

General Description

The WSD50P10DN56 is the highest performance trench P-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 WSD50P10DN56 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

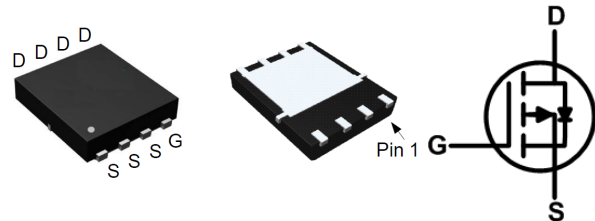
Product Summary

BVDSS	R _{DS(on)}	I _D
-100V	40mΩ	-34A

Applications

- Power Management for Industrial DC / DC Converters.

DFN5X6 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-100	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, -V _{GS} @ -10V	-34	A
I _D @T _C =100°C	Continuous Drain Current, -V _{GS} @ -10V	-22	A
I _{DM}	Pulsed Drain Current	-136 ^a	A
E _{AS} ^c	Single Pulse Avalanche Energy	182	mJ
I _{AS} ^c	Avalanche Current	-27	A
P _D @T _C =25°C	Total Power Dissipation	96	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA} ^b	Thermal Resistance Junction-Ambient	---	60	°C/W
R _{θJC}	Thermal Resistance Junction-Case	---	1.3	°C/W

Note a : Pulse width is limited by max. junction temperature.

Note b : Surface Mounted on 1in² pad area.

Note c : UIS tested and pulse width are limited by maximum junction temperature 150°C(initial temperature T_J=25°C).

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.021	---	V/ $^\circ\text{C}$
$R_{DS(ON)}^d$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-18A$	---	32	40	m Ω
		$V_{GS}=-4.5V, I_D=-10A$	---	38	51	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-2.0	-3.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.08	---	mV/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-80V, V_{GS}=0V, T_J=85^\circ\text{C}$	---	---	-30	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
Q_g^e	Total Gate Charge	$V_{DS}=-30V, V_{GS}=-10V, I_D=-18A$	---	56	---	nC
Q_{gs}^e	Gate-Source Charge		---	9.5	---	
Q_{gd}^e	Gate-Drain Charge		---	14.5	---	
$T_{d(on)}^e$	Turn-On Delay Time	$V_{DD}=-30V, V_{GS}=-10V,$ $R_G=6\Omega, I_D=-1A, R_L=30\Omega.$	---	17	---	ns
T_r^e	Rise Time		---	9	---	
$T_{d(off)}^e$	Turn-Off Delay Time		---	83	---	
T_f^e	Fall Time		---	34	---	
C_{iss}^e	Input Capacitance	$V_{DS}=-50V, V_{GS}=0V, f=1\text{MHz}$	---	2480	3207	pF
C_{oss}^e	Output Capacitance		---	268	---	
C_{rss}^e	Reverse Transfer Capacitance		---	126	---	

Diode Characteristics

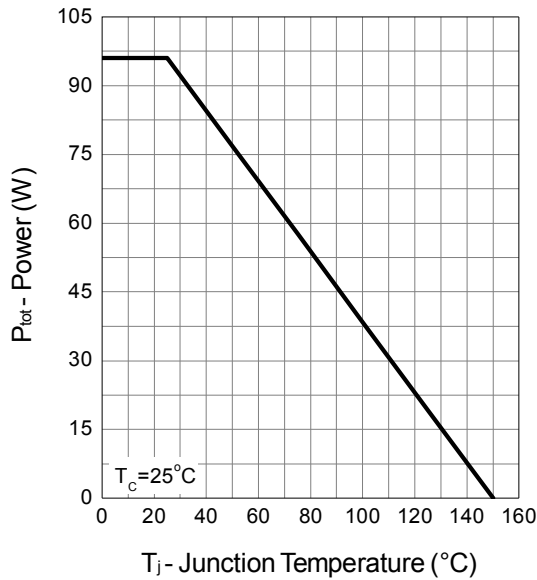
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-18	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-18A, T_J=25^\circ\text{C}$	---	---	-1.2	V

Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

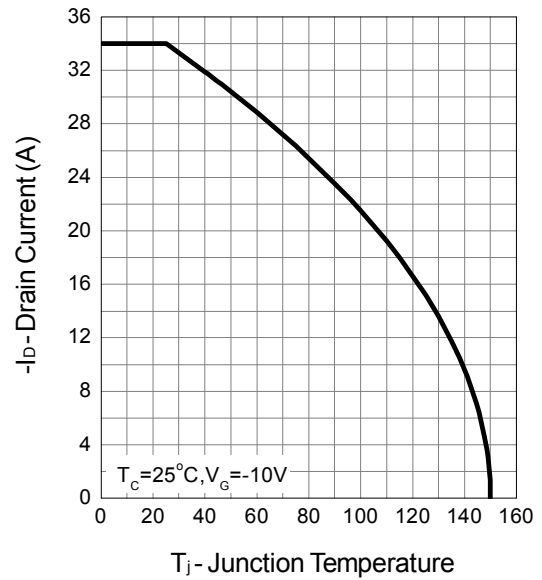
Note e : Guaranteed by design, not subject to production testing.

Typical Characteristics

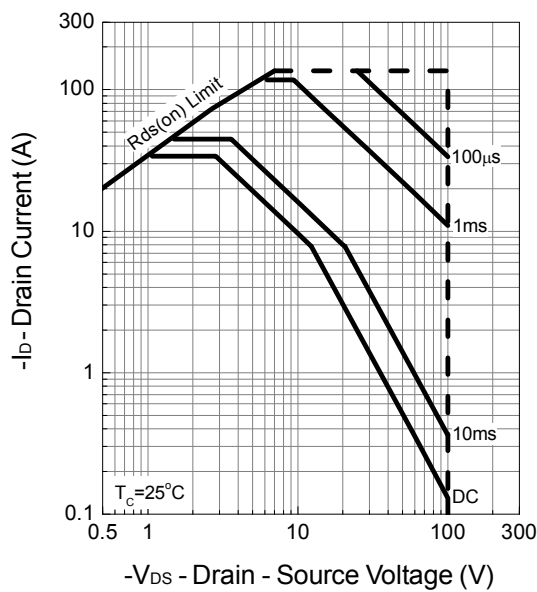
Power Dissipation



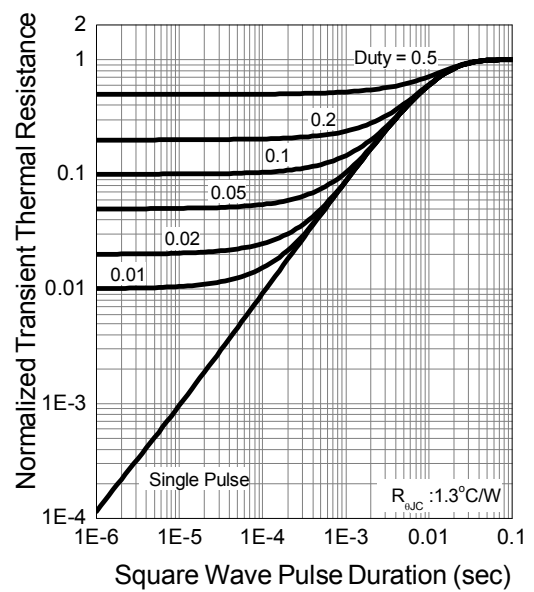
Drain Current



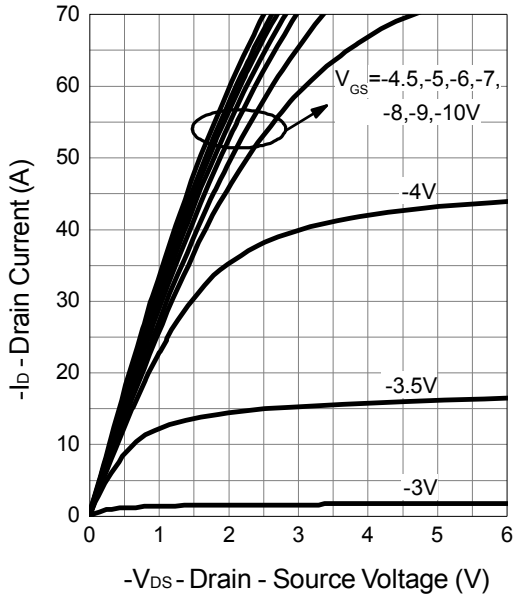
Safe Operation Area



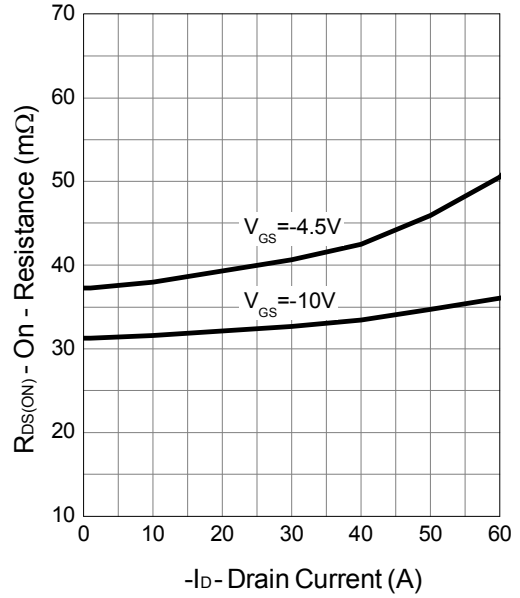
Thermal Transient Impedance



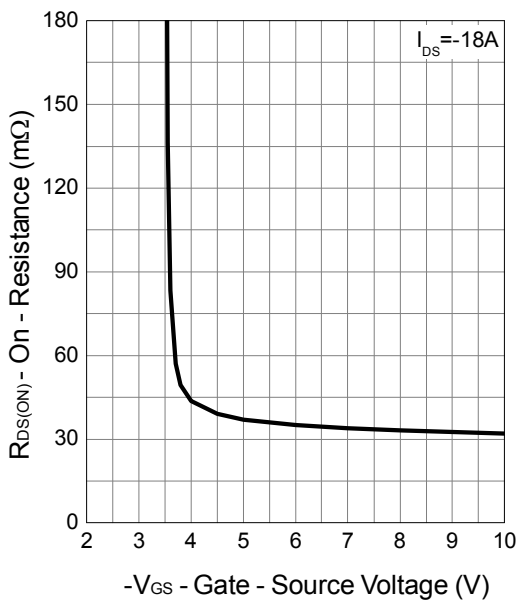
Output Characteristics



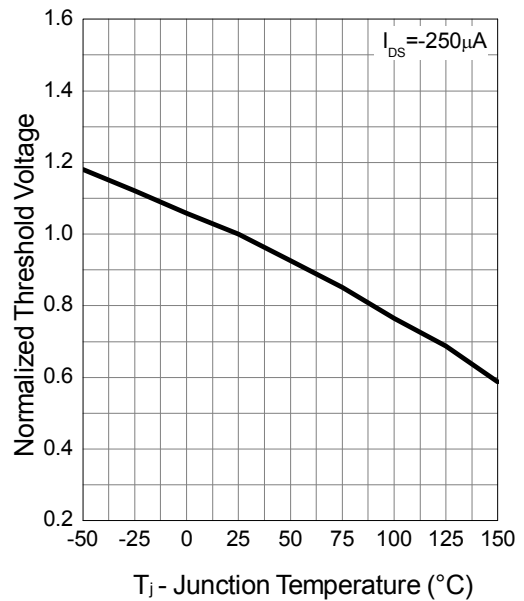
Drain-Source On Resistance



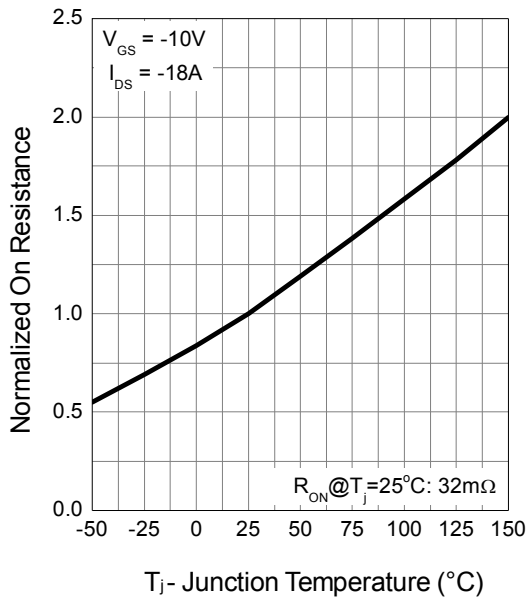
Gate-Source On Resistance



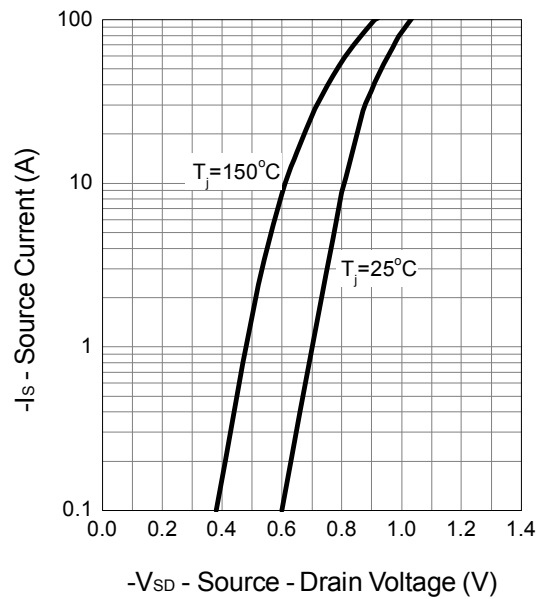
Gate Threshold Voltage



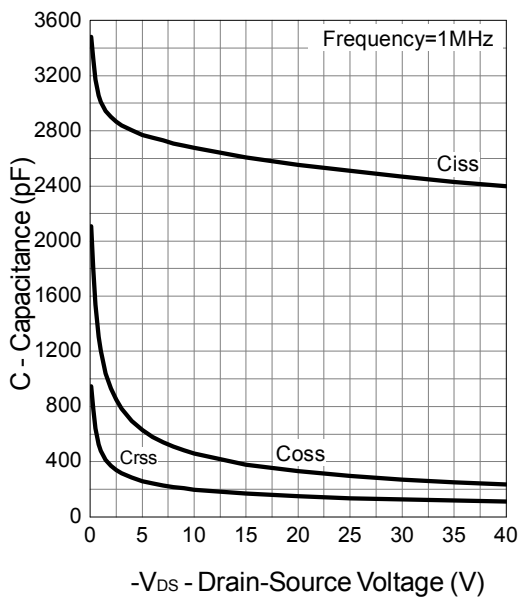
Drain-Source On Resistance



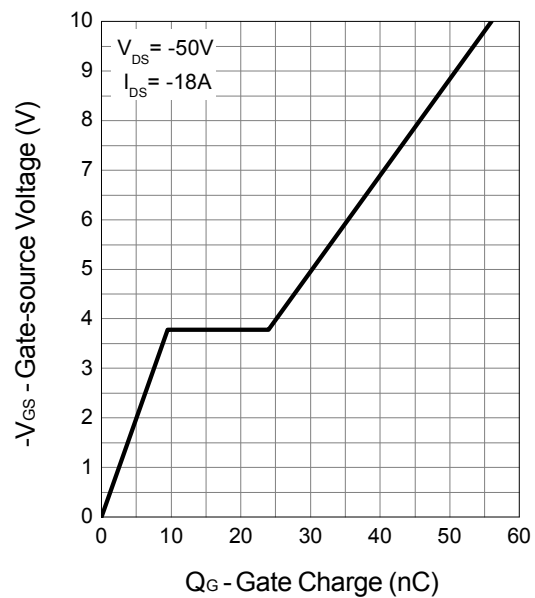
Source-Drain Diode Forward



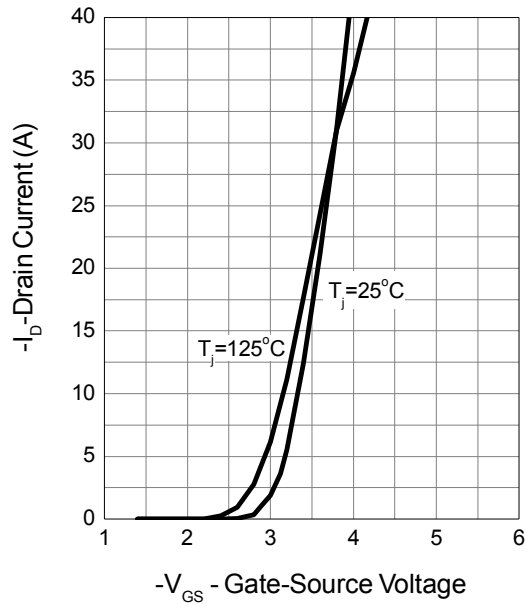
Capacitance



Gate Charge



Transfer Characteristics





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