

General Description

The WSF5N50A is silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy.

The transistor can be used in various power switching circuit for system miniaturization and higher efficiency.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

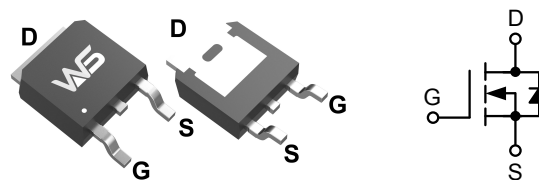
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
500V	2400mΩ	4.8A

Applications

- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)

TO-252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	± 30	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	4.8	A
I_{DM}	Pulsed Drain Current ²	14.4	A
EAS	Single Pulse Avalanche Energy	57	mJ
I_{AR}	Avalanche Current ²	2.4	A
EAR	Repetitive Avalanche Energy	6.4	mJ
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation	32.9	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	62.5	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	6.25	$^\circ\text{C/W}$

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 =1mA	---	0.25	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =3.5A	---	2400	3000	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		---	-4.64	---	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 =150°C	---	---	200	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±30V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =30V, I _D =2.5A	---	5.2	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	4.2	---	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =400V, V _{GS} =10V, I _D =2A	---	8	---	nC
Q _{gs}	Gate-Source Charge		---	1.2	---	
Q _{gd}	Gate-Drain Charge		---	5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =250V, R _G =25Ω, I _D =3A.	---	7.8	---	ns
T _r	Rise Time		---	33	---	
T _{d(off)}	Turn-Off Delay Time		---	23	---	
T _f	Fall Time		---	59	---	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	310	---	pF
C _{oss}	Output Capacitance		---	39	---	
C _{rss}	Reverse Transfer Capacitance		---	6	---	

Diode Characteristics

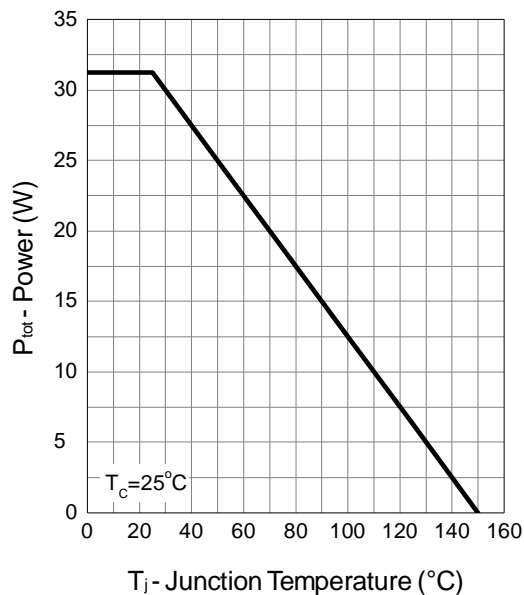
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	3.0	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	12	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =3A, T _J =25°C	---	---	1.4	V
t _{rr}	Reverse Recovery Time	I _S =3A, dI/dt=100A/μs, T _J =25°C	---	80	---	nS
Q _{rr}	Reverse Recovery Charge		---	1.8	---	uC

Note :

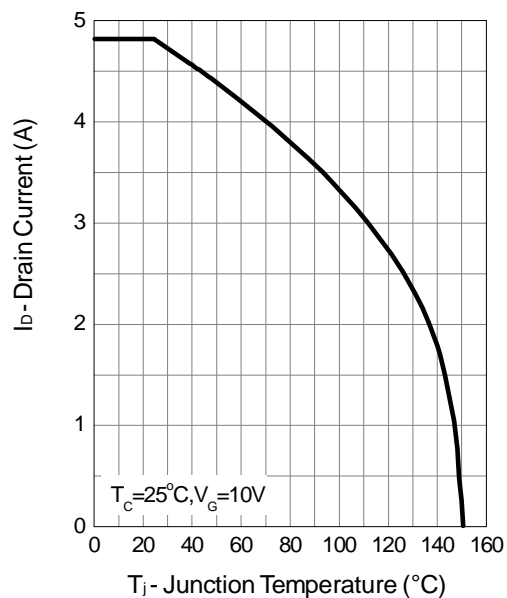
- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper,t<10sec.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The Min. value is 100% EAS tested guarantee.
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

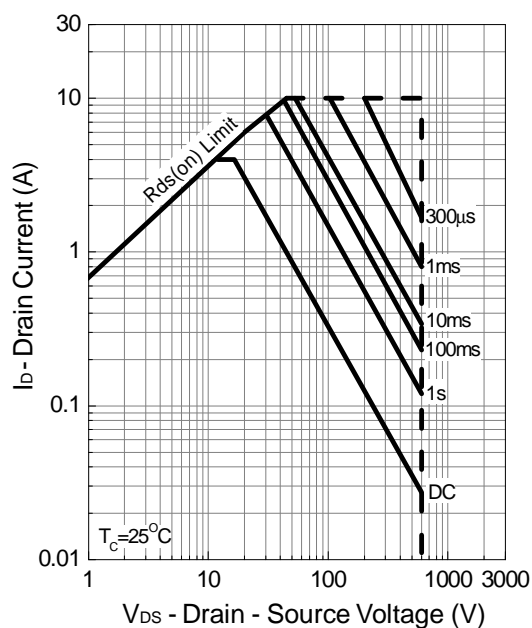
Power Dissipation



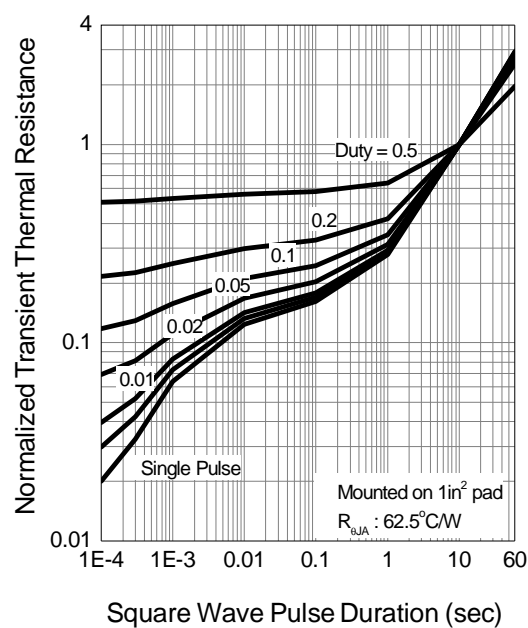
Drain Current



Safe Operation Area

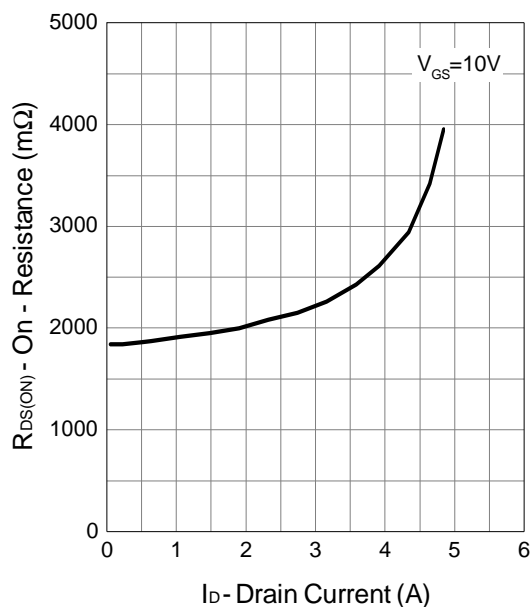


Thermal Transient Impedance

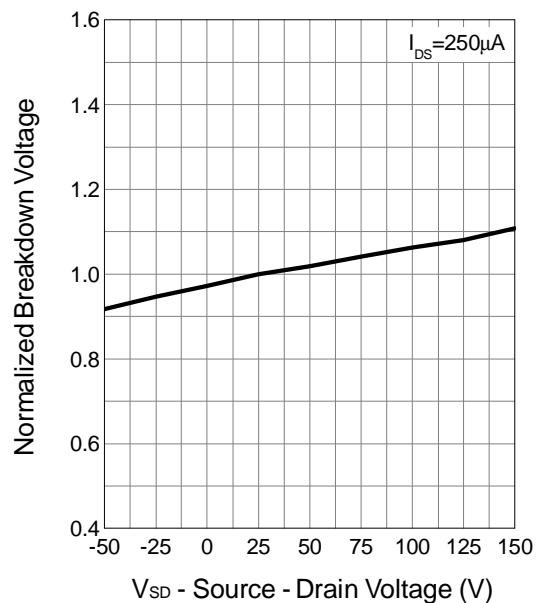


Typical Characteristics (Cont.)

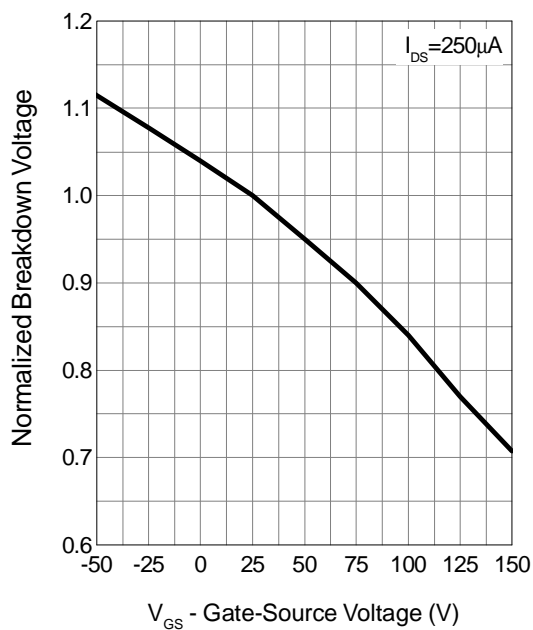
Drain-Source On Resistance



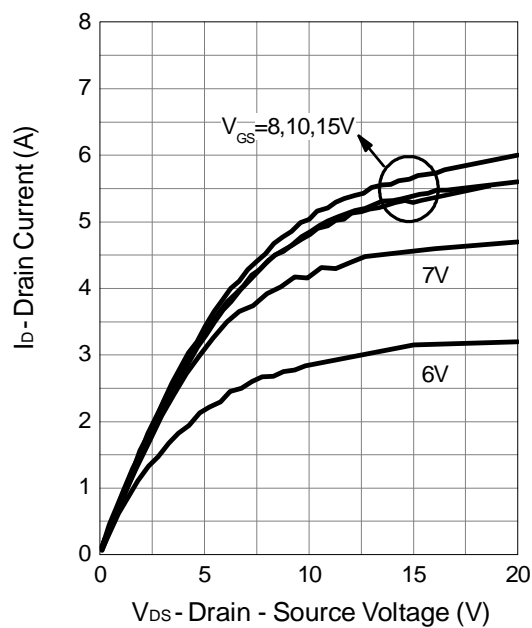
BVDSS vs Junction Temperature

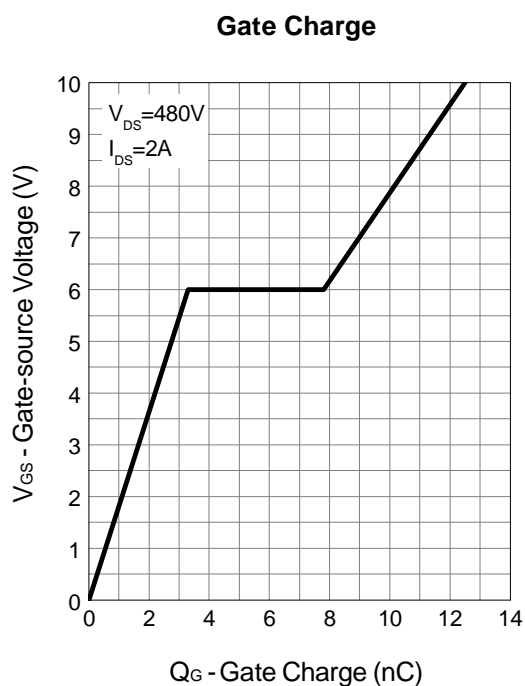
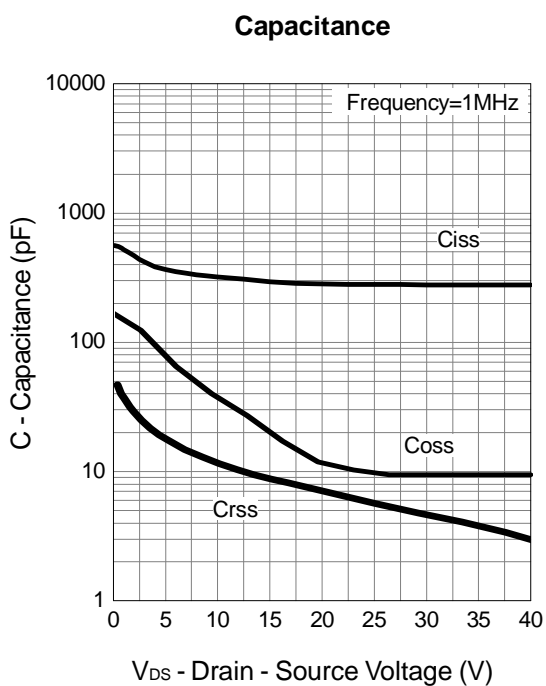
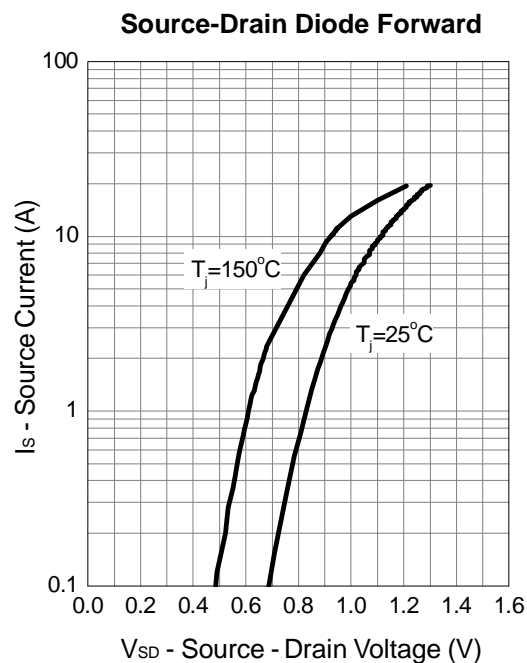
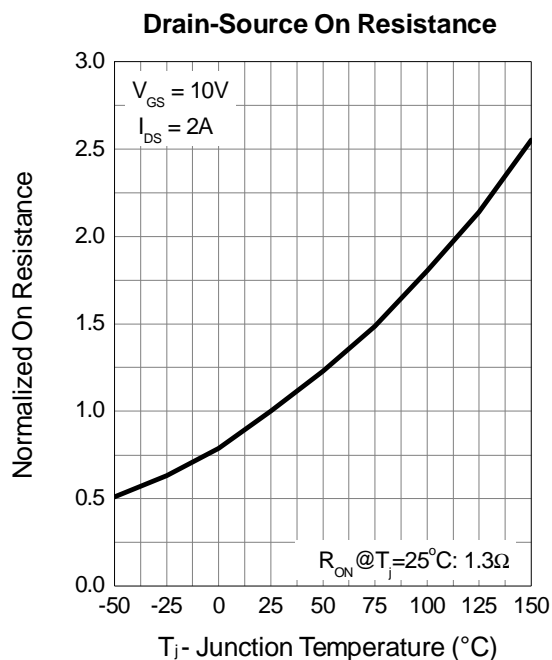


$V_{GS(th)}$ vs Junction Temperature

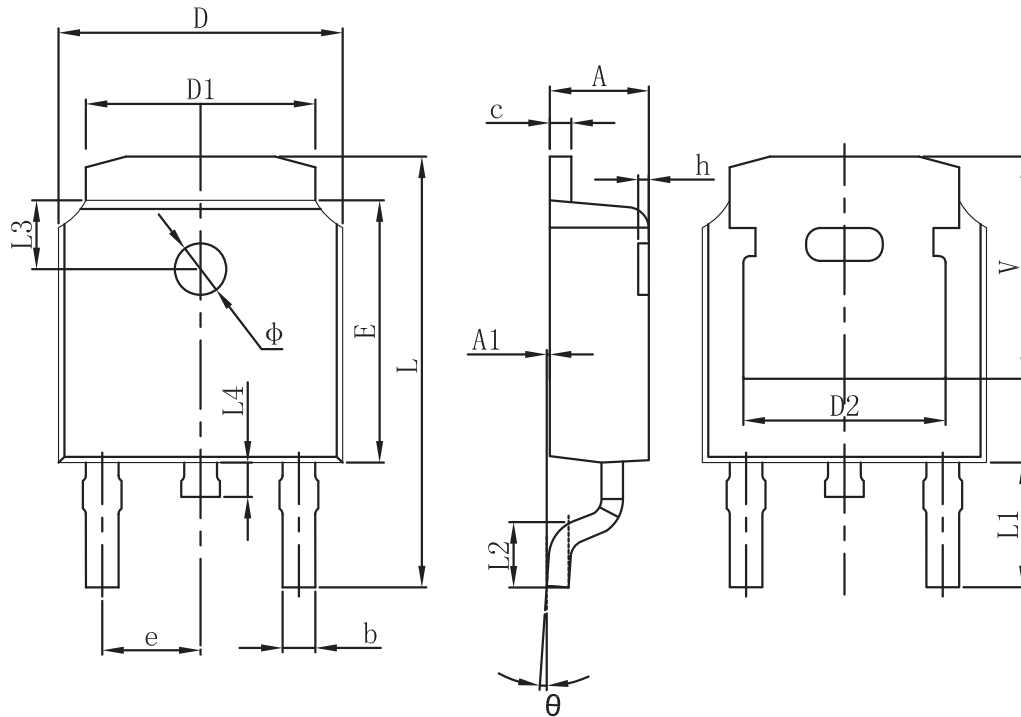


Output Characteristics



Typical Characteristics (Cont.)


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.	

Attention

- 1, Any and all Winsok power products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your Winsok power representative nearest you before using any Winsok power products described or contained herein in such applications.
- 2, Winsok power assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all Winsok power products described or contained herein.
- 3, Specifications of any and all Winsok power products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- 4, Winsok power Semiconductor CO., LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- 5, In the event that any or all Winsok power products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- 6, No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of Winsok power Semiconductor CO., LTD.
- 7, Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. Winsok power believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.
- 8, Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the Winsok power product that you intend to use.
- 9, this catalog provides information as of Sep. 2014. Specifications and information herein are subject to change without notice.