

General Description

The WSD50P10DN56 is the highest performance trench P-Channel 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% E_{AS} guaranteed with full function reliability approved.

Features

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

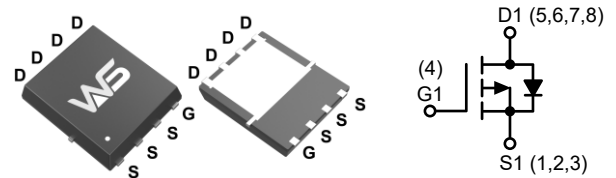
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
-100V	32m Ω	-34A

Applications

- Power Management for Industrial DC/DC Converters.

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-34	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-22	
I_{DM}^1	Pulsed Drain Current	-136	
E_{AS}^3	Single Pulse Avalanche Energy	182	mJ
I_{AS}^3	Avalanche Current	-27	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	96	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}^2$	Thermal Resistance Junction-Ambient	---	60	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	1.3	

Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-100	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.021	---	V/°C
R _{DS(ON)} ⁴	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-18A	---	32	40	mΩ
		V _{GS} =-4.5V, I _D =-10A	---	38	51	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250μA	-1.0	-2.0	-3.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4.08	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-80V, V _{GS} =0V, T _J =25°C	---	---	-1.0	μA
		V _{DS} =-80V, V _{GS} =0V, T _J =85°C	---	---	-30	
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Q _g ⁵	Total Gate Charge	V _{DS} =-30V, V _{GS} =-10V, I _D =-18A	---	56	---	nC
Q _{gs} ⁵	Gate-Source Charge		---	9.5	---	
Q _{gd} ⁵	Gate-Drain Charge		---	14.5	---	
T _{d(on)} ⁵	Turn-On Delay Time	V _{DD} =-30V, V _{GS} =-10V, R _G =6Ω, I _D =-18A, R _L =30Ω	---	17	---	ns
T _r ⁵	Rise Time		---	9	---	
T _{d(off)} ⁵	Turn-Off Delay Time		---	83	---	
T _f ⁵	Fall Time		---	34	---	
C _{iss} ⁵	Input Capacitance	V _{DS} =-50V, V _{GS} =0V, f=1.0MHz	---	2590	---	pF
C _{oss} ⁵	Output Capacitance		---	320	---	
C _{rss} ⁵	Reverse Transfer Capacitance		---	45	---	

Diode Characteristics

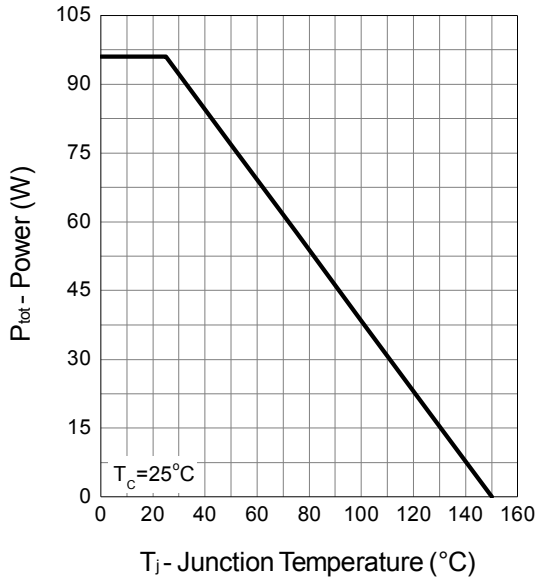
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	-18	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-18A, T _J =25°C	---	---	-1.2	V

Note:

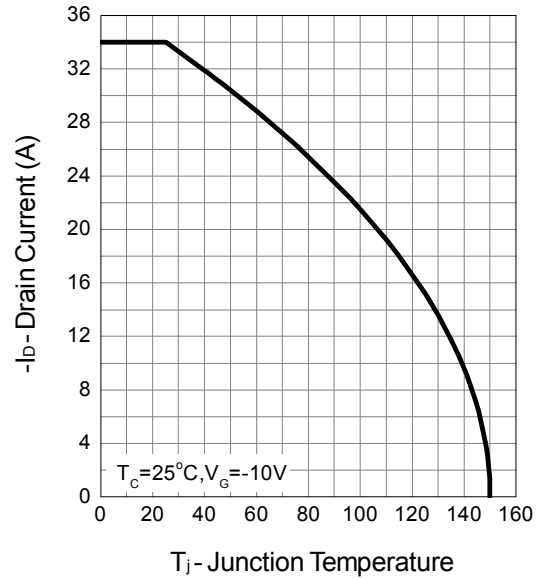
1. Pulse width is limited by max. junction temperature.
2. Surface Mounted on 1in² pad area.
3. UIS tested and pulse width are limited by maximum junction temperature 150°C (initial temperature T_J=25°C).
4. Pulse test; pulse width≤300μs, duty cycles≤2%.
5. Guaranteed by design, not subject to production testing.

Typical Characteristics

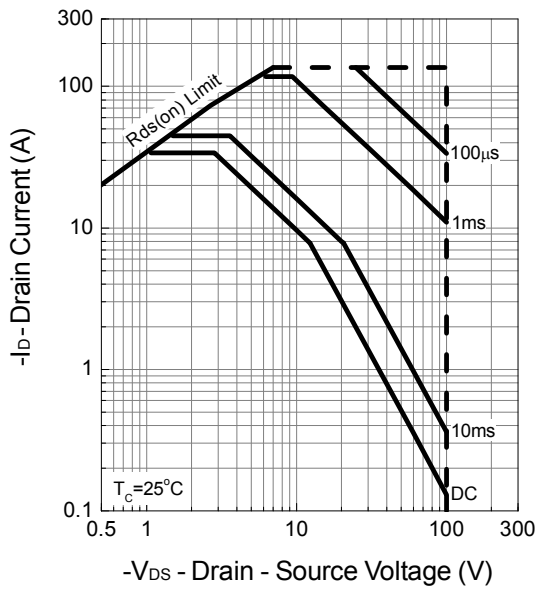
Power Dissipation



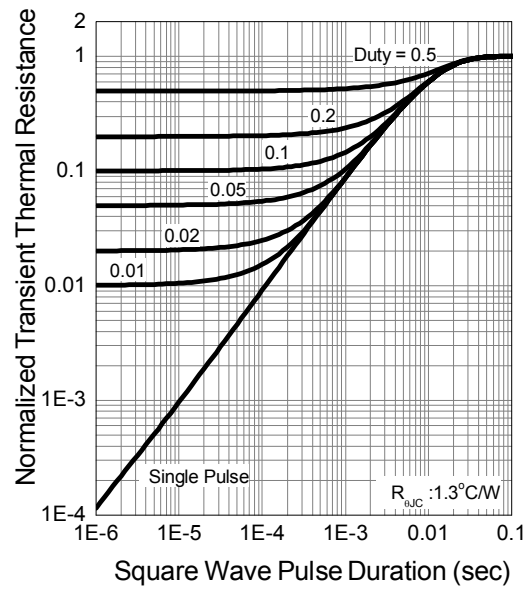
Drain Current



Safe Operation Area

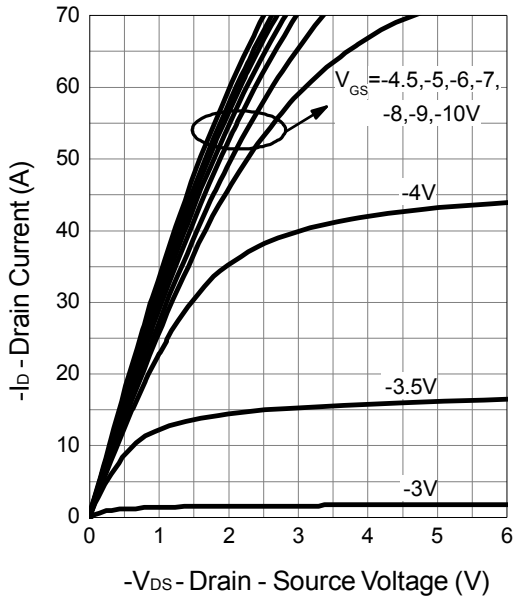


Thermal Transient Impedance

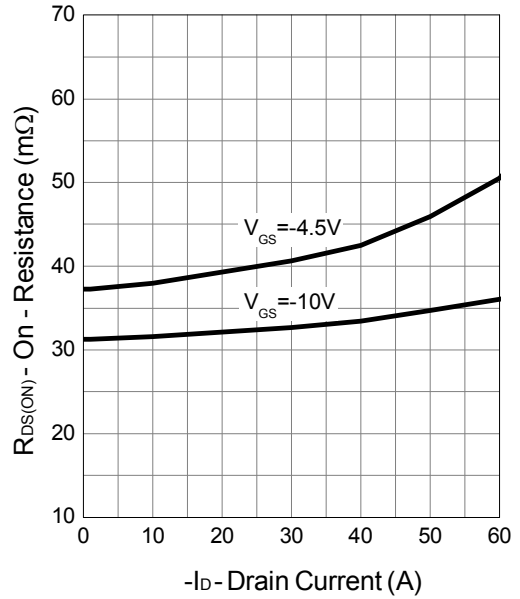


Typical Characteristics (Cont.)

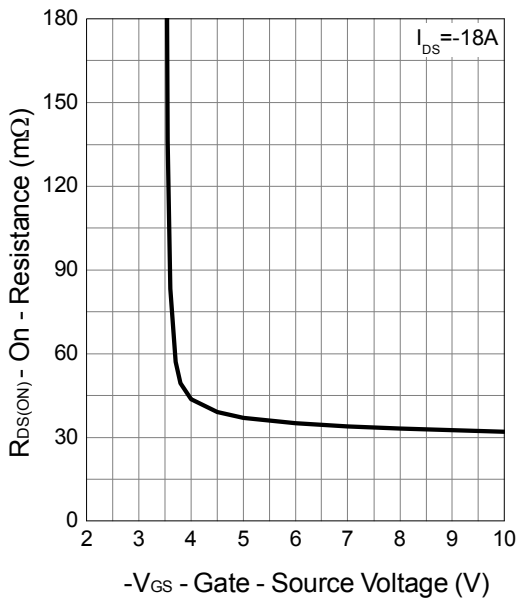
Output Characteristics



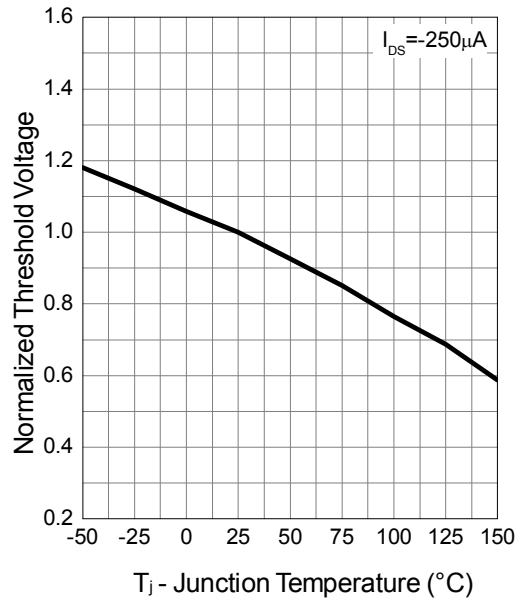
Drain-Source On Resistance



Gate-Source On Resistance

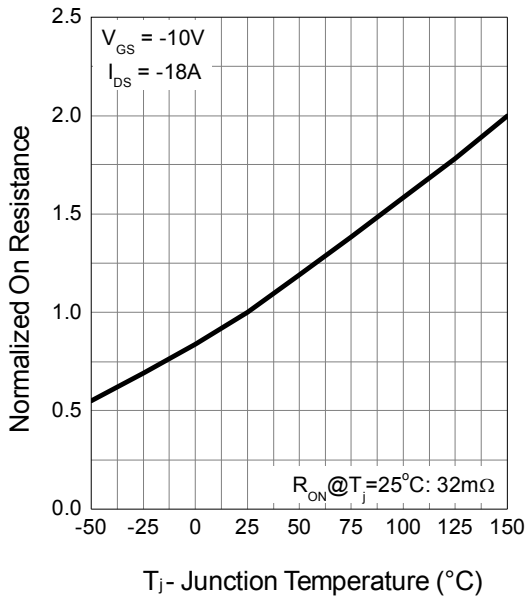


Gate Threshold Voltage

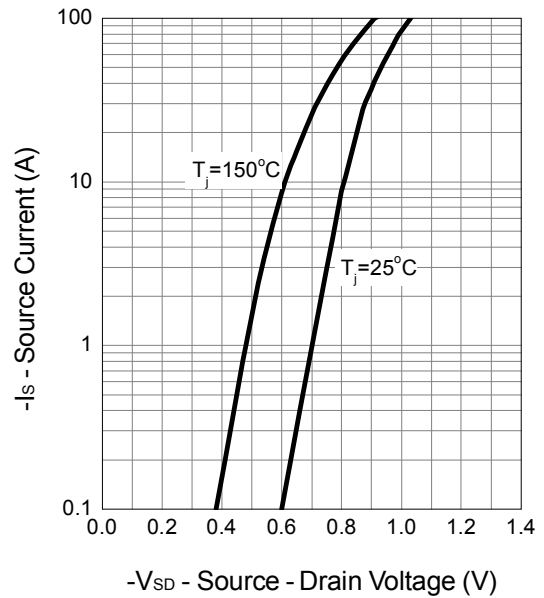


Typical Characteristics (Cont.)

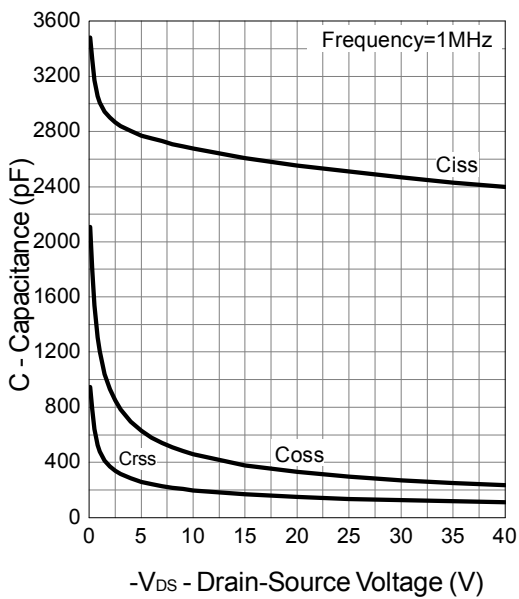
Drain-Source On Resistance



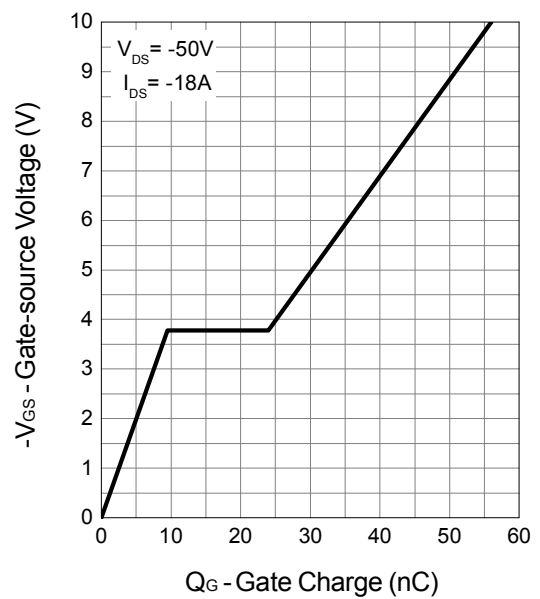
Source-Drain Diode Forward



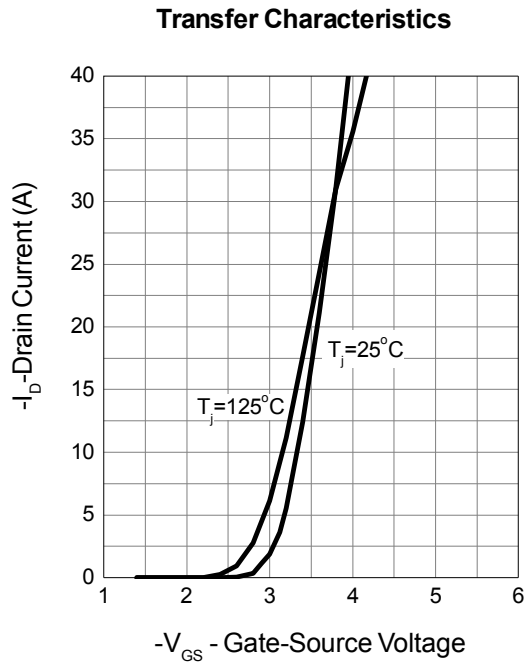
Capacitance

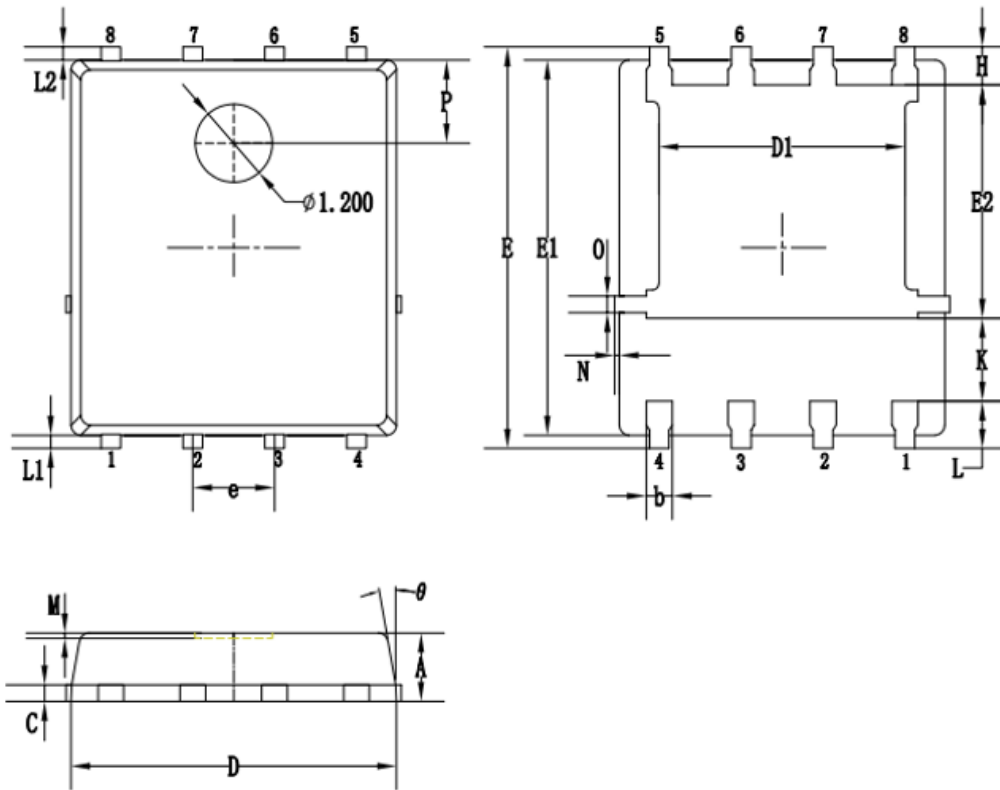


Gate Charge



Typical Characteristics (Cont.)



Packaging information


SYMBOLS	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1	3.72	3.82	3.92
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		

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