

General Description

The WSD6070DN56 is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications.

The WSD6070N56 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

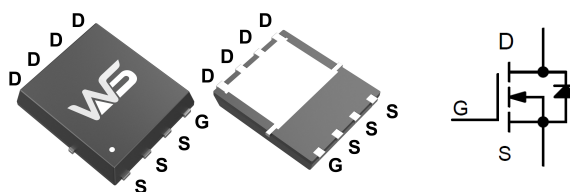
Product Summary

BV_{DSS}	R_{DS(on)}	I_D
60V	7mΩ	80A

Applications

- DC-DC converter switching for Networkong
- General purpose switching

DFN5X6-8 Pin Configuration



Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
T _J	Maximum Junction Temperature	150	°C
I _D	Storage Temperature Range	-55 to 150	°C
I _S	Diode Continuous Forward Current, T _C =25°C	80	A
I _D	Continuous Drain Current, V _{GS} =10V, T _C =25°C	80	A
	Continuous Drain Current, V _{GS} =10V, T _C =100°C	66	A
I _{DM}	Pulsed Drain Current, T _C =25°C	300	A
P _D	Maximum Power Dissipation, T _C =25°C	150	W
	Maximum Power Dissipation, T _C =100°C	75	W
R _{θJA}	Thermal Resistance-Junction to Ambient, t = 10s	50	°C/W
	Thermal Resistance-Junction to Ambient, Steady State	62.5	°C/W
R _{θJC}	Thermal Resistance-Junction to Case	1	°C/W
I _{AS}	Avalanche Current, Single pulse, L=0.5mH	30	A
E _{AS}	Avalanche Energy, Single pulse, L=0.5mH	225	mJ

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.043	---	V/ $^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=40A$	---	7.0	9.0	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2.0	3.0	4.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.94	---	mV/ $^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=48V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	2	μA
		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=20A$	---	50	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	1.0	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=30V$, $V_{GS}=10V$, $I_D=40A$	---	48	---	nC
Q_{gs}	Gate-Source Charge		---	17	---	
Q_{gd}	Gate-Drain Charge		---	12	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V$, $V_{GEN}=10V$, $R_G=1\Omega$, $I_D=1A$, $R_L=15\Omega$.	---	16	---	ns
T_r	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	40	---	
T_f	Fall Time		---	35	---	
C_{iss}	Input Capacitance	$V_{DS}=30V$, $V_{GS}=0V$, $f=1MHz$	---	2680	---	pF
C_{oss}	Output Capacitance		---	386	---	
C_{rss}	Reverse Transfer Capacitance		---	160	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	80	A
I_{SM}	Pulsed Source Current ^{2,6}		---	---	300	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=20A$, $T_J=25^{\circ}\text{C}$	---	---	1.3	V

Note :

1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, $t < 10\text{sec}$.

2.The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

3.The EAS data shows Max. rating. The test condition is $V_{DD}=25V$, $V_{GS}=10V$, $L=0.5mH$, $I_{AS}=30A$

4.The power dissipation is limited by 150°C junction temperature

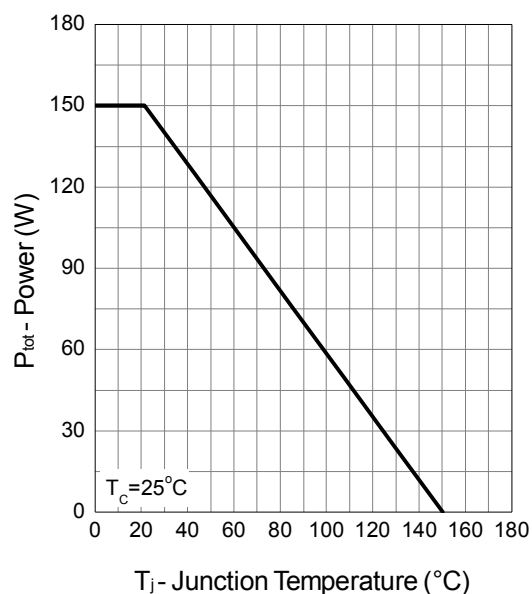
5.The Min. value is 100% EAS tested guarantee.

6.The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

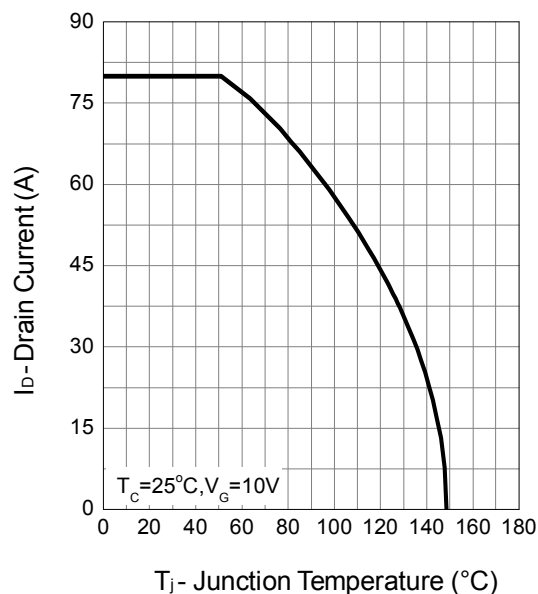
7.Package limitation current is 100A.

Typical Characteristics

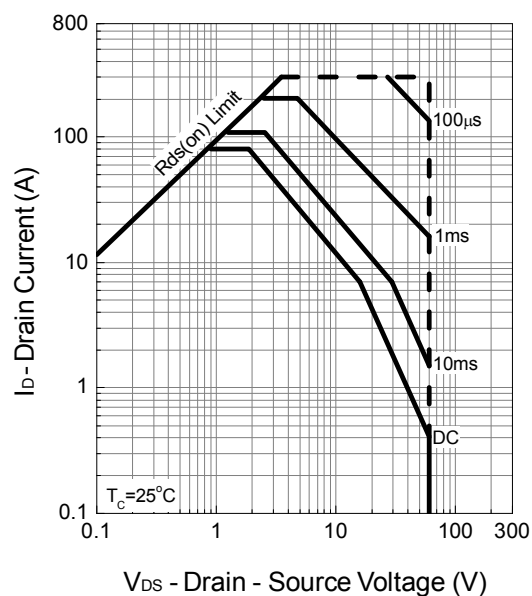
Power Dissipation



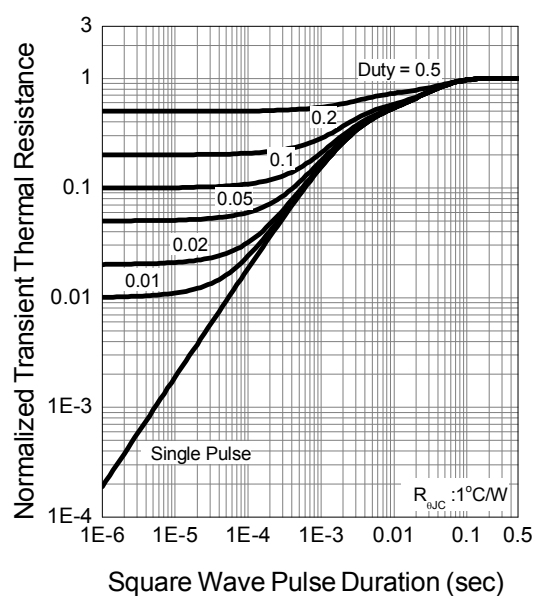
Drain Current



Safe Operation Area

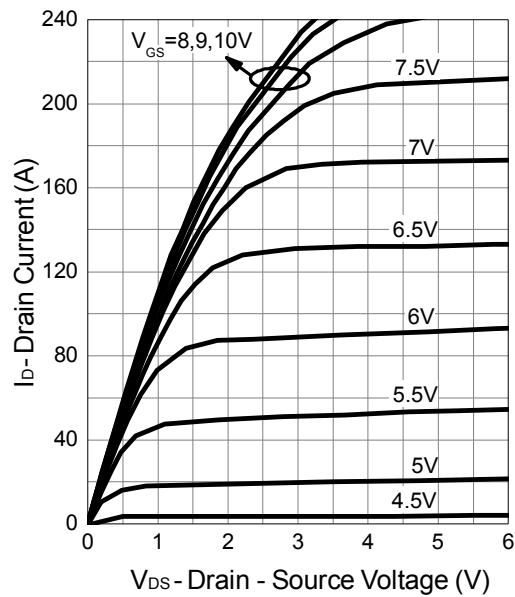


Thermal Transient Impedance

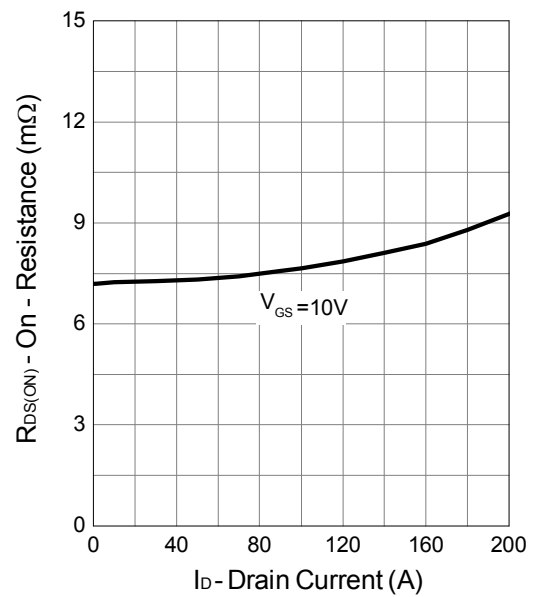


Typical Characteristics

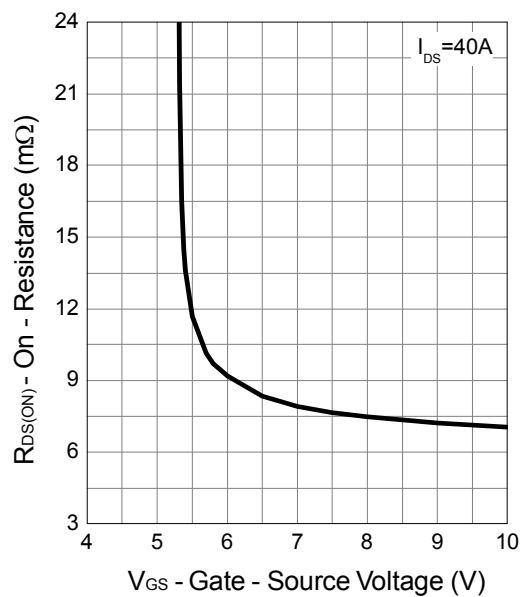
Output Characteristics



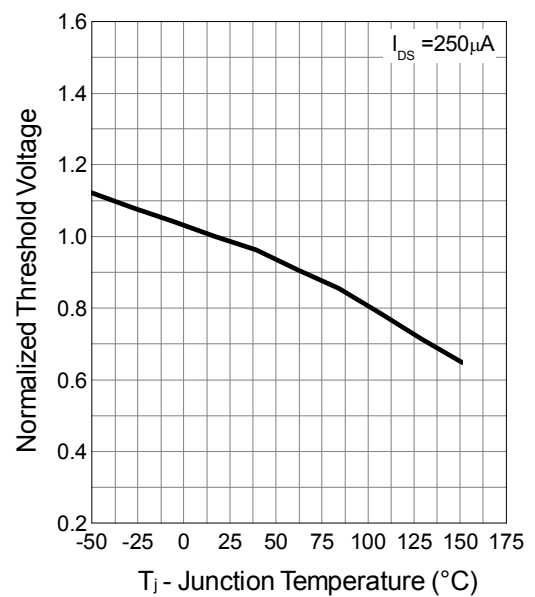
Drain-Source On Resistance



Gate-Source On Resistance

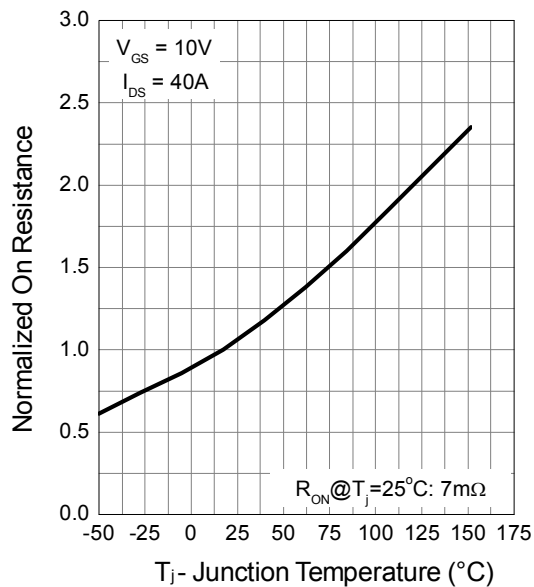


Gate Threshold Voltage

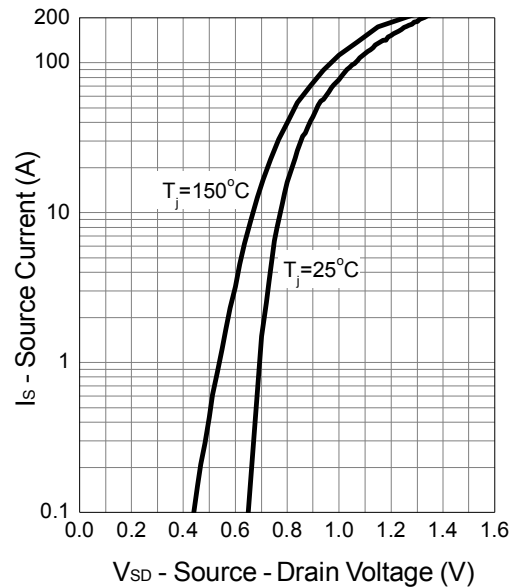


Typical Characteristics

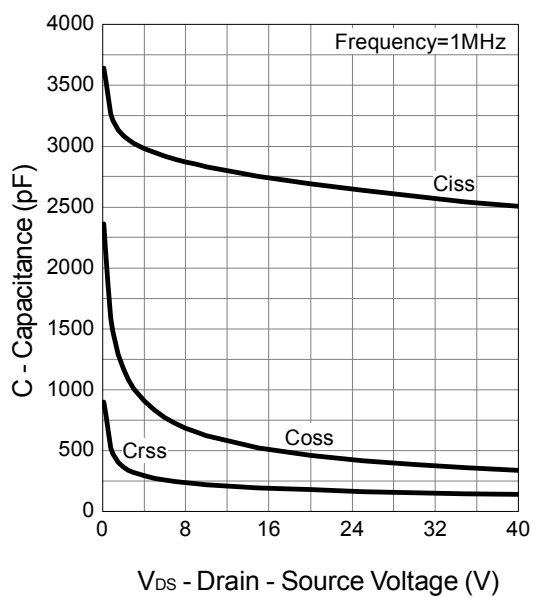
Drain-Source On Resistance



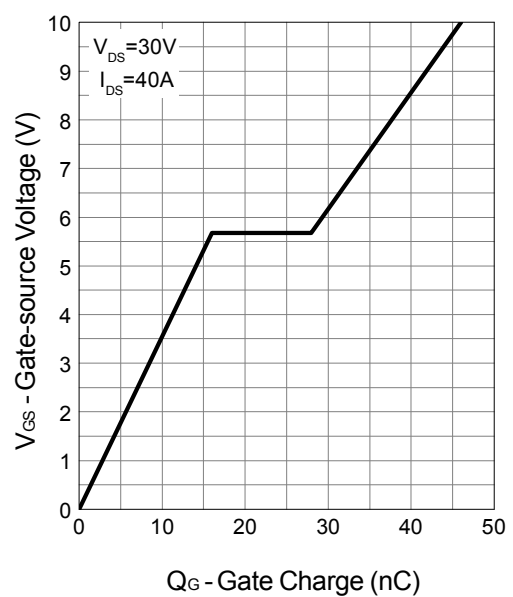
Source-Drain Diode Forward



Capacitance



Gate Charge



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