

General Description

The WSC4N65 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 WSC4N65 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

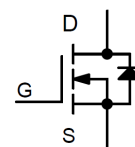
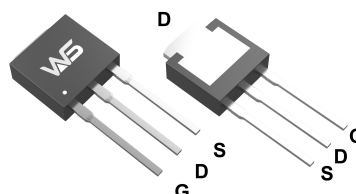
Product Summary

BV _{DSS}	R _{DS(on)}	I _D
650V	2600mΩ	4A

Applications

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

TO-251 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°C	Continuous Drain Current, V _{GS} @ 10V ^{1.5}	4	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ^{1.5}	2.5	A
I _{DM}	Pulsed Drain Current ^{1,2,5}	16	A
EAS	Single Pulse Avalanche Energy ¹	128	mJ
P _D	Total Power Dissipation ^{1,5}	77	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 _{θJA}	Thermal Resistance Junction-ambient ¹	---	62.5	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	1.62	°C/W

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	650	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=250\mu A$	---	0.6	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=3.5A$	---	2600	3000	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2.0	3.0	4.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.57	---	mV/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=650V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=520V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=40V$, $I_D=3.5A$	---	5	---	S
Q_g	Total Gate Charge (10V)	$V_{DS}=520V$, $V_{GS}=10V$, $I_D=7A$	---	10.2	---	nC
Q_{gs}	Gate-Source Charge		---	2.3	---	
Q_{gd}	Gate-Drain Charge		---	2.1	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=300V$, $V_{GS}=10V$, $R_G=25\Omega$, $I_D=10A$.	---	15.5	---	ns
T_r	Rise Time		---	13	---	
$T_{d(off)}$	Turn-Off Delay Time		---	40	---	
T_f	Fall Time		---	16	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	550	---	pF
C_{oss}	Output Capacitance		---	46	---	
C_{rss}	Reverse Transfer Capacitance		---	2.3	---	

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	$V_{GS}=0V$, $I_S=7A$, $T_J=25^\circ\text{C}$	---	---	1.4	V
t_{rr}	Reverse Recovery Time	$I_F=7A$, $dI/dt=40A/\mu s$, $T_J=25^\circ\text{C}$	---	454	---	nS
Q_{rr}	Reverse Recovery Charge		---	2076	---	nC

Notes:

Note 1 : limited by maximum junction temperature.

Note 2 : Bond wire current limit.

Note 3 : $V_{DS}=520V$, $I_D=4A$.

Note 4 : $I_D=0.5A$, $V_{DD}=50V$, $T_J=25^\circ\text{C}$.

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

Typical Characteristics

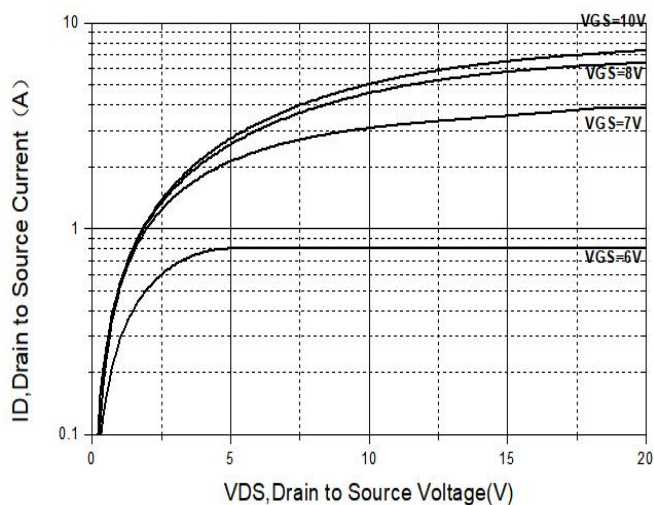


Figure 1 Output Characteristics

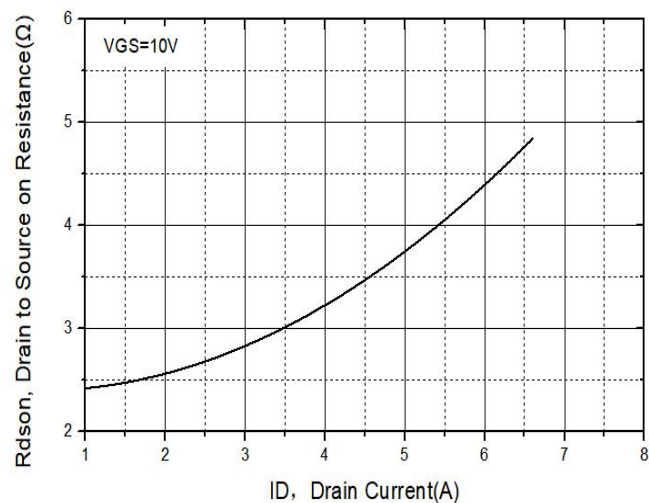


Figure 3 $R_{DS(on)}$ - I_D Characteristics

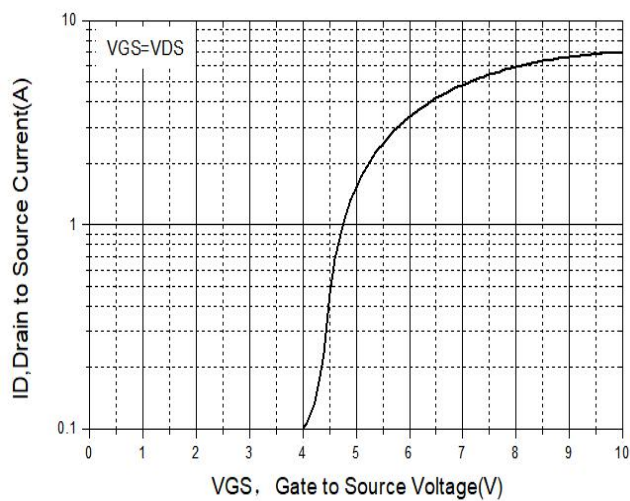


Figure 2 Transfer Characteristics

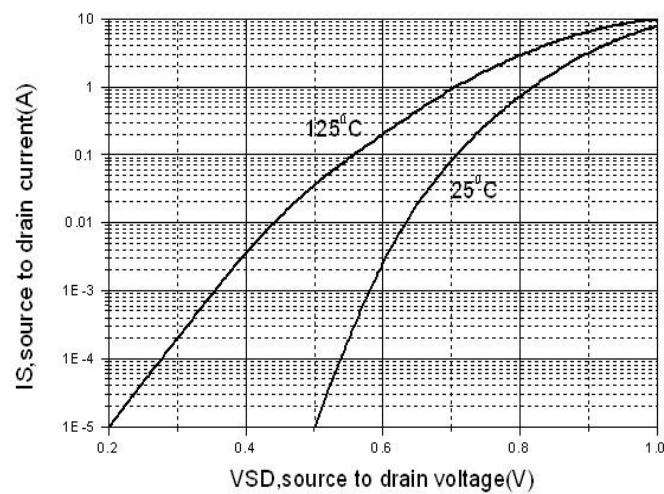


Figure 4 Body diode Characteristics

Typical Characteristics

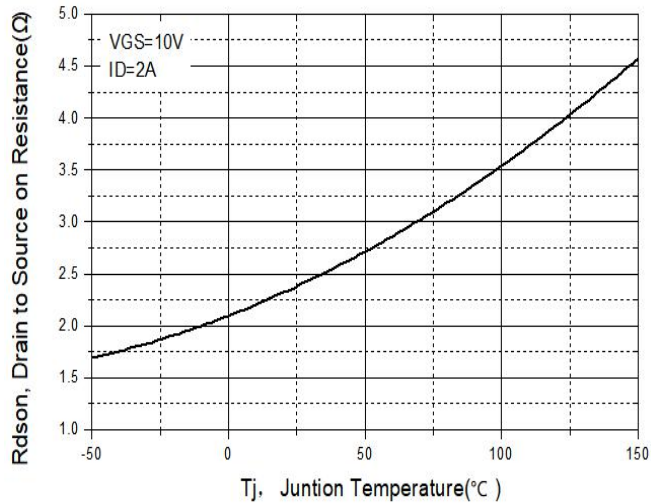


Figure 5 Rdson- Tj Relation

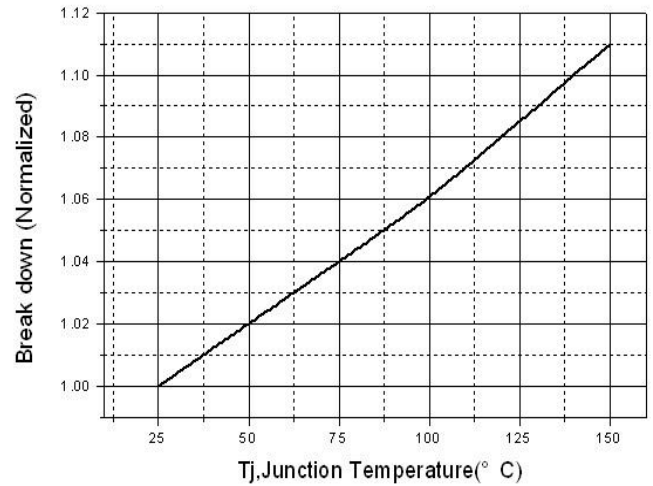


Figure 6 BVDSS vs Junction Temperature

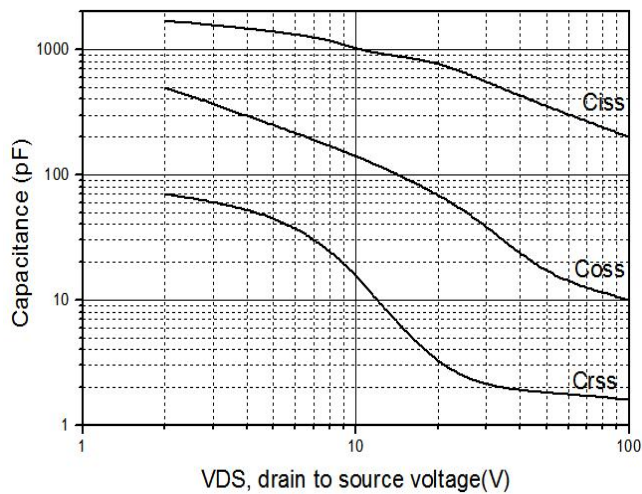


Figure 7 Capacitance vs Vds

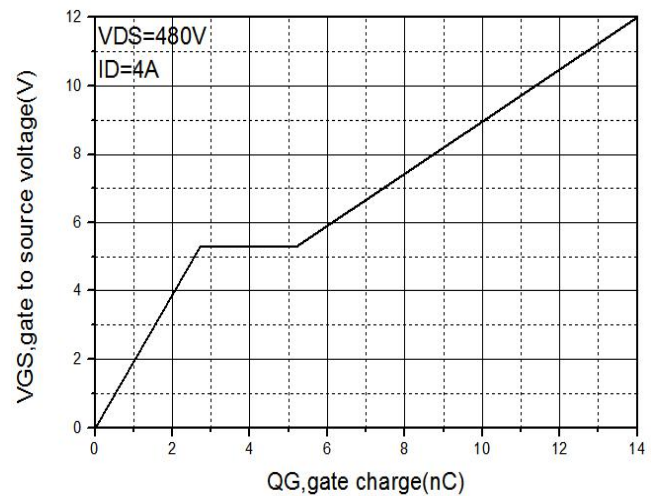


Figure 8 VGS vs QG Characteristics

Typical Characteristics

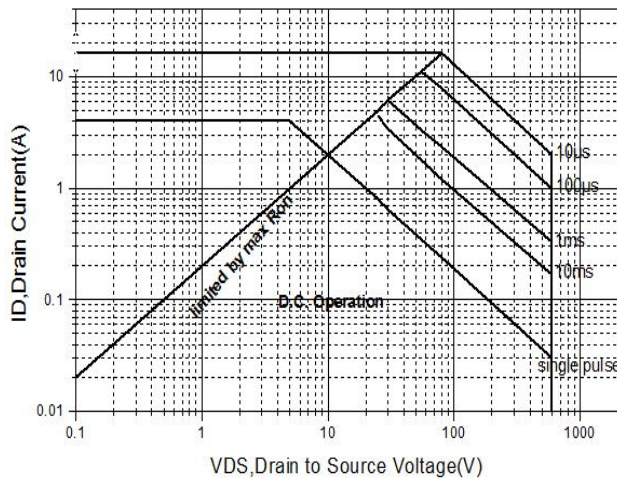


Figure 9 Safe Operation Area

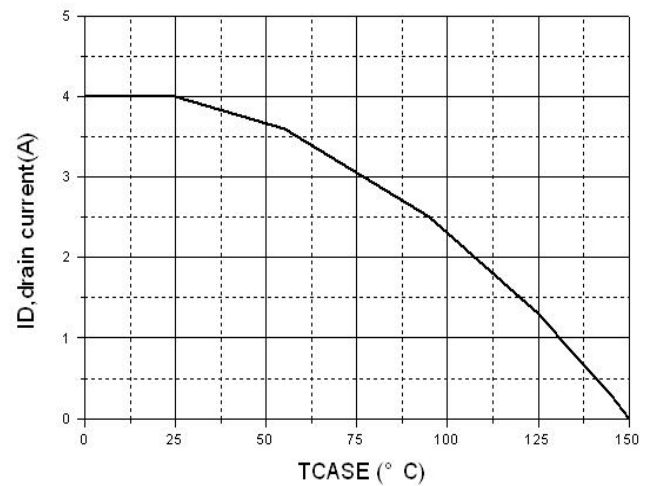


Figure 10 Maximum current attenuation

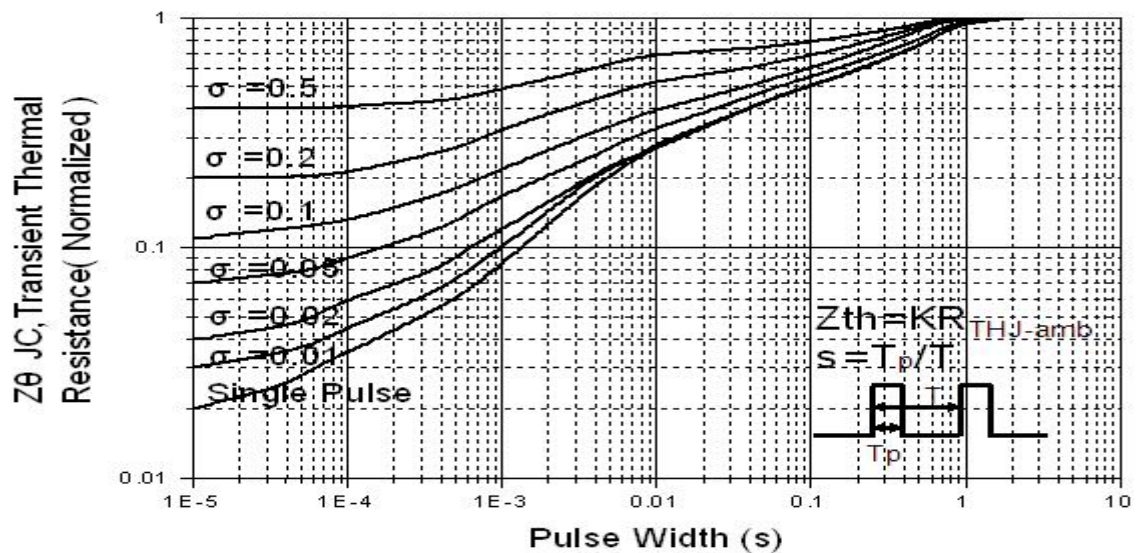
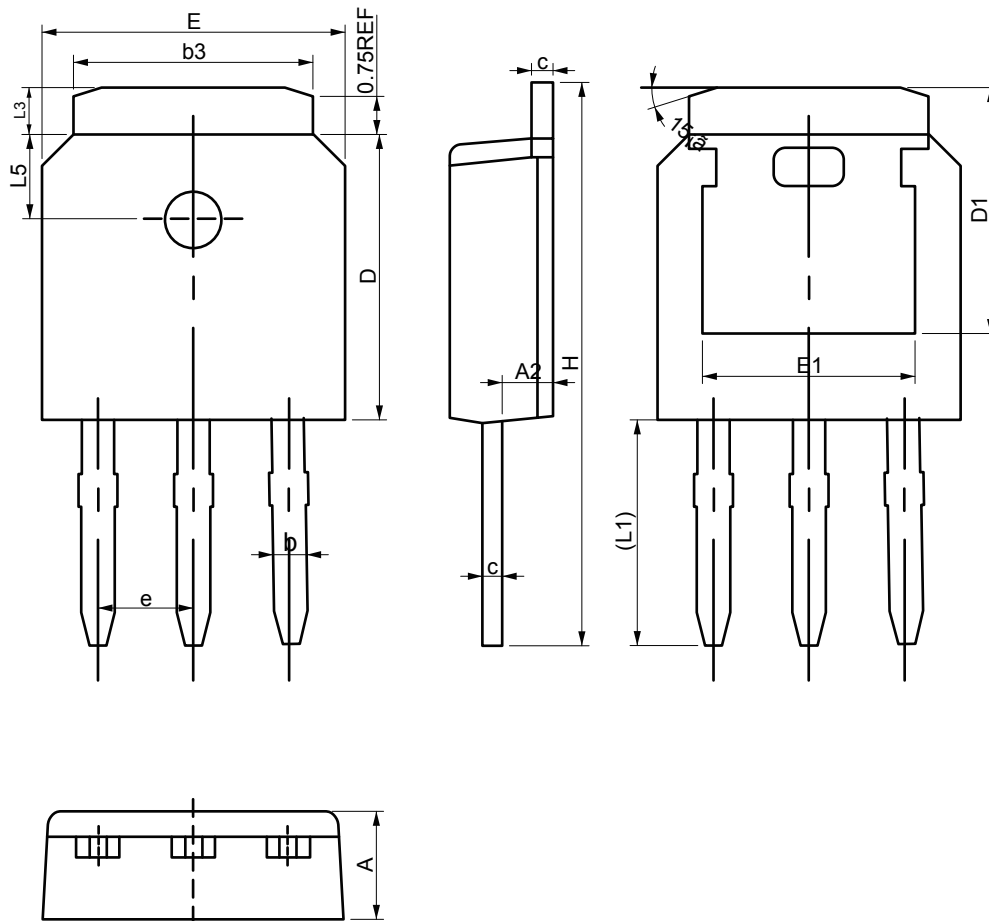


Figure 11 Normalized Maximum Transient Thermal Impedance

Packaging information



SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.286BSC		
H	10.00	11.22	11.44
L1	3.90	4.10	4.30
L3	0.88	1.02	1.28
L5	1.65	1.80	1.95

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