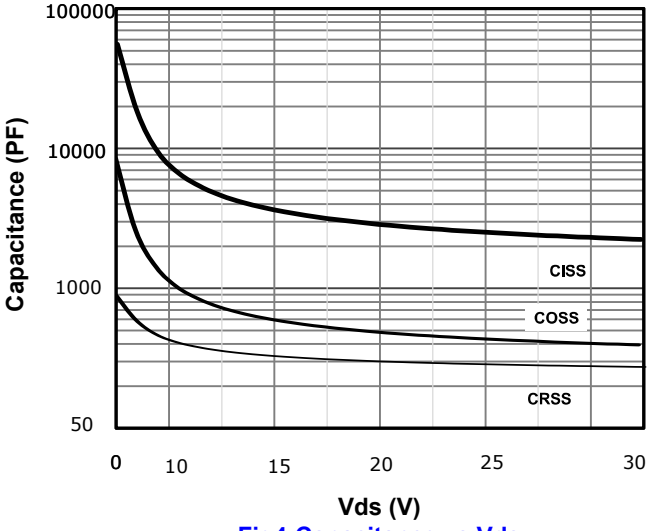


Fig4:Capacitance vs Vds

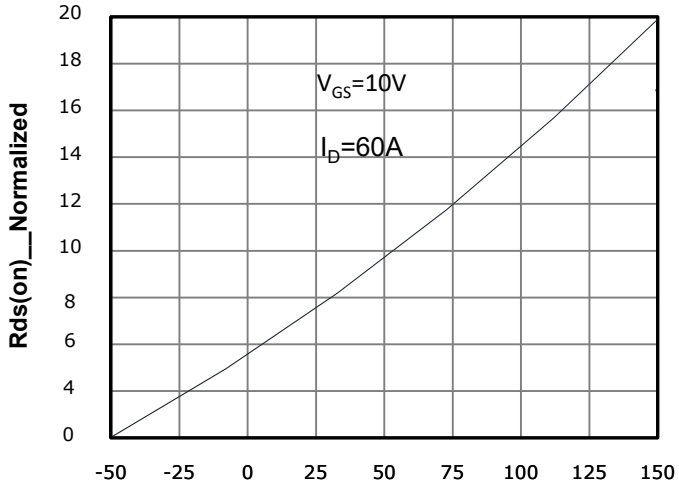


Fig5:Rds(on) vs. Temperature

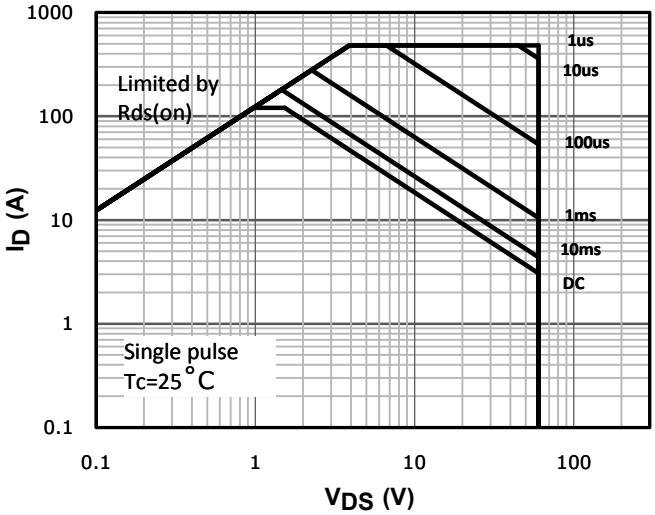


Fig6:Safe Operating Area

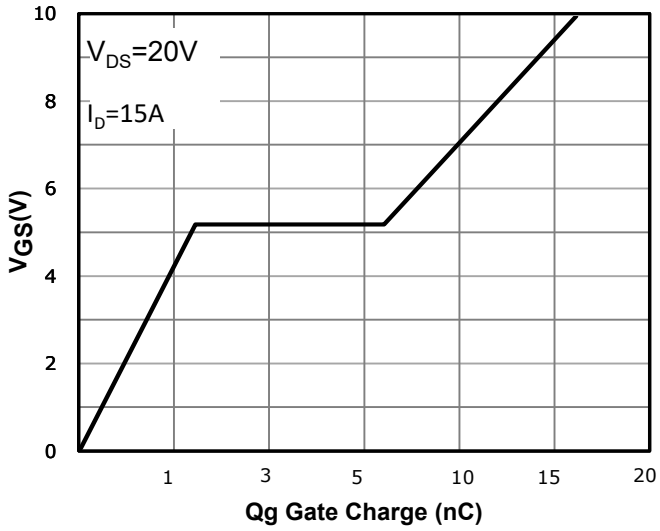


Fig7:Gate Charge

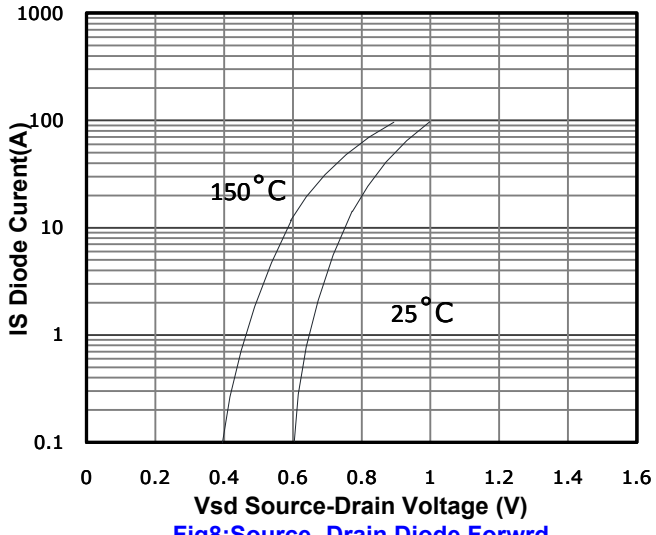


Fig8:Source- Drain Diode Forwrd

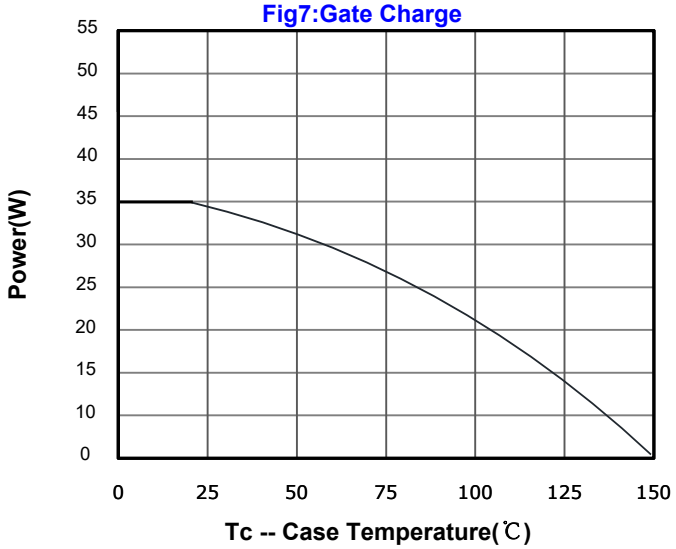


Fig9:Power Disipation

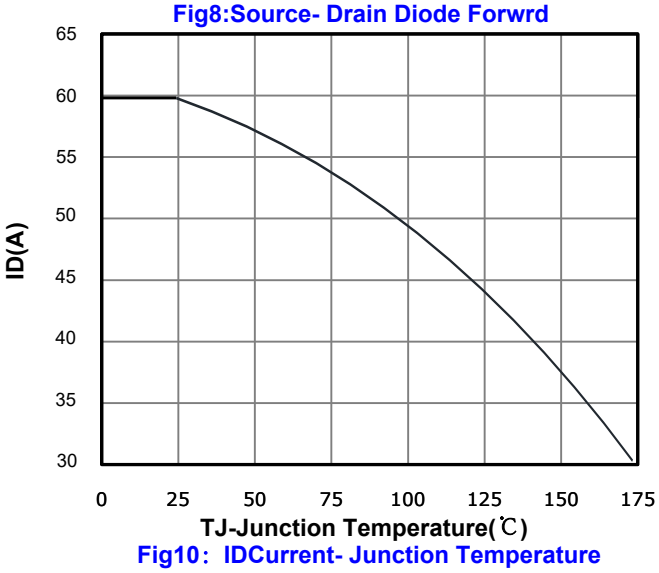


Fig10： IDCurrent- Junction Temperature

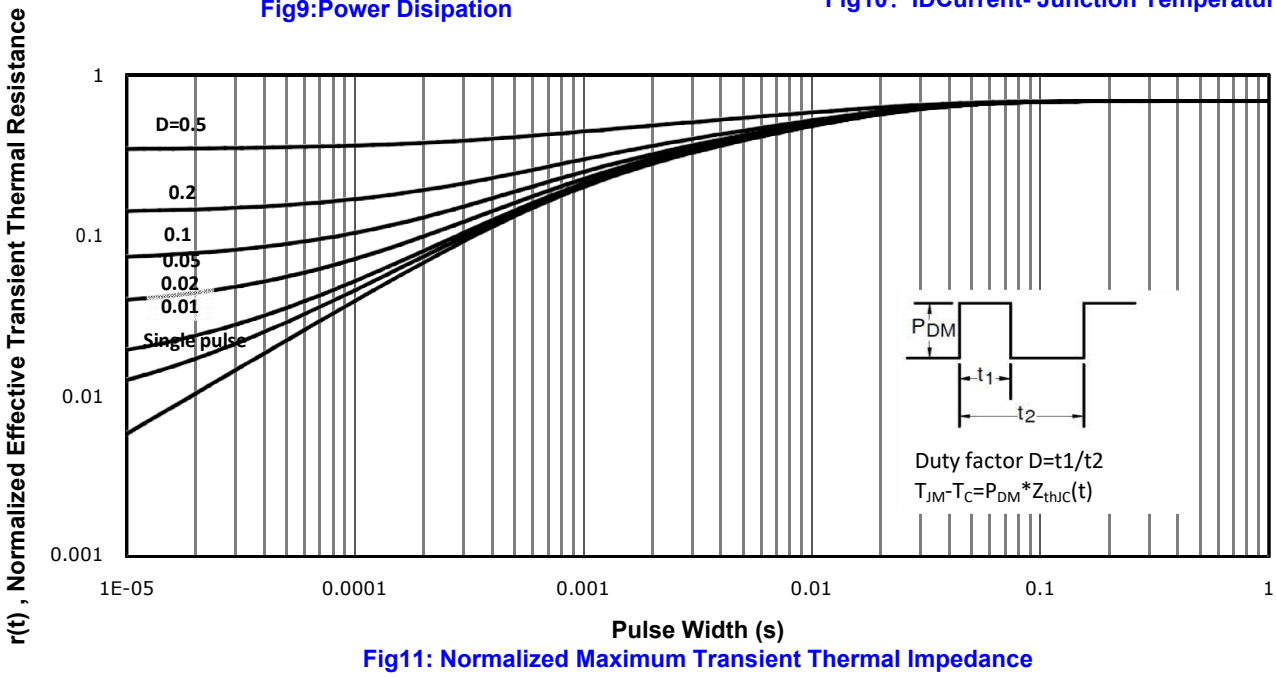


Fig11: Normalized Maximum Transient Thermal Impedance

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