

## General Description

The WSR30N65C series of devices use advanced trench gate super junction technology and design to provide excellent RDS(ON) with low gate charge. This super junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC/DC power conversion, and industrial power applications.

The WSR30N65C 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

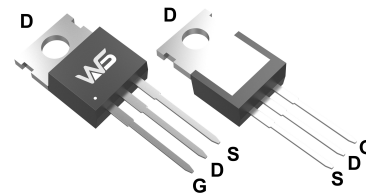
## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
650V	110mΩ	28A

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch

## TO-220F Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	650	V
$V_{GS}$	Gate-Source Voltage	±30	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	28	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	18	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	112	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	676	mJ
$P_D$	Total Power Dissipation <sup>3</sup>	260	W
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	62.5	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	0.48	°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> =250μA	650	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.098	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =14A	---	110	140	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	2.0	3.0	4.0	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> =650V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	μA
		V <sub>DS</sub> =650V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	100	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±200V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =9A	---	32	---	S
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =18A	---	38	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	13	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	11.5	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =18A, R <sub>L</sub> =30Ω	---	14	---	ns
T <sub>r</sub>	Rise Time		---	12	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	65	---	
T <sub>f</sub>	Fall Time		---	11	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	---	2070	---	pF
C <sub>oss</sub>	Output Capacitance		---	120	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	0.5	---	

**Diode Characteristics**

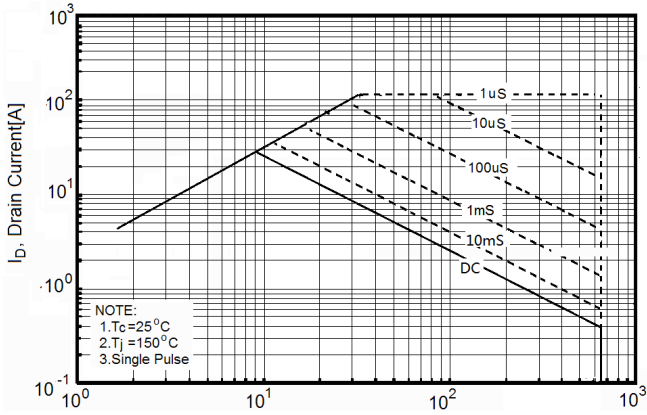
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	28	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,6</sup>		---	---	112	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =28A, T <sub>J</sub> =25°C	---	---	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =14A, dI/dt=100A/μs, T <sub>J</sub> =25°C	---	190	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	2000	---	nC

**Notes:**

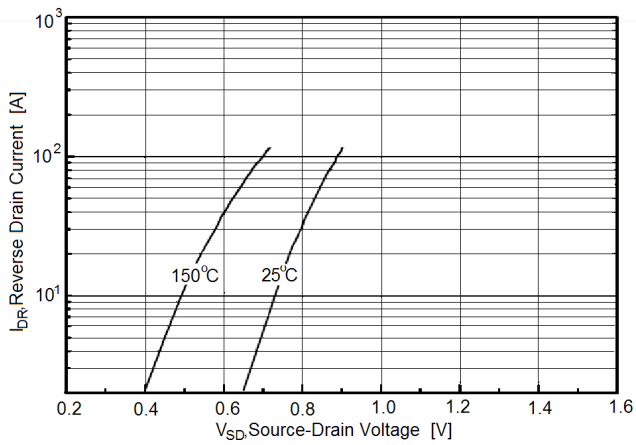
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω

**Typical Characteristics**

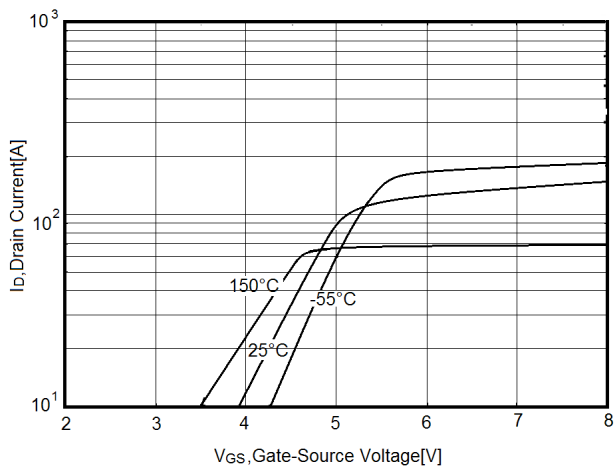
**Figure1. Safe operating area**



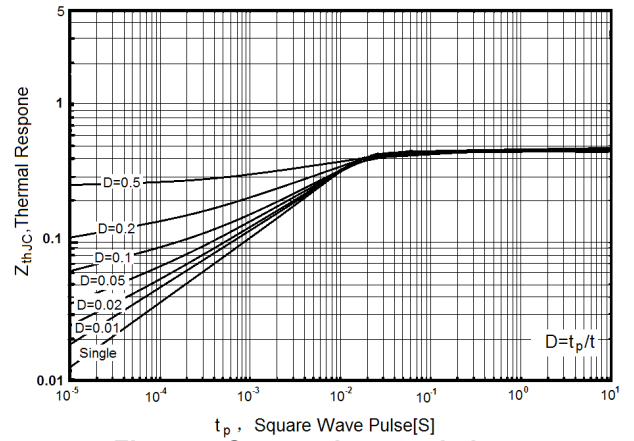
**Figure3. Source-Drain Diode Forward Voltage**



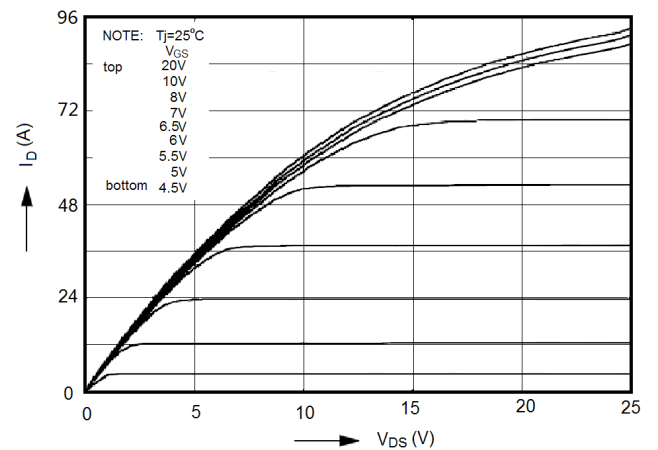
**Figure5. Transfer characteristics**



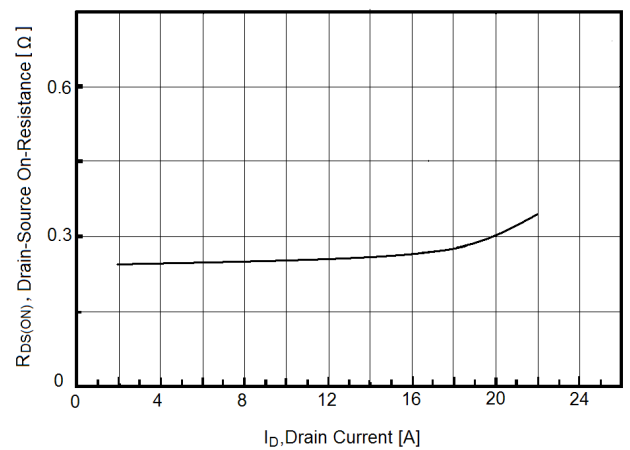
**Figure2. Transient Thermal Impedance**



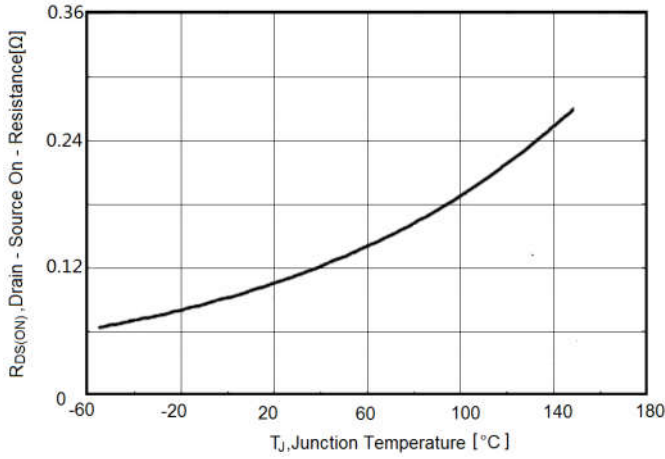
**Figure4. Output characteristics**



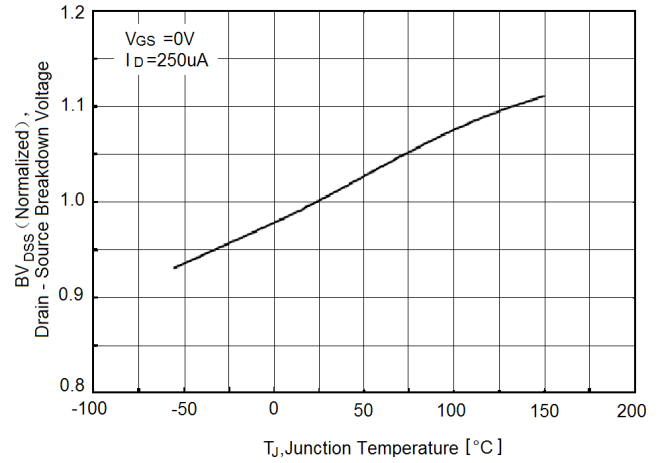
**Figure6. Static drain-source on resistance**



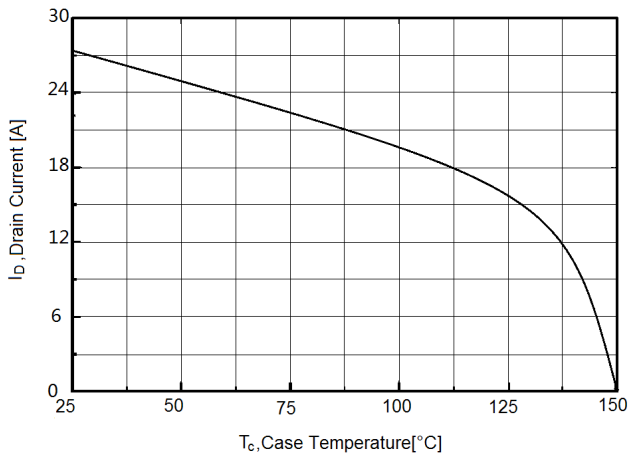
**Figure7.  $R_{DS(ON)}$  vs Junction Temperature**



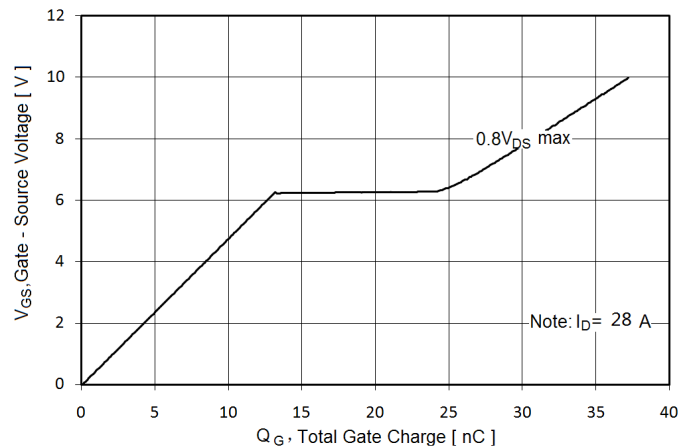
**Figure8.  $BV_{DSS}$  vs Junction Temperature**



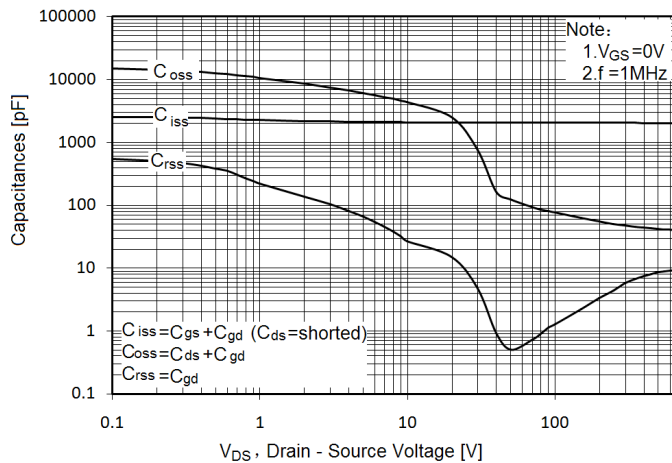
**Figure9. Maximum  $I_D$  vs Junction Temperature**



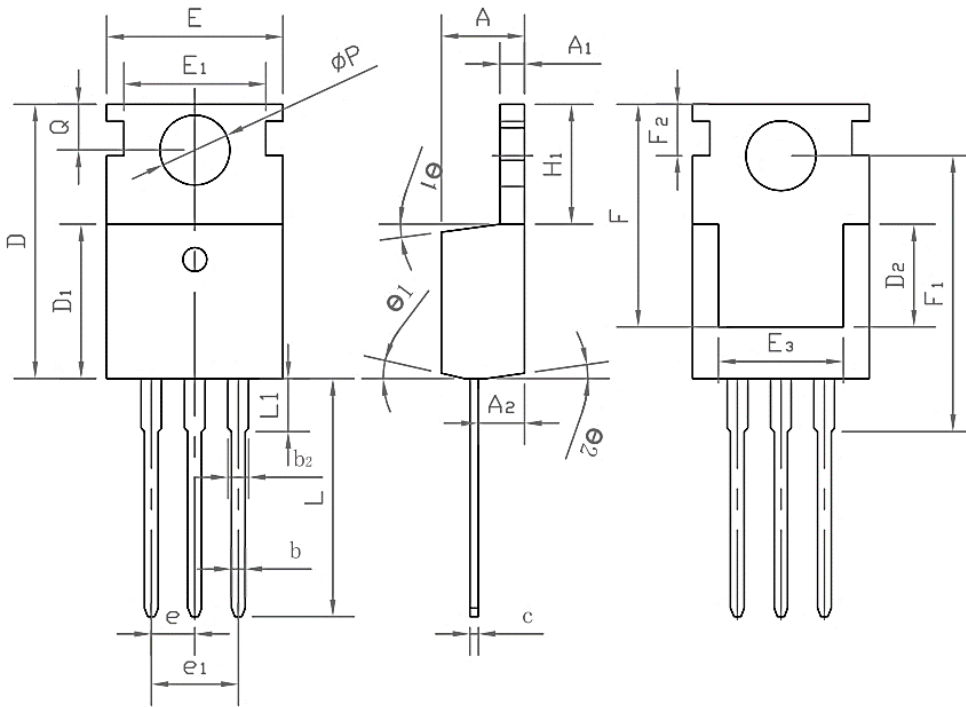
**Figure10. Gate charge waveforms**



**Figure11. Capacitance**

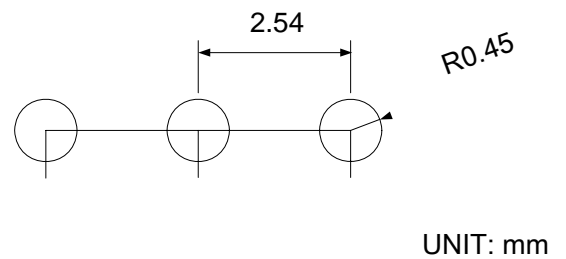


**TO-220 Package Information**



TO-220	TO-220			
	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**





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