

### General Description

The WSK96N08 is the highest performance trench N-ch MOSFET with extreme high cell density, which provide excellent R<sub>DS(on)</sub> and gate charge for most of the synchronous buck converter applications.

The WSK96N08 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

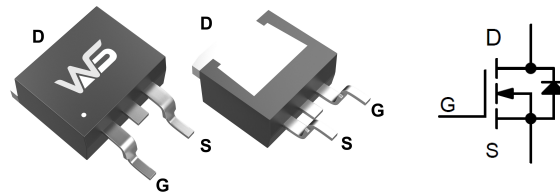
### Applications

- Switching application
- Power management for inverter systems

### Product Summary

BVDSS	R <sub>DS(on)</sub>	I <sub>D</sub>
80V	7mΩ	96A

### TO-263-2L Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	80	V
V <sub>GS</sub>	Gate-Source Voltage	±25	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	90	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	64	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	360**	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	416***	mJ
I <sub>AS</sub>	Avalanche Current	200	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>3</sup>	185	W
P <sub>D</sub> @T <sub>C</sub> =100°C	Total Power Dissipation <sup>3</sup>	92	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 175	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 175	°C

Note: \* Repetitive rating; pulse width limited by max.junction temperature.  
 \*\* Surface mounted on 1in2 FR-4 board.  
 \*\*\* Limited by T<sub>Jmax</sub>, starting T<sub>J</sub>=25°C, L = 0.5mH, R<sub>G</sub>= 25Ω, V<sub>GS</sub> =10V.

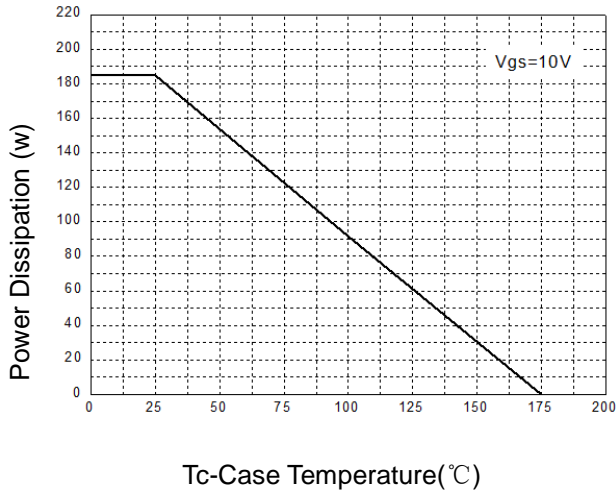
**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

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	80	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.0	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =45A	---	7	9	mΩ
		V <sub>GS</sub> =6V, I <sub>D</sub> =10A	---	10	12	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2	3	4	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-6.57	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	-	1	uA
		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	-	2	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	-	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	18	---	---	S
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =120A	---	86	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	16	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	28	---	
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> =145A, R <sub>L</sub> =30Ω	---	25	---	ns
T <sub>r</sub>	Rise Time		---	42	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	62	---	
T <sub>f</sub>	Fall Time		---	19	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	---	3800	---	pF
C <sub>oss</sub>	Output Capacitance		---	389	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	250	---	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>SD</sub> =45A, V <sub>GS</sub> =0V	---	0.8	---	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =45A, dI <sub>SD</sub> /dt=100A/μs	---	60	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	125	---	nC

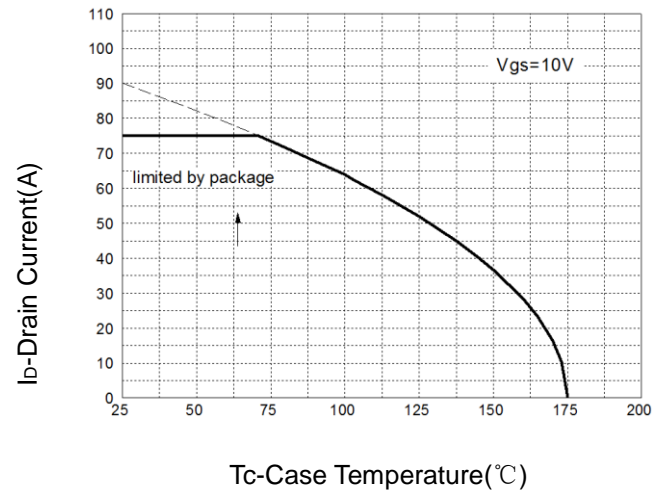
Note: \*Pulse test, pulse width ≤ 300us, duty cycle ≤ 2%

**Typical Operating Characteristics**

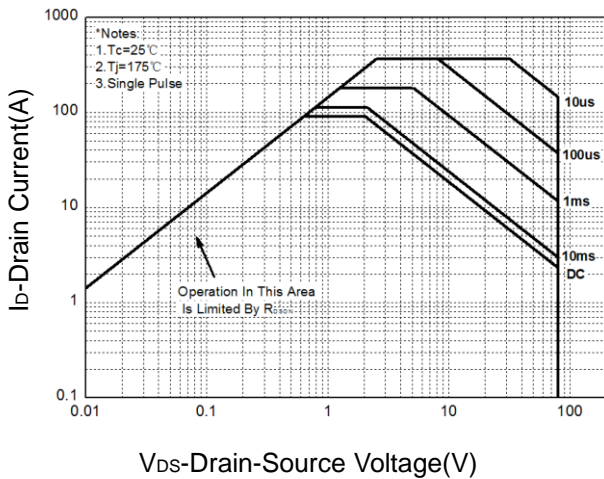
**Figure 1: Power Dissipation**



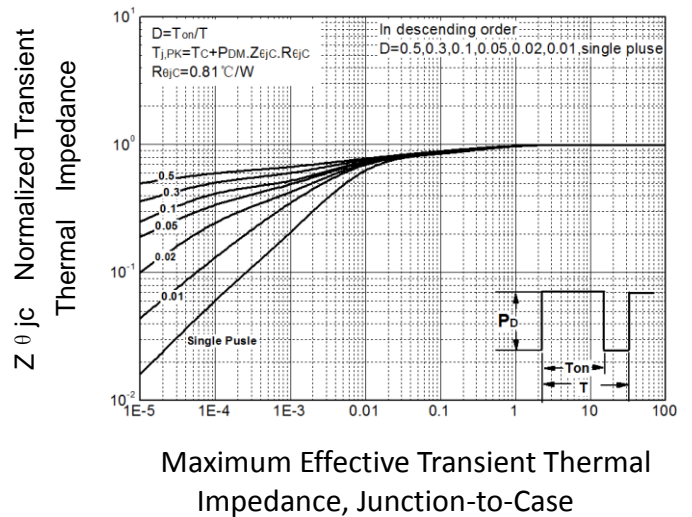
**Figure 2: Drain Current**



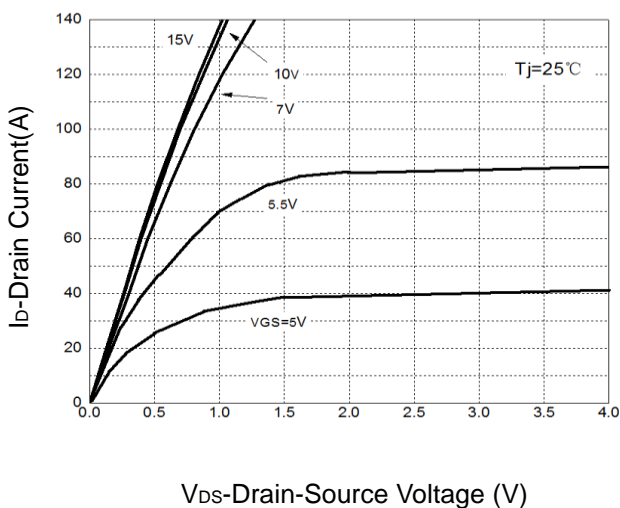
**Figure 3: Safe Operation Area**



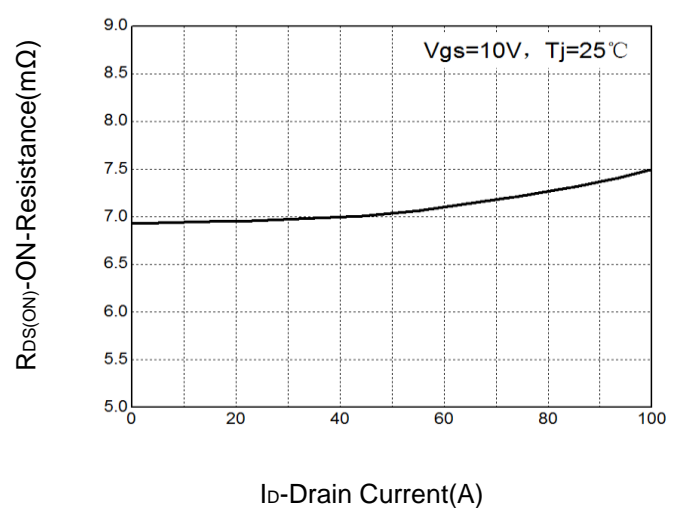
**Figure 4: Thermal Transient Impedance**



**Figure 5: Output Characteristics**

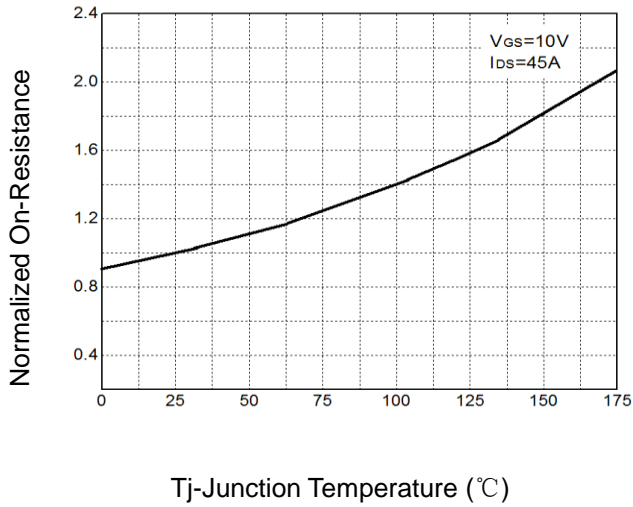


**Figure 6: Drain-Source On Resistance**

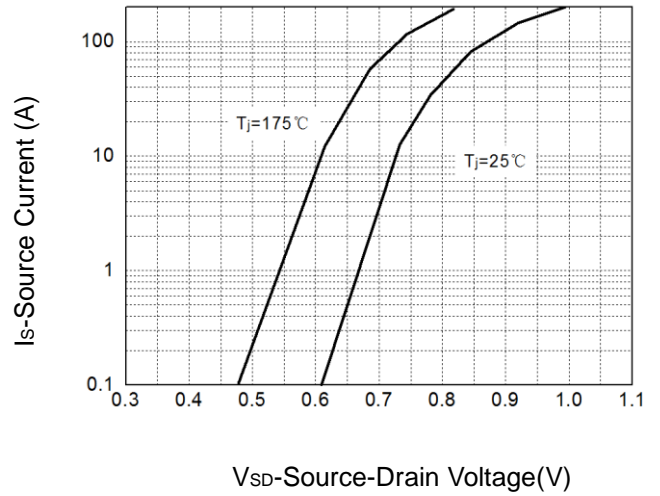


**Typical Operating Characteristics**

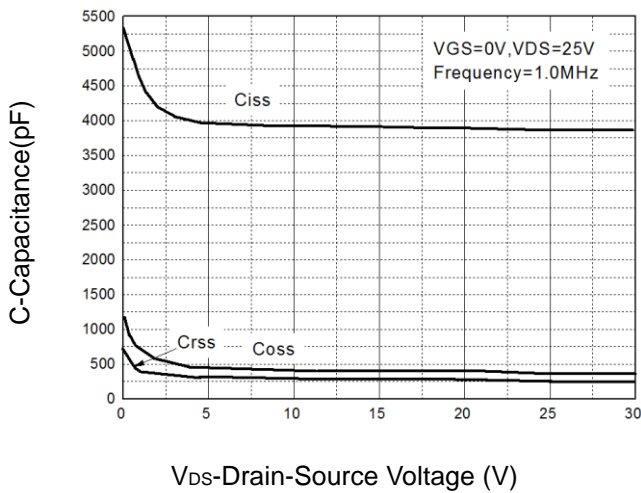
**Figure 7: On-Resistance vs. Temperature**



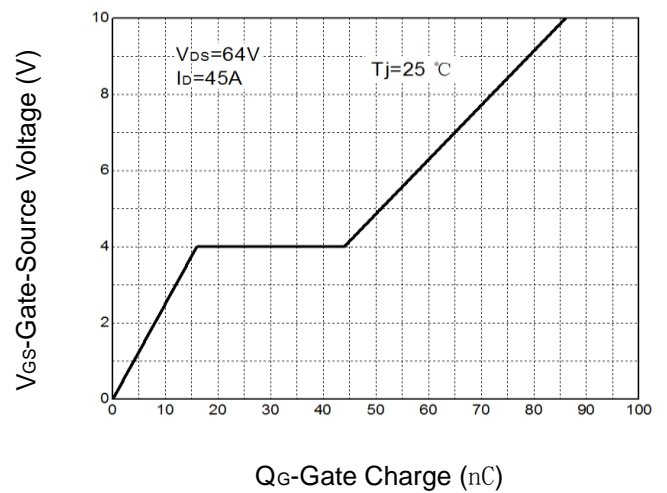
**Figure 8: Source-Drain Diode Forward**



**Figure 9: Capacitance Characteristics**

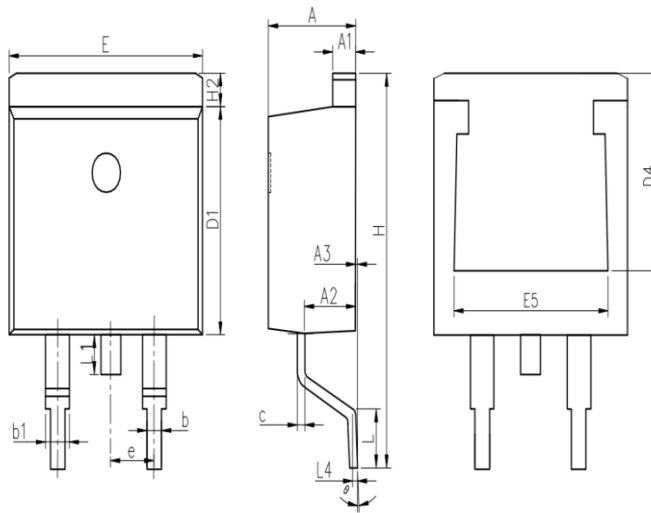


**Figure 10: Gate Charge Characteristics**



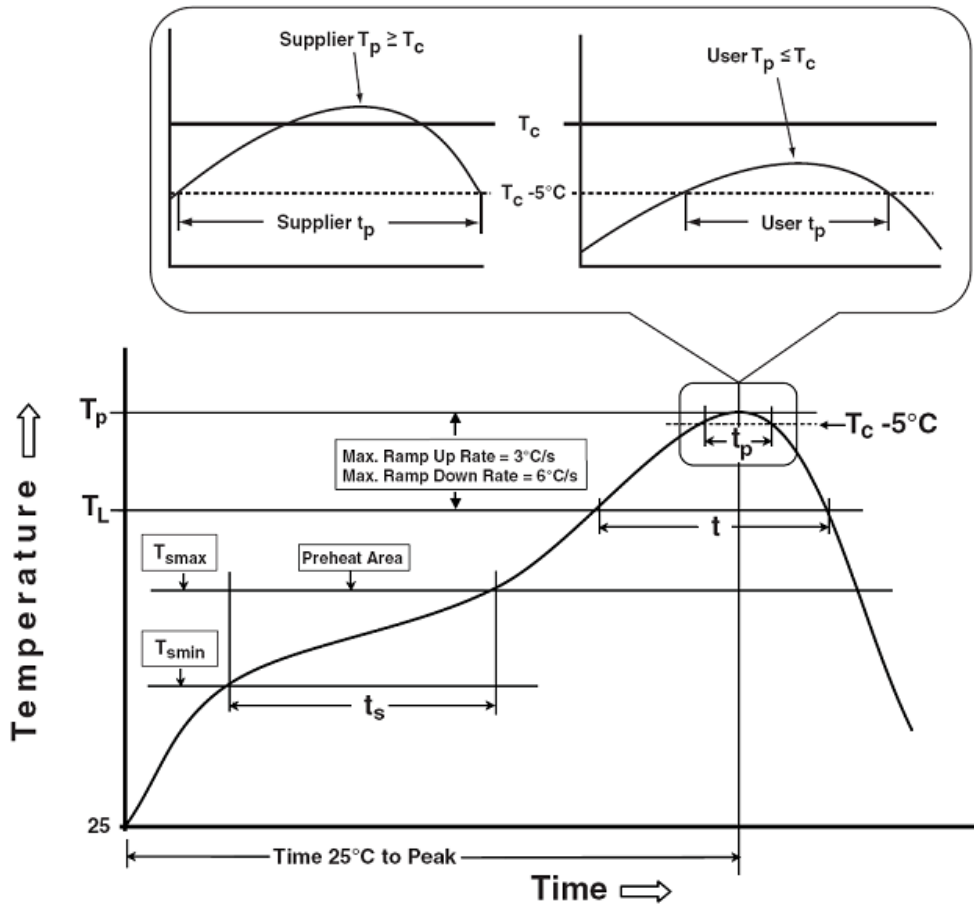
**Device Per Unit**

Package Type	Unit	Quantity
TO-263-2L	Reel	50

**Package Information**
**TO-263-2L**

**COMMON DIMENSIONS**

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0	0.13	0.25
b	0.7	0.81	0.96
b1	1.17	1.27	1.47
c	0.3	0.38	0.53
D1	8.5	8.7	8.9
D4	6.6	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.7	15.1	15.5
H2	1.07	1.27	1.47
L	2	2.3	2.6
L1	1.4	1.55	1.7
L4	0.25 BSC		
θ	0°	5°	9°

Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
<b>Preheat &amp; Soak</b>		
Temperature min ( $T_{smin}$ )	100 °C	150 °C
Temperature max ( $T_{smax}$ )	150 °C	200 °C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	3 °C/second max.	3°C/second max.
Liquidous temperature ( $T_L$ )	183 °C	217 °C
Time at liquidous ( $t_l$ )	60-150 seconds	60-150 seconds
Peak package body Temperature ( $T_p$ )*	See Classification Temp in table 1	See Classification Temp in table 2
Time ( $t_p$ )** within 5°C of the specified classification temperature ( $T_c$ )	20** seconds	30** seconds
Average ramp-down rate ( $T_p$ to $T_{smax}$ )	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
*Tolerance for peak profile Temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.		
** Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.		



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