

## General Description

The WSF7N65 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 WSF7N65 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

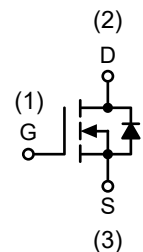
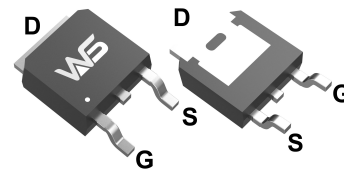
## Product Summary

$BV_{DSS}$	$R_{DS(on)}$	$I_D$
650V	1200mΩ	7A

## 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	650	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1.5}$	7	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1.5}$	2.8	A
$I_{DM}$	Pulsed Drain Current <sup>1,2,5</sup>	21	A
EAS	Single Pulse Avalanche Energy <sup>1</sup>	17.5	mJ
$P_D$	Total Power Dissipation <sup>1,5</sup>	69	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 <sup>1</sup>	---	62.5	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	1.8	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	650	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =250uA	---	0.6	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =2A	---	1200	1450	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2.5	3.5	4.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4.57	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =520V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =520V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C	---	---	200	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =40V, I <sub>D</sub> =3.5A	---	5	---	S
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =520V, V <sub>GS</sub> =10V, I <sub>D</sub> =2A	---	12.8	16.6	nC
Q <sub>gs</sub>	Gate-Source Charge		---	3	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	5.1	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =400V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =4A.	---	10	---	ns
T <sub>r</sub>	Rise Time		---	22.5	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	13	---	
T <sub>f</sub>	Fall Time		---	15	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	225	290	pF
C <sub>oss</sub>	Output Capacitance		---	200	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	1.5	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,2,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	7	A
I <sub>SM</sub>	Pulsed Source Current <sup>1,2</sup>		---	---	16	A
V <sub>SD</sub>	Diode Forward Voltage <sup>1</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =4A, T <sub>J</sub> =25°C	---	0.95	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =7A, dI/dt=40A/μs, T <sub>J</sub> =25°C	---	454	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	2076	---	nC

**Notes:**

Note 1 : limited by maximum junction temperature.

Note 2 : Bond wire current limit.

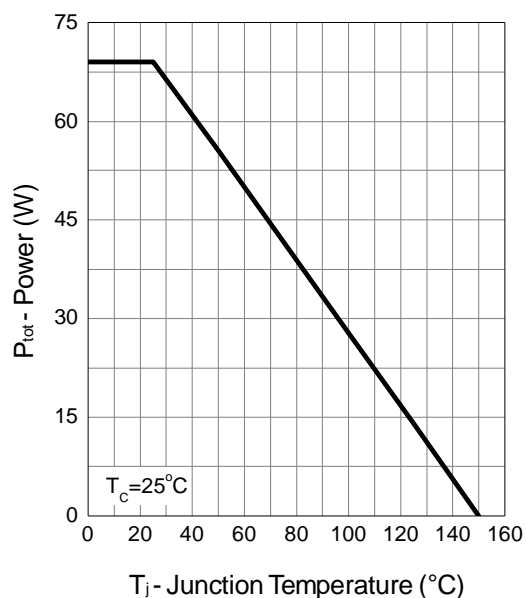
Note 3 : V<sub>DS</sub>=520V, I<sub>D</sub>=4A.

Note 4 : I<sub>D</sub>=0.5A, V<sub>DD</sub>=50V, T<sub>J</sub>=25°C.

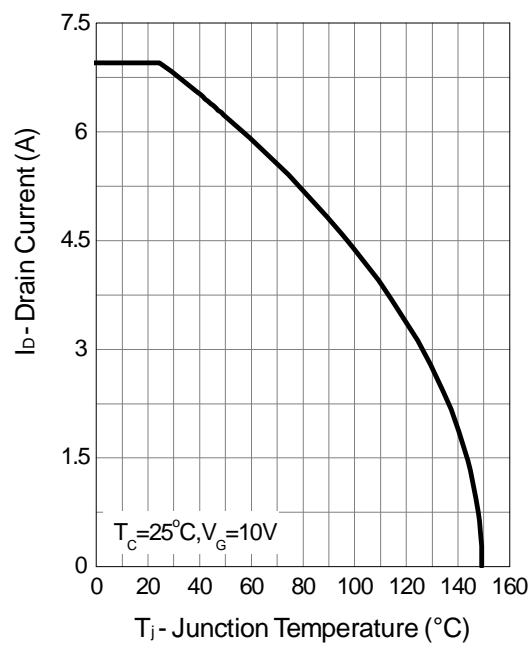
Note 5 : Repetitive Rating : Pulse width limited by maximum junction temperature.

## Typical Characteristics

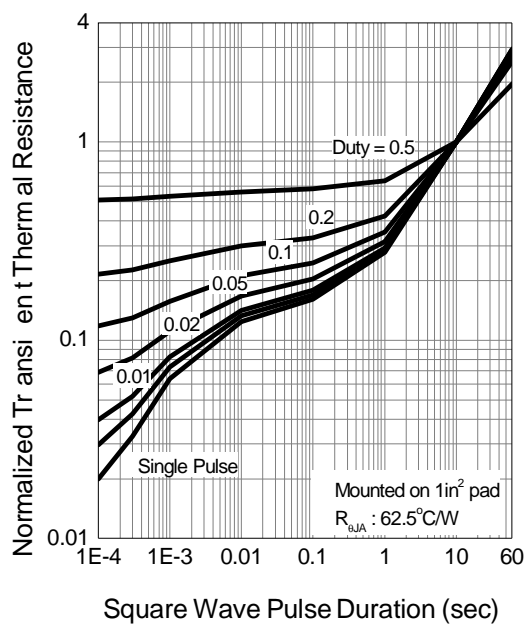
**Power Dissipation**



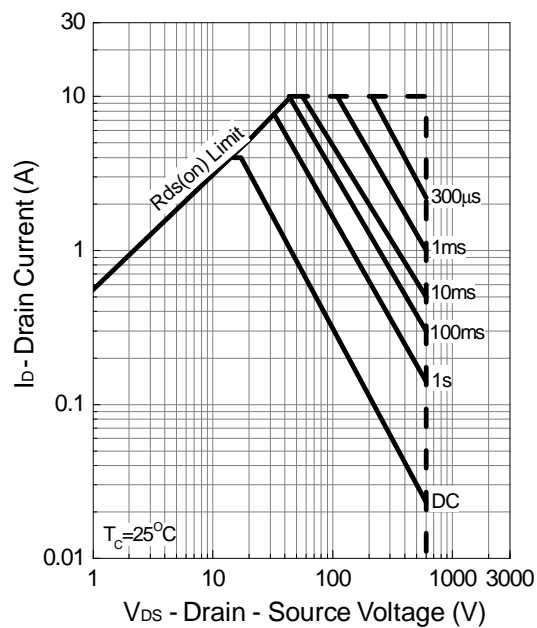
**Drain Current**



**Thermal Transient Impedance**

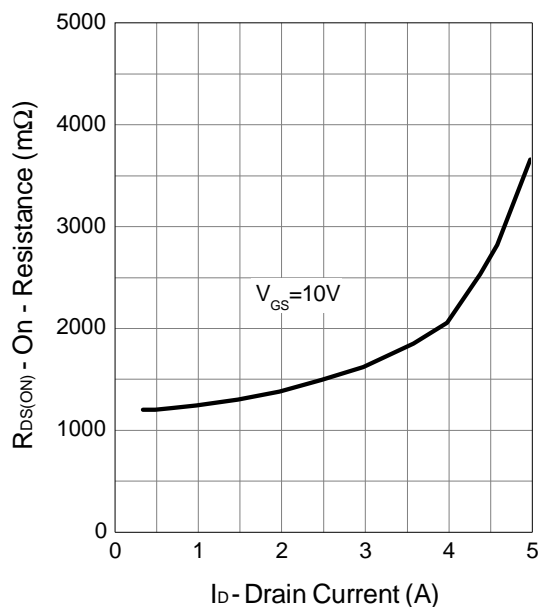


**Safe Operation Area**

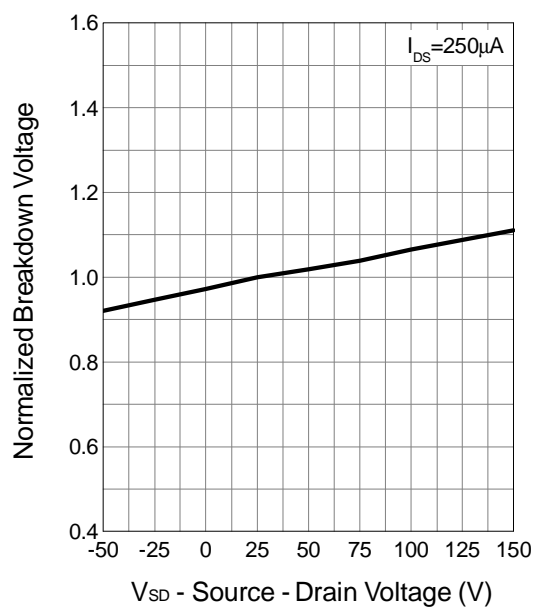


**Typical Characteristics (Cont.)**

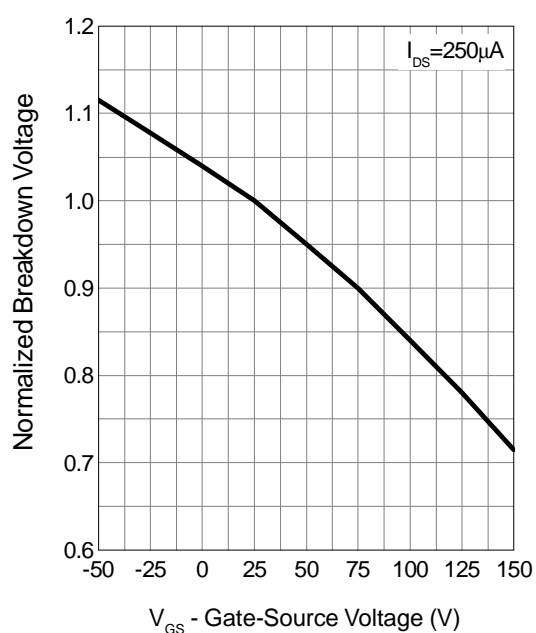
**Drain-Source On Resistance**



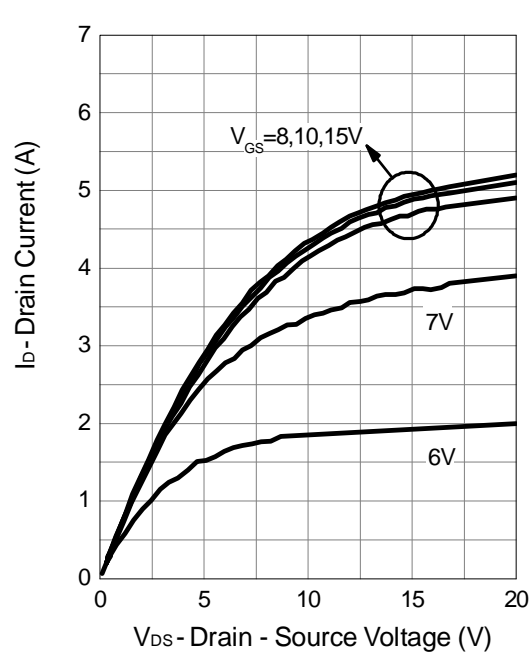
**BVDSS vs Junction Temperature**

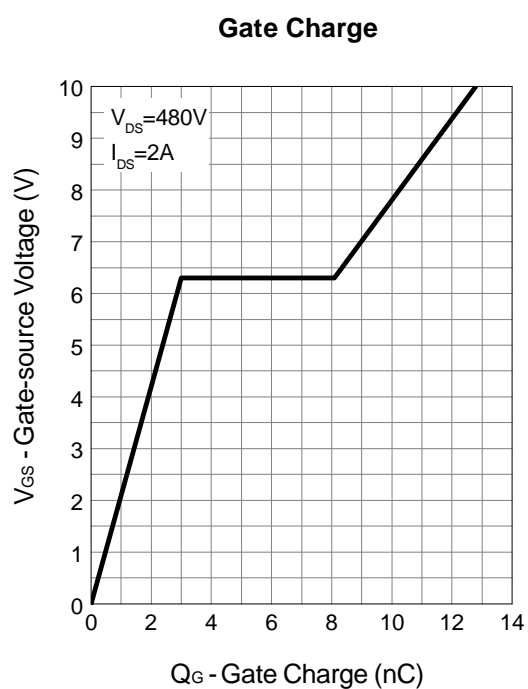
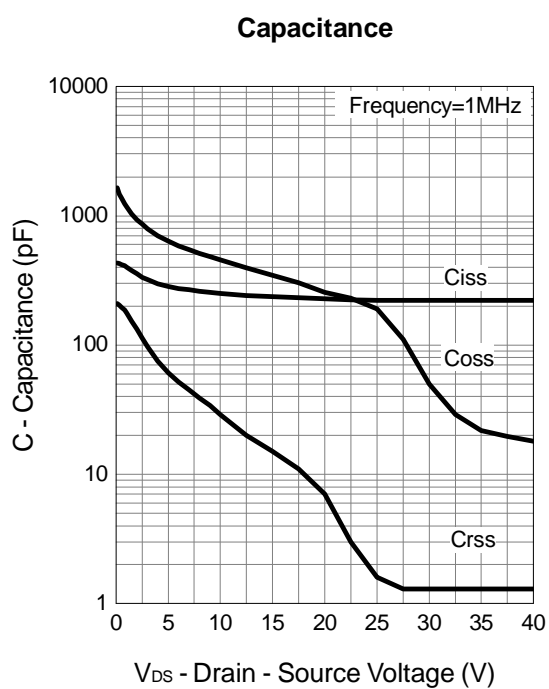
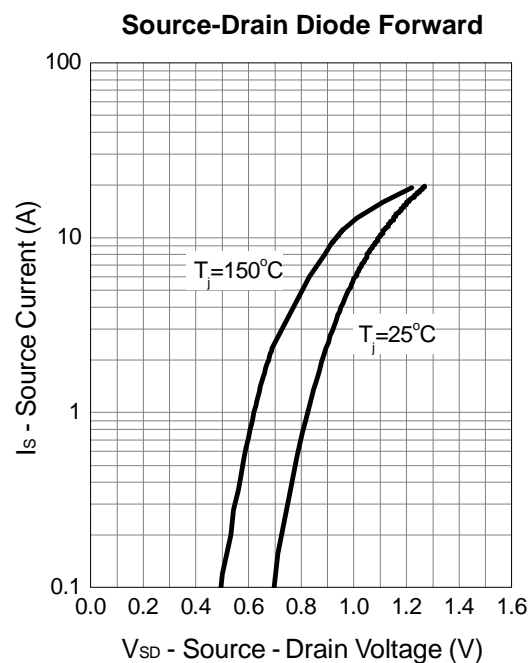
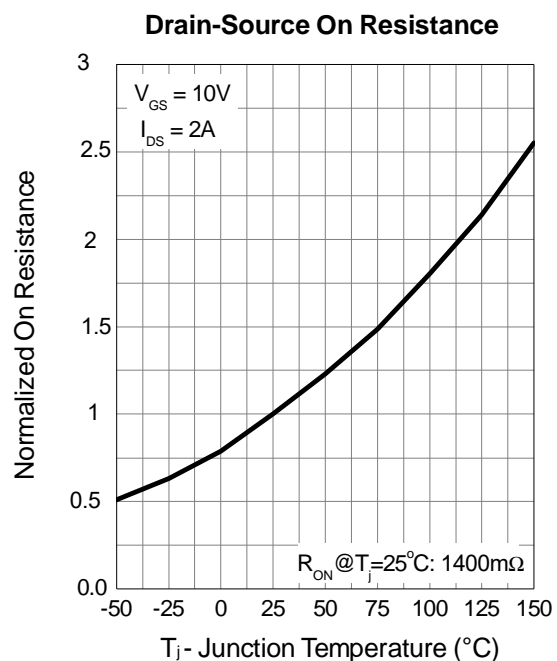


**$V_{GS(th)}$  vs Junction Temperature**

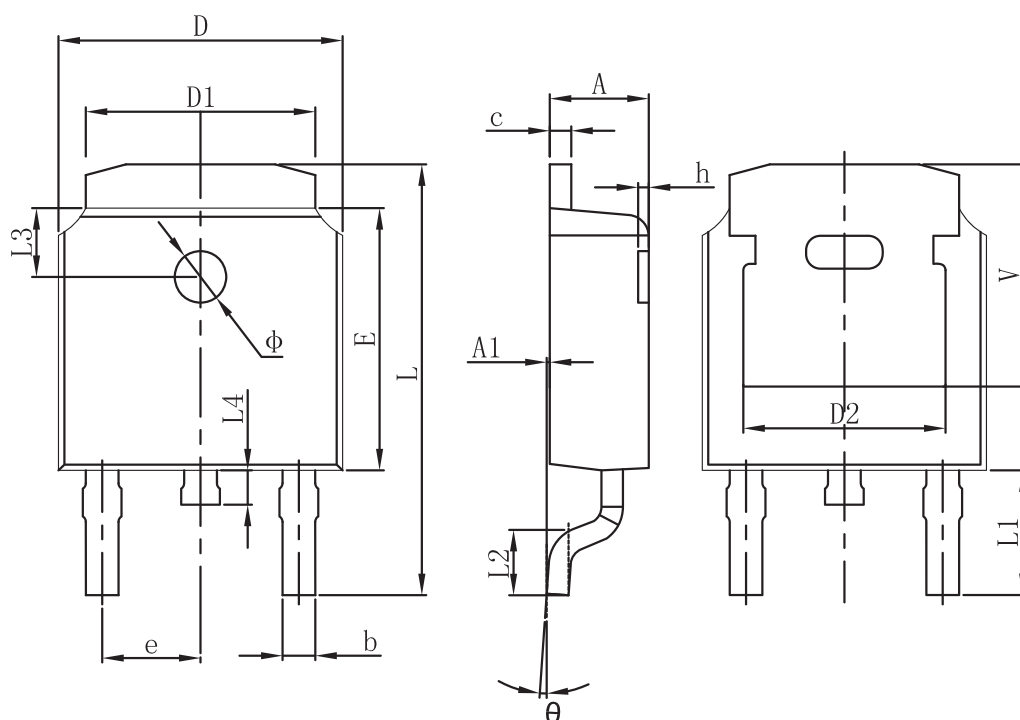


**Output Characteristics**



**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.	

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