

General Description

The WSF4N50 is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSF4N50 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
- Green Device Available

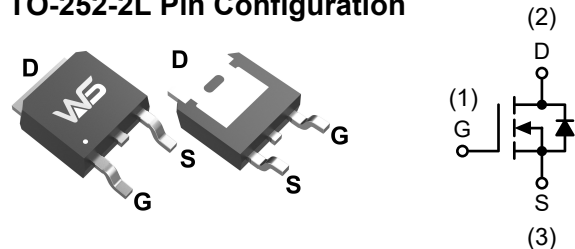
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
500V	2100mΩ	4A

Applications

- AC/DC Power Conversion in Switched Mode Power Supplies (SMPS).
- Uninterruptible Power Supply(UPS)
- Adapter.

TO-252-2L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	± 30	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1.5}$	4	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1.5}$	1.2	A
I_{DM}	Pulsed Drain Current ^{1,2,5}	9	A
P_D	Total Power Dissipation ^{1,5}	104	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.2	$^\circ C/W$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	500	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =250uA	---	0.6	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =2A	---	2100	2500	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	3.0	4.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4.57	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =400V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =400V, V _{GS} =0V, T _J =85°C	---	---	30	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±30V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =40V, I _D =3.5A	---	5	---	S
Q _g	Total Gate Charge (10V)	V _{DS} =300V, V _{GS} =10V, I _D =2A	---	11.2	15.7	nC
Q _{gs}	Gate-Source Charge		---	3.7	---	
Q _{gd}	Gate-Drain Charge		---	2.9	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =6Ω, I _D =1A.	---	5	9	ns
T _r	Rise Time		---	12	22	
T _{d(off)}	Turn-Off Delay Time		---	6	11	
T _f	Fall Time		---	16	29	
C _{iss}	Input Capacitance	V _{DS} =300V, V _{GS} =0V, f=1MHz	---	610	800	pF
C _{oss}	Output Capacitance		---	27	---	
C _{rss}	Reverse Transfer Capacitance		---	15	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,2,5}	V _G =V _D =0V, Force Current	---	---	4	A
I _{SM}	Pulsed Source Current ^{1,2}		---	---	16	A
V _{SD}	Diode Forward Voltage ¹	V _{GS} =0V, I _S =2A, T _J =25°C	---	0.8	1.5	V
t _{rr}	Reverse Recovery Time	I _F =2A, dI/dt=40A/μs, T _J =25°C	---	150	---	nS
Q _{rr}	Reverse Recovery Charge		---	1000	---	nC

Notes:

Note 1 : limited by maximum junction temperature.

Note 2 : Bond wire current limit.

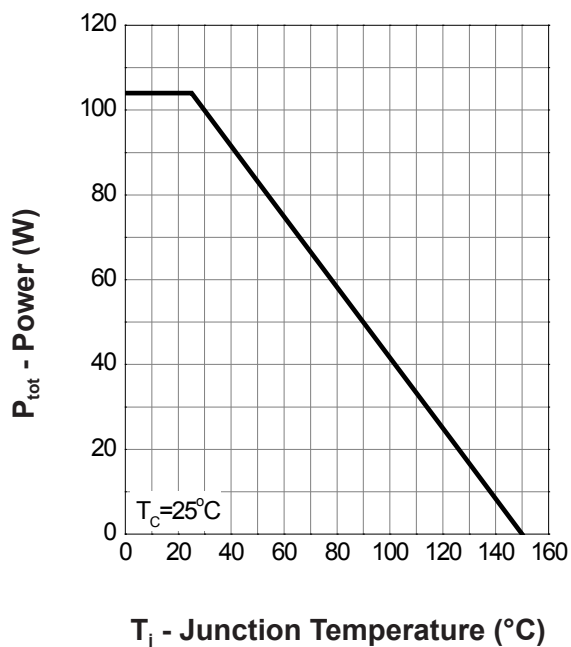
Note 3 : V_{DS}=500V, I_D=4A.

Note 4 : I_D=0.5A, V_{DD}=50V, T_J=25°C.

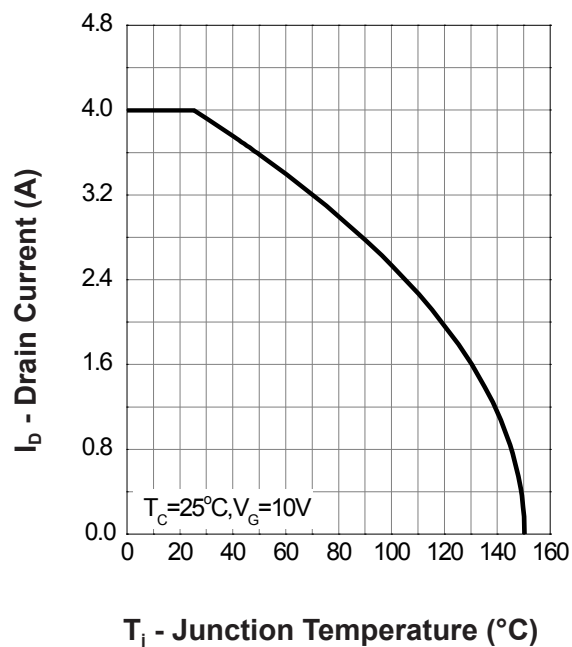
Note 5 : Repetitive Rating : Pulse width limited by maximum junction temperature.

Typical Characteristics

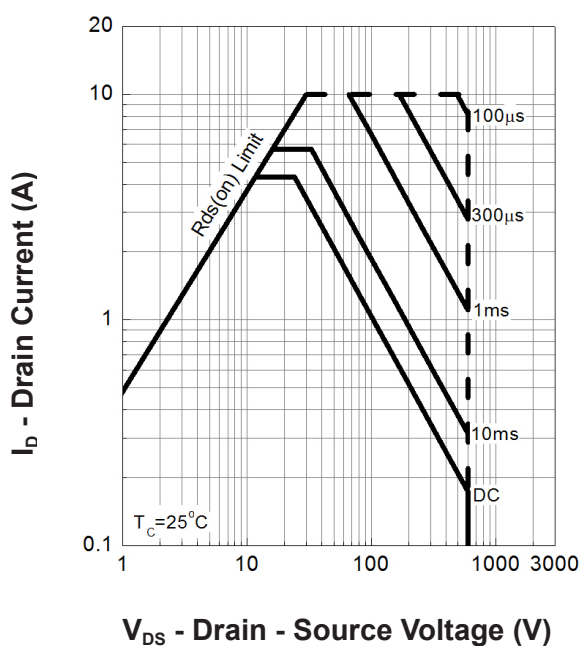
Power Dissipation



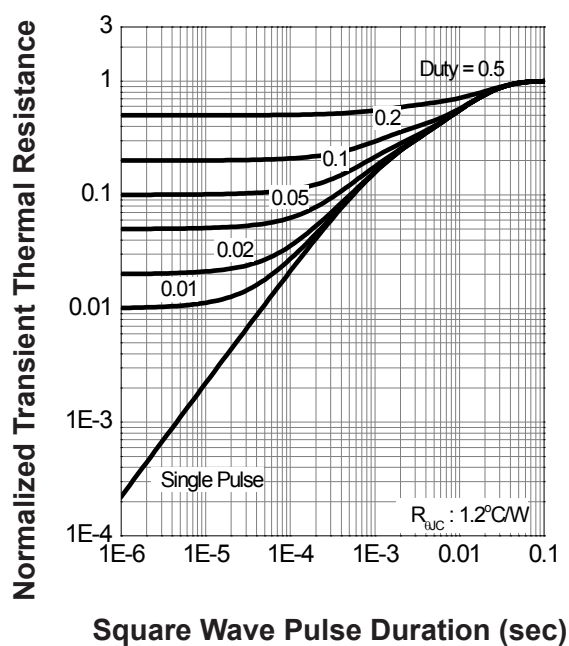
Drain Current



Safe Operation Area

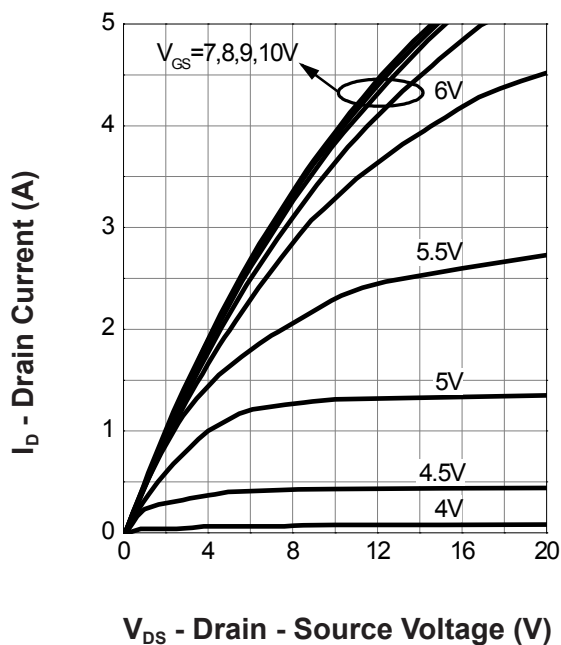


Thermal Transient Impedance

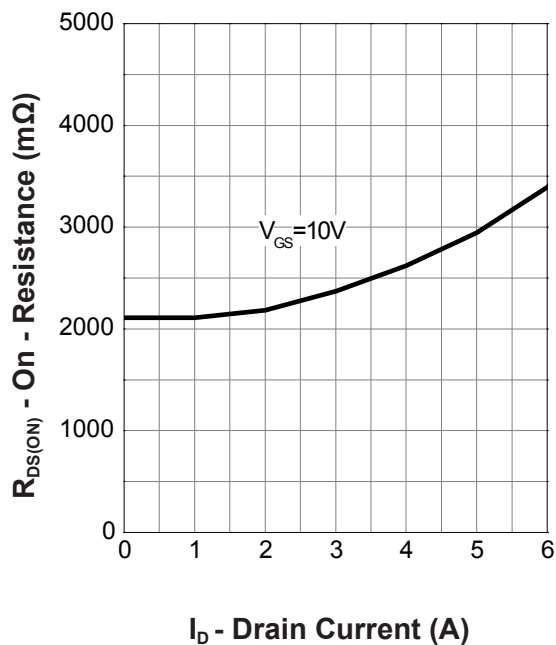


Typical Characteristics(Cont.)

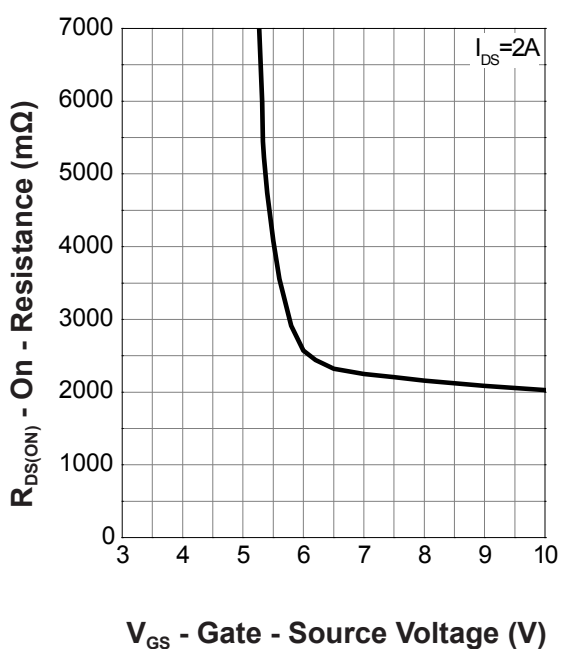
Output Characteristics



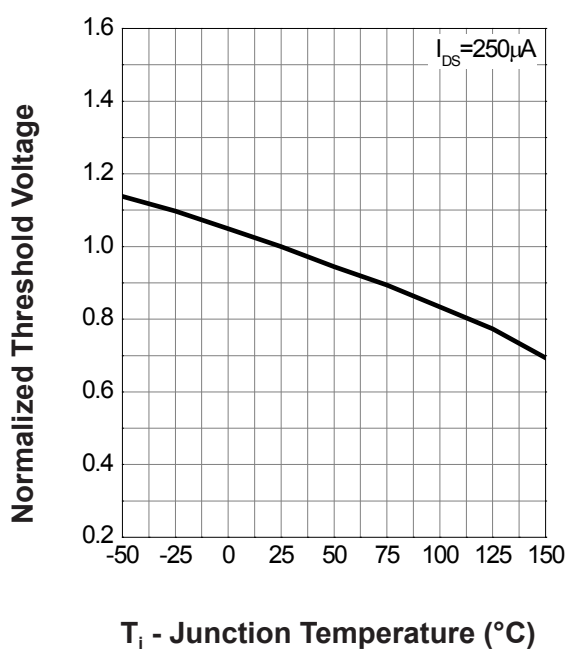
Drain-Source On Resistance



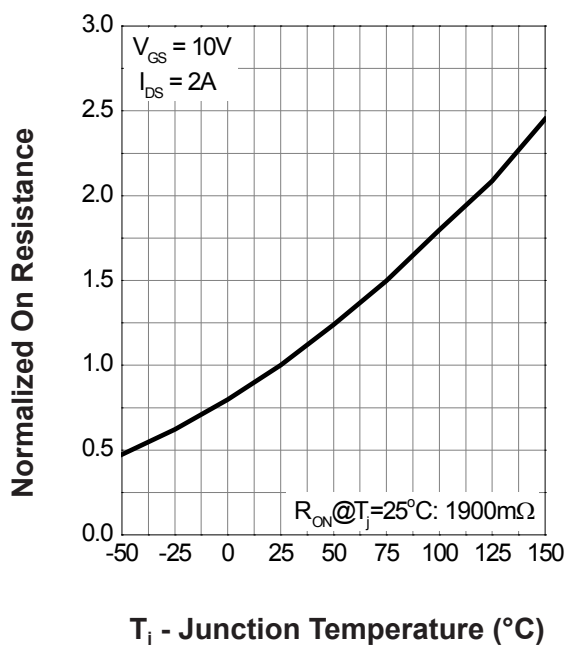
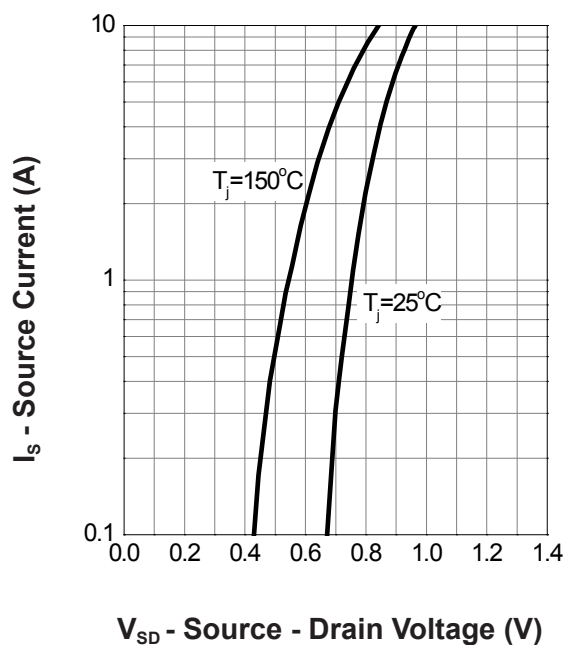
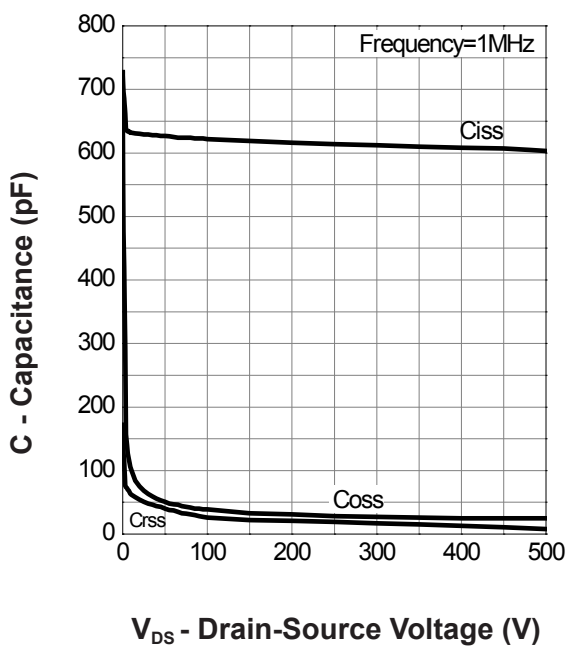
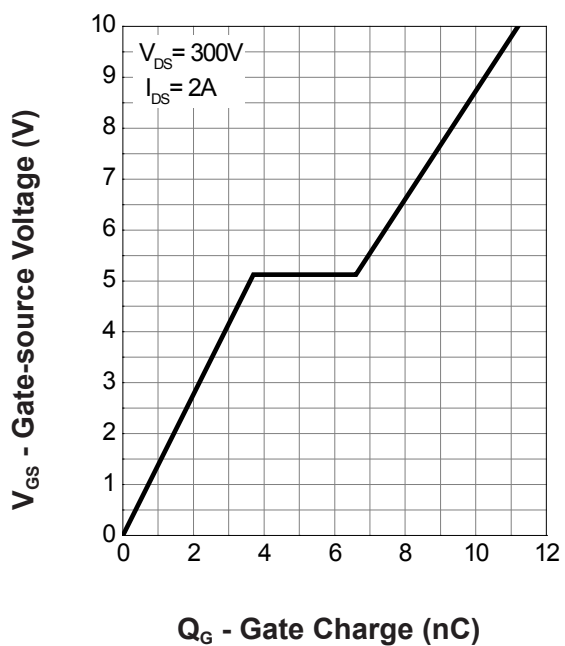
Gate-Source On Resistance

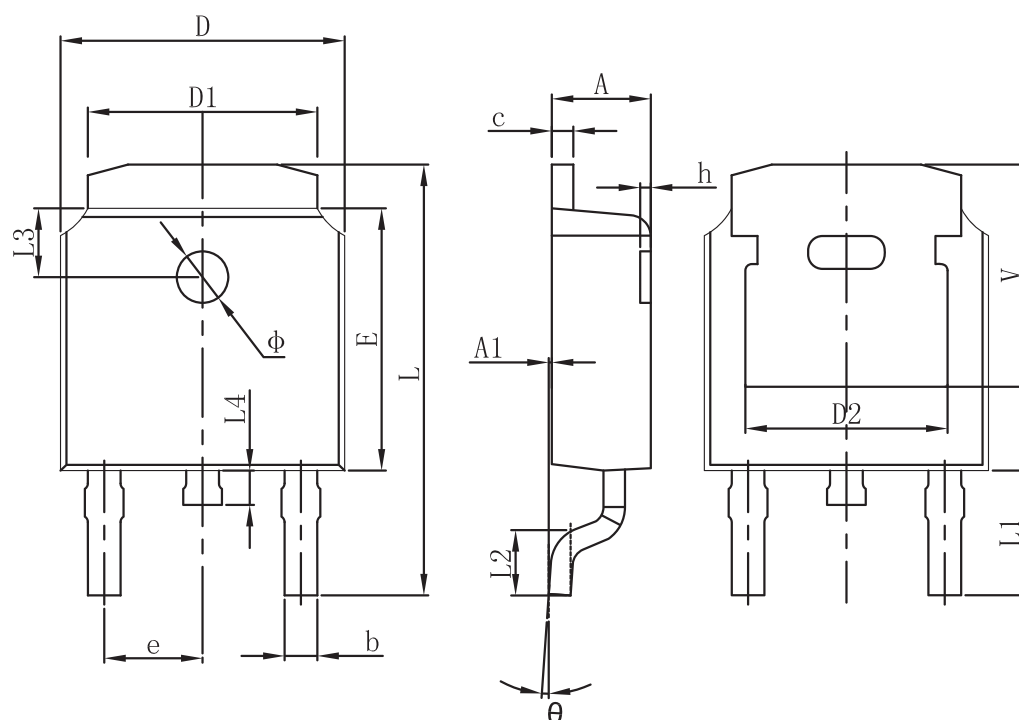


Gate Threshold Voltage



Typical Characteristics(Cont.)

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


Packaging information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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