General Description

The WSR7N65F is the highest performance trench N-Ch MOSFET with extreme high cell density,which provide excellent R_{DSON} and gate charge for most of the synchronous buck converter applications .

The WSR7N65F 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

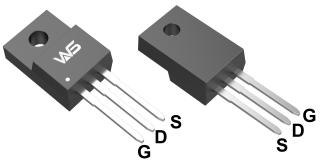
Product Summery

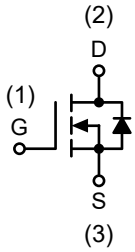
BV_{DSS}	R_{DSON}	I_D
650V	1000mΩ	7A

Applications

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

TO-220F-3L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1.5]	7	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1.5]	4	A
I_{DM}	Pulsed Drain Current[1.2.5]	28	A
EAS	Single Pulse Avalanche Energy[1]	171	mJ
P_D	Total Power Dissipation[1,5]	48	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	2.7	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	650	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=250uA	---	0.6	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=3.5A	---	1000	1300	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.0	3.0	4.0	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.57	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=650V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=520V , V_{GS}=0V , T_J=55℃	---	---	10	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=40V , I_D=3.5A	---	6	---	S
Q_g	Total Gate Charge (10V)	V_{DS}=520V , V_{GS}=10V , I_D=7A	---	16	---	nC
Q_{gs}	Gate-Source Charge		---	4	---	
Q_{gd}	Gate-Drain Charge		---	3.6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=300V , V_{GS}=10V , R_G=25Ω, I_D=10A.	---	17	---	ns
T_r	Rise Time		---	26	---	
$T_{d(off)}$	Turn-Off Delay Time		---	23	---	
T_f	Fall Time		---	57	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	930	---	pF
C_{oss}	Output Capacitance		---	100	---	
C_{rss}	Reverse Transfer Capacitance		---	4.5	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,2,5]	V_G=V_D=0V , Force Current	---	---	7	A
I_{SM}	Pulsed Source Current[1,2]		---	---	28	A
V_{SD}	Diode Forward Voltage[1]	V_{GS}=0V , I_S=7A , T_J=25℃	---	---	1.4	V
t_{rr}	Reverse Recovery Time	I_F=7A , dI/dt=40A/μs , T_J=25℃	---	487	---	nS
Q_{rr}	Reverse Recovery Charge		---	2289	---	nC

Notes:

Note 1：limited by maximum junction temperature.
Note 2：Bond wire current limit.
Note 3：V_{DS}=520V, I_D=7A.
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

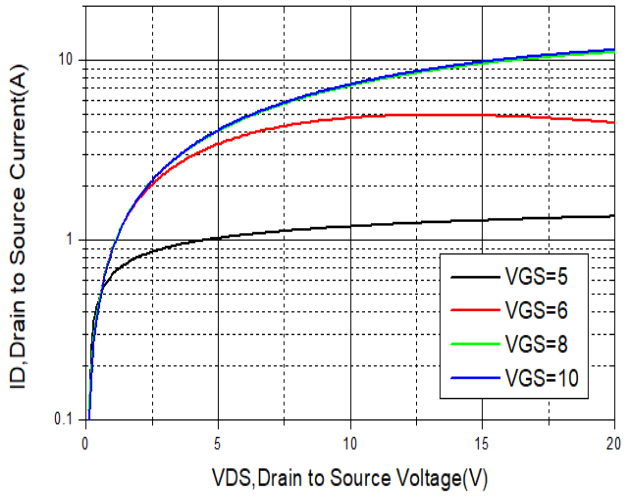


Figure 1 Output Characteristics

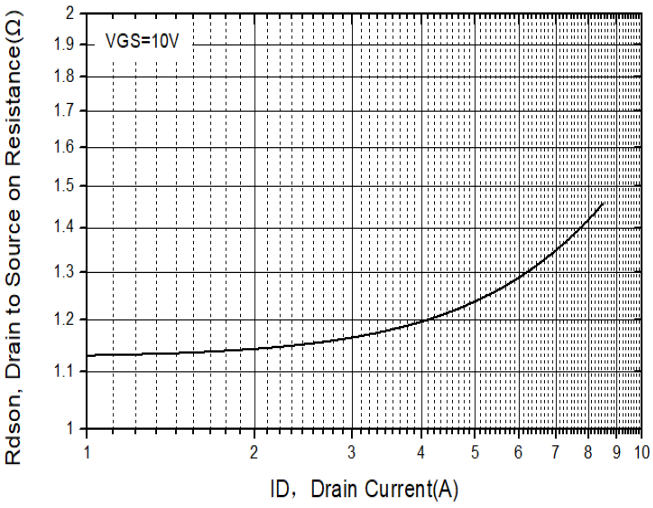


Figure 3 Rdson-ID Characteristics

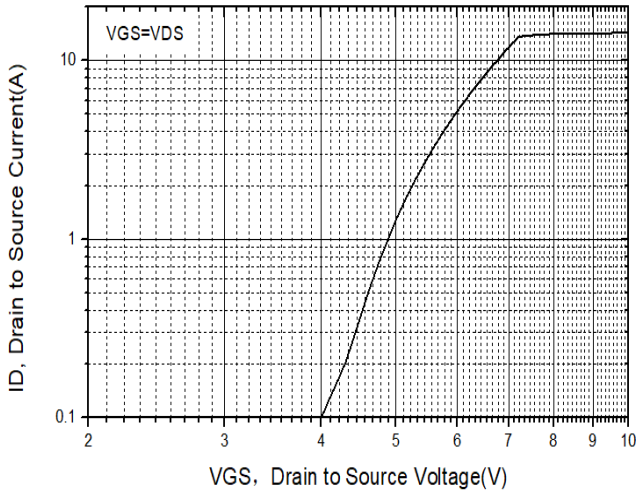


Figure 2 Transfer Characteristics

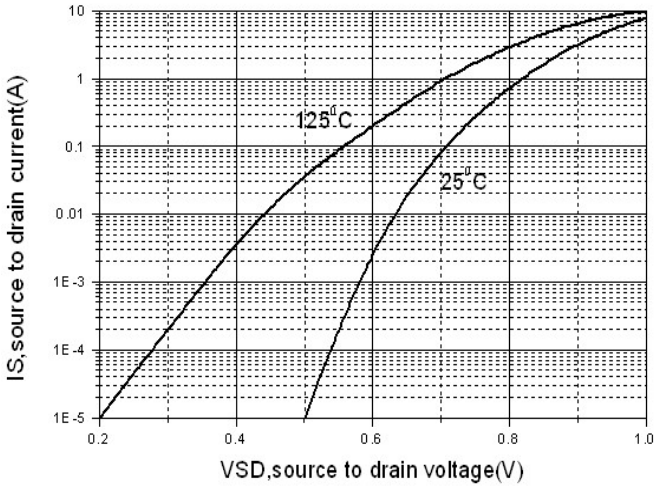


Figure 4 Body diode Characteristics

Typical Characteristics

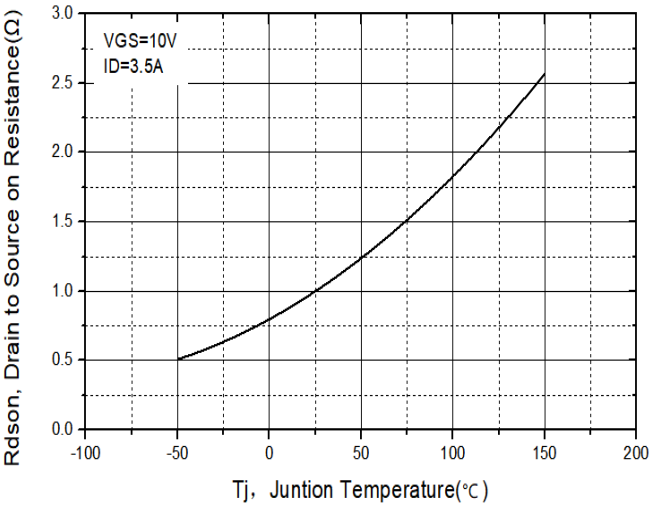


Figure 5 Rdson- Tj Relation

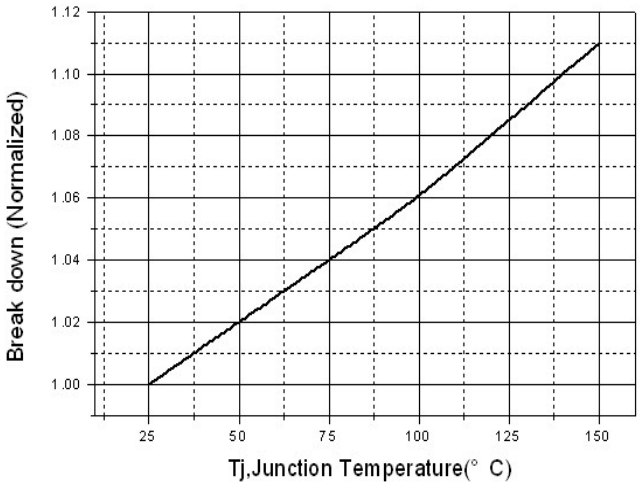


Figure 6 BVDSS vs Junction Temperature

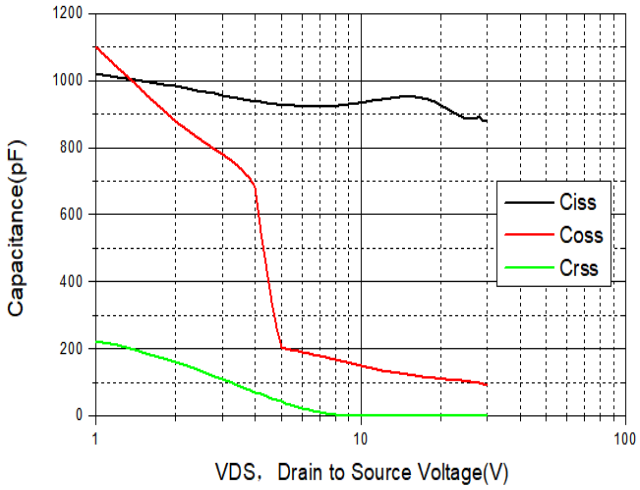


Figure 7 Capacitance vs Vds

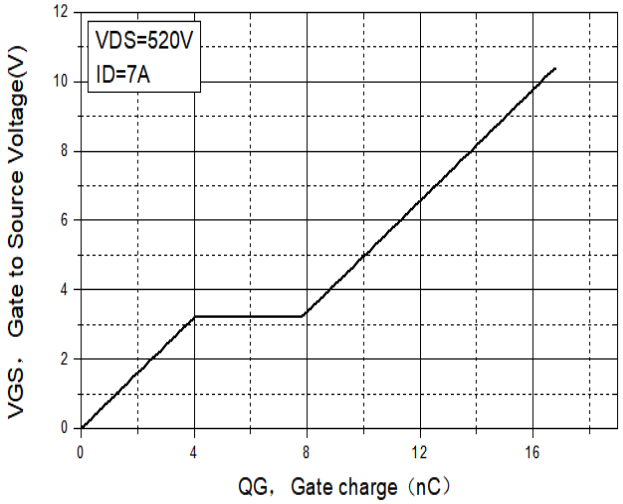


Figure 8 VGS vs QG Characteristics

Typical Characteristics

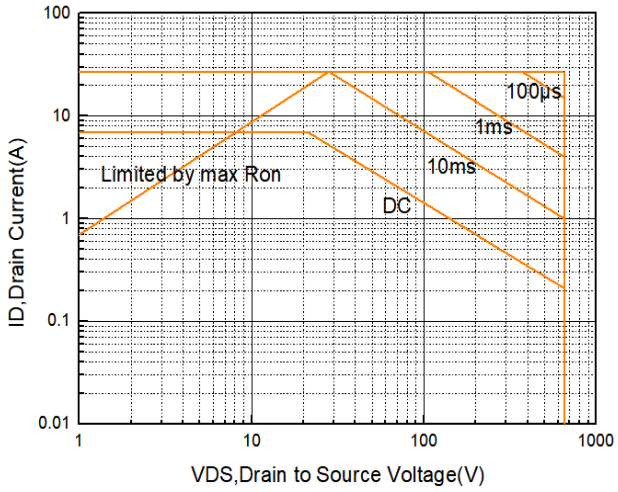


Figure 9 Safe Operation Area

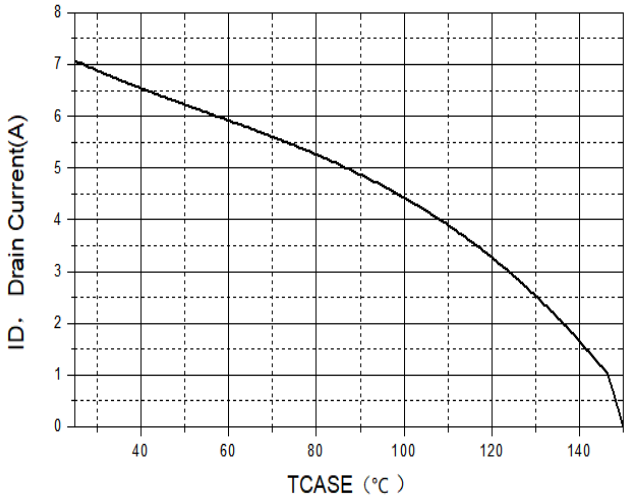


Figure 10 Maximum current attenuation

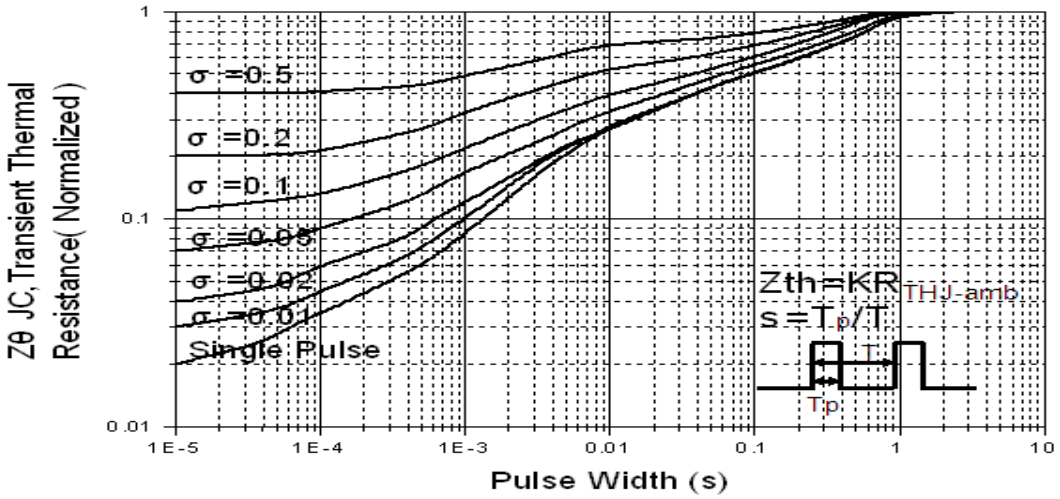
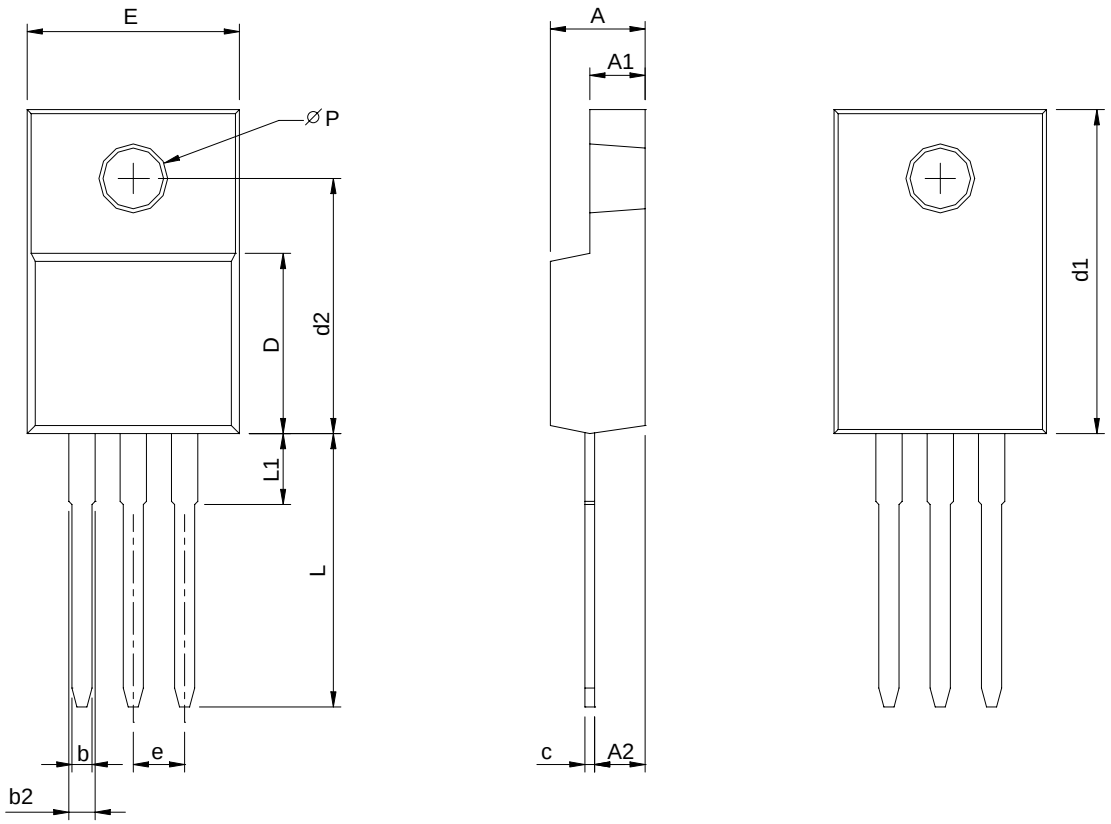


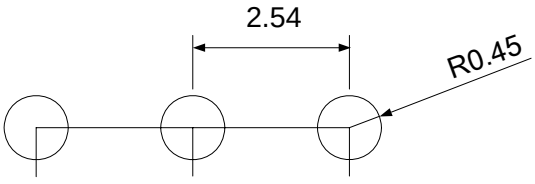
Figure 11 Normalized Maximum Transient Thermal Impedance

Packaging information



SYMBOL	TO-220F-3L			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.20	4.80	0.165	0.189
A1	2.34	3.20	0.092	0.126
A2	2.10	2.90	0.083	0.114
b	0.50	0.90	0.020	0.035
b2	0.91	1.90	0.035	0.075
c	0.30	0.80	0.012	0.031
D	8.10	9.40	0.319	0.370
d1	14.50	16.50	0.571	0.650
d2	12.10	12.90	0.476	0.508
E	9.70	10.70	0.382	0.421
e	2.54 BSC		0.100 BSC	
L	13.00	14.50	0.512	0.570
L1	1.60	4.00	0.063	0.157
P	3.00	3.60	0.118	0.142

RECOMMENDED LAND PATTERN



UNIT: mm

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.

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.