

General Description

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

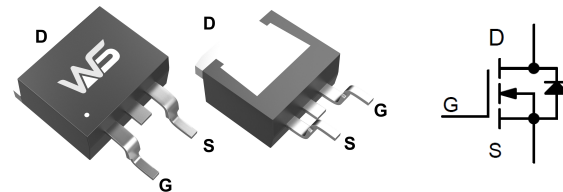
Product Summary

BVDSS	RDSON	ID
80V	7mΩ	96A

Applications

- Switching application
- Power management for inverter systems

TO-263-2L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	80	V
V_{GS}	Gate-Source Voltage	± 25	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	90	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	64	A
I_{DM}	Pulsed Drain Current ²	360**	A
EAS	Single Pulse Avalanche Energy ³	416***	mJ
I_{AS}	Avalanche Current	200	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ³	185	W
$P_D@T_C=100^\circ\text{C}$	Total Power Dissipation ³	92	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$

Note: * Repetitive rating; pulse width limited by max.junction temperature.

** Surface mounted on 1in2 FR-4 board.

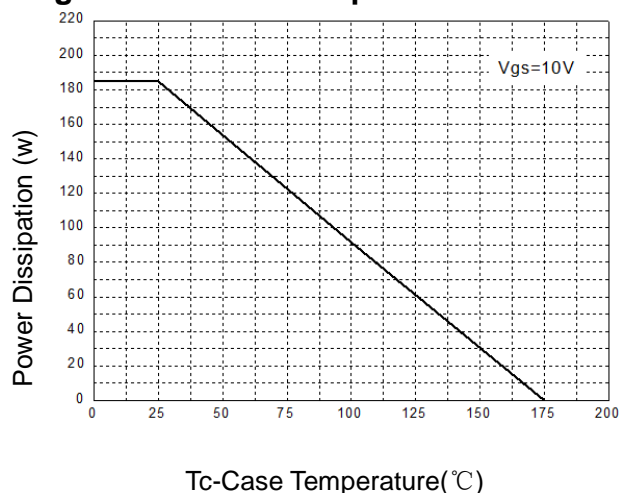
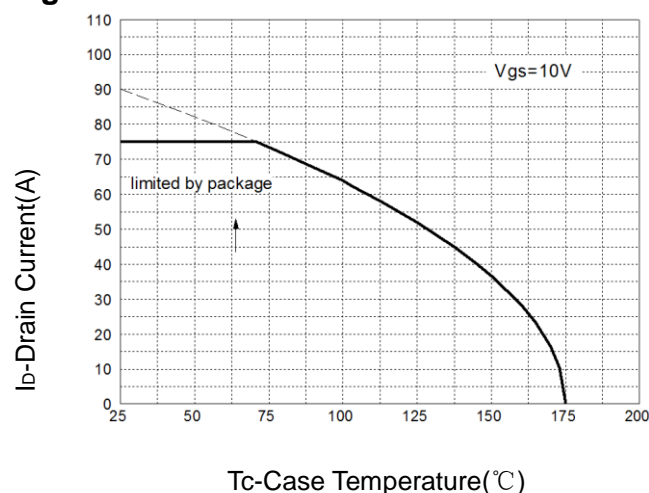
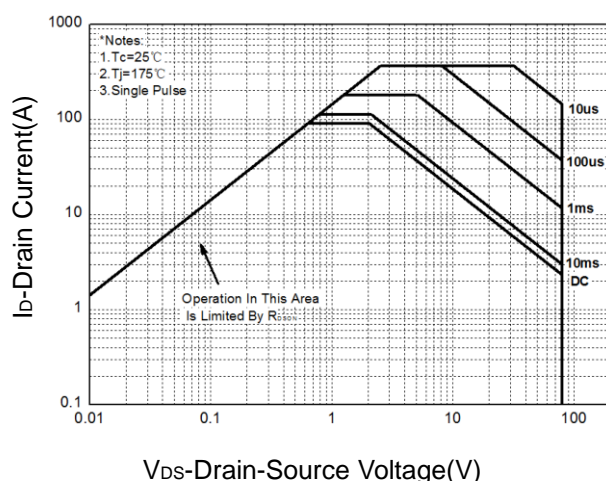
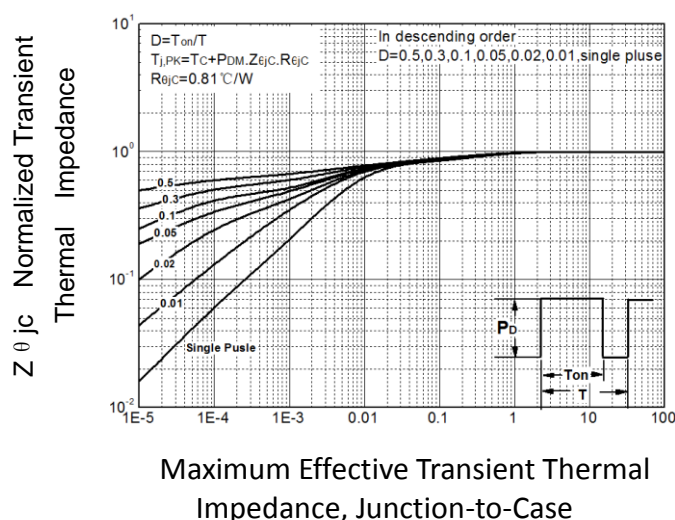
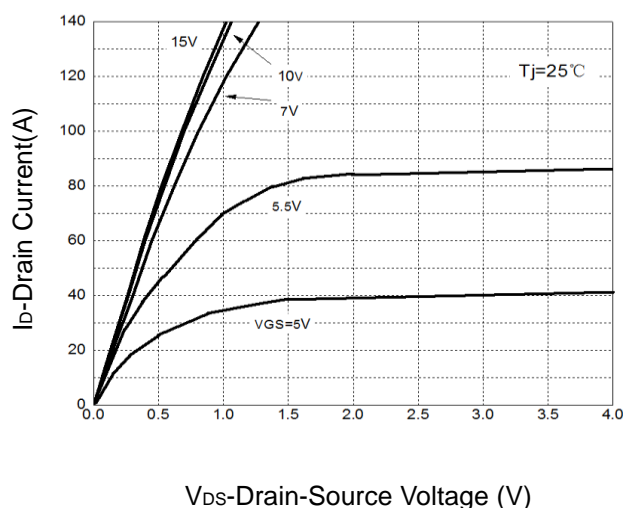
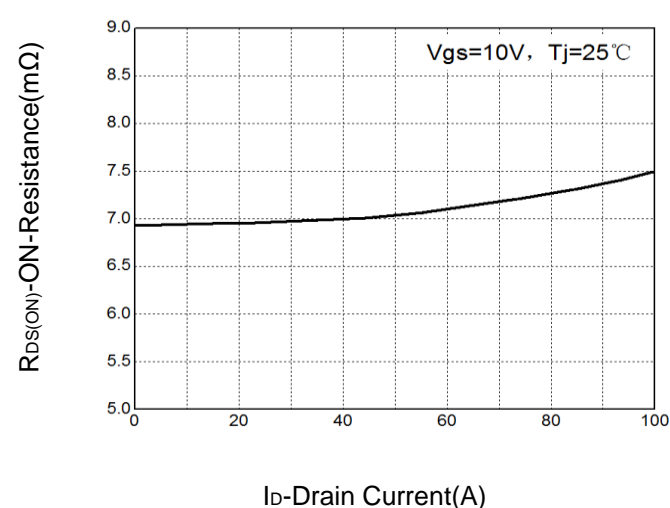
*** Limited by T_{Jmax} , starting $T_J=25^\circ\text{C}$, $L = 0.5\text{mH}$, $R_G = 25\Omega$, $V_{GS} = 10V$.

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	80	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.0	---	V/ $^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=45A$	---	7	9	$m\Omega$
		$V_{GS}=6V, I_D=10A$	---	10	12	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.57	---	mV/ $^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	-	1	μA
		$V_{DS}=80V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	-	2	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	-	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=20A$	18	---	---	S
Q_g	Total Gate Charge (10V)	$V_{DS}=50V, V_{GS}=10V, I_D=120A$	---	86	---	nC
Q_{gs}	Gate-Source Charge		---	16	---	
Q_{gd}	Gate-Drain Charge		---	28	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V,$ $R_G=6\Omega, I_D=145A,$ $R_L=30\Omega$	---	25	---	ns
T_r	Rise Time		---	42	---	
$T_{d(off)}$	Turn-Off Delay Time		---	62	---	
T_f	Fall Time		---	19	---	
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1MHz$	---	3800	---	pF
C_{oss}	Output Capacitance		---	389	---	
C_{rss}	Reverse Transfer Capacitance		---	250	---	
V_{SD}	Diode Forward Voltage	$I_{SD}=45A, V_{GS}=0V$	---	0.8	---	V
t_{rr}	Reverse Recovery Time	$I_{SD}=45A, dI_{SD}/dt=100A/\mu s$	---	60	---	ns
Q_{rr}	Reverse Recovery Charge		---	125	---	nC

Note: *Pulse test, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

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

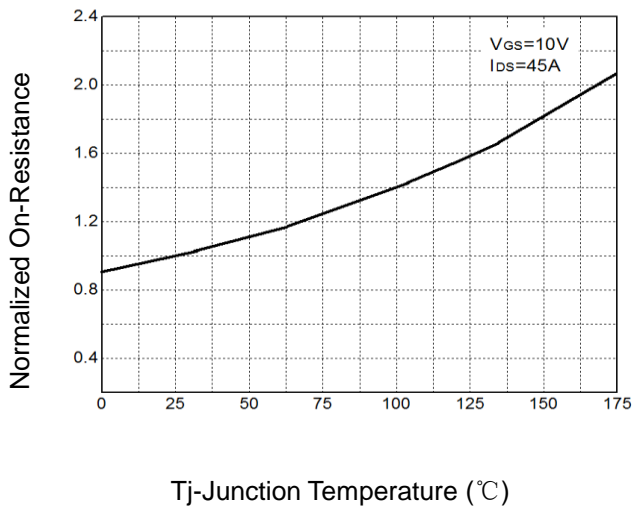


Figure 8: Source-Drain Diode Forward

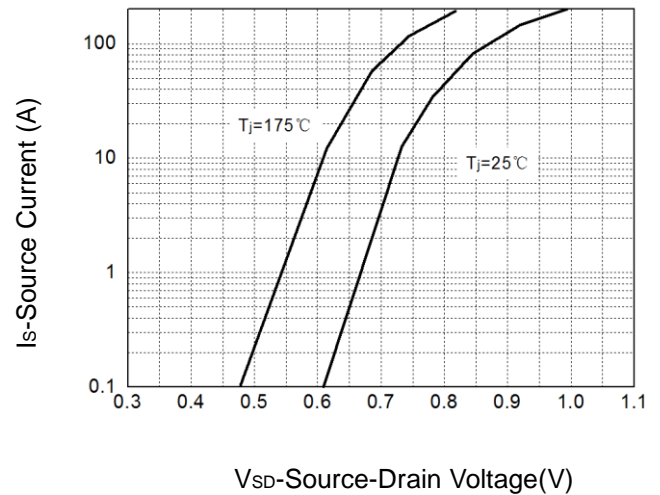


Figure 9: Capacitance Characteristics

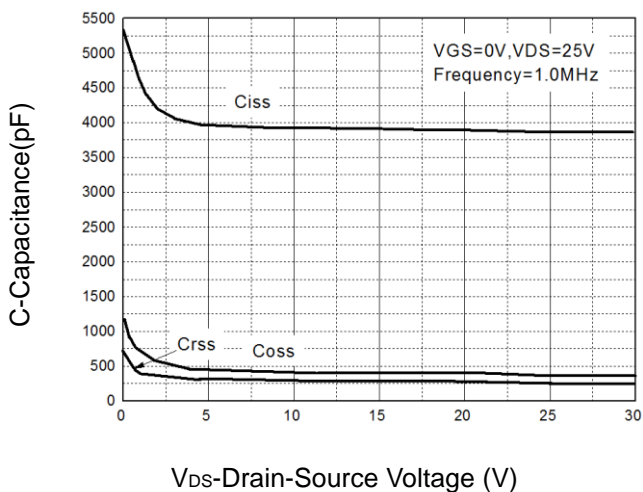
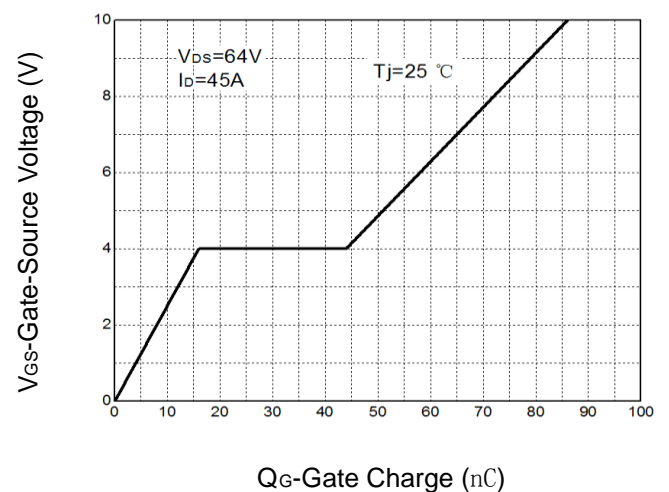
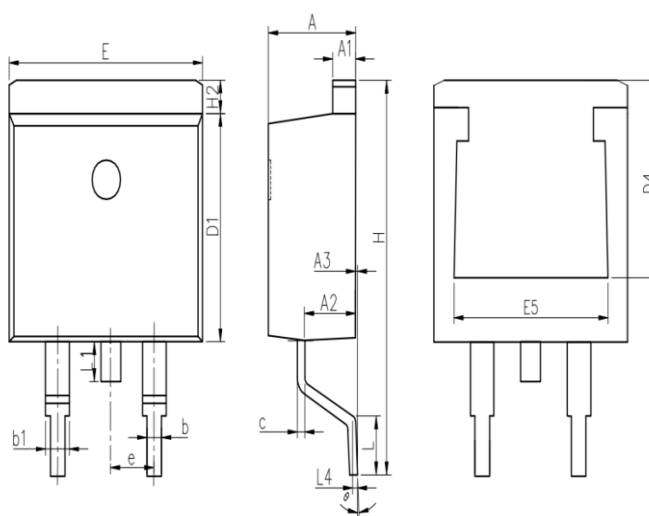


Figure 10: Gate Charge Characteristics



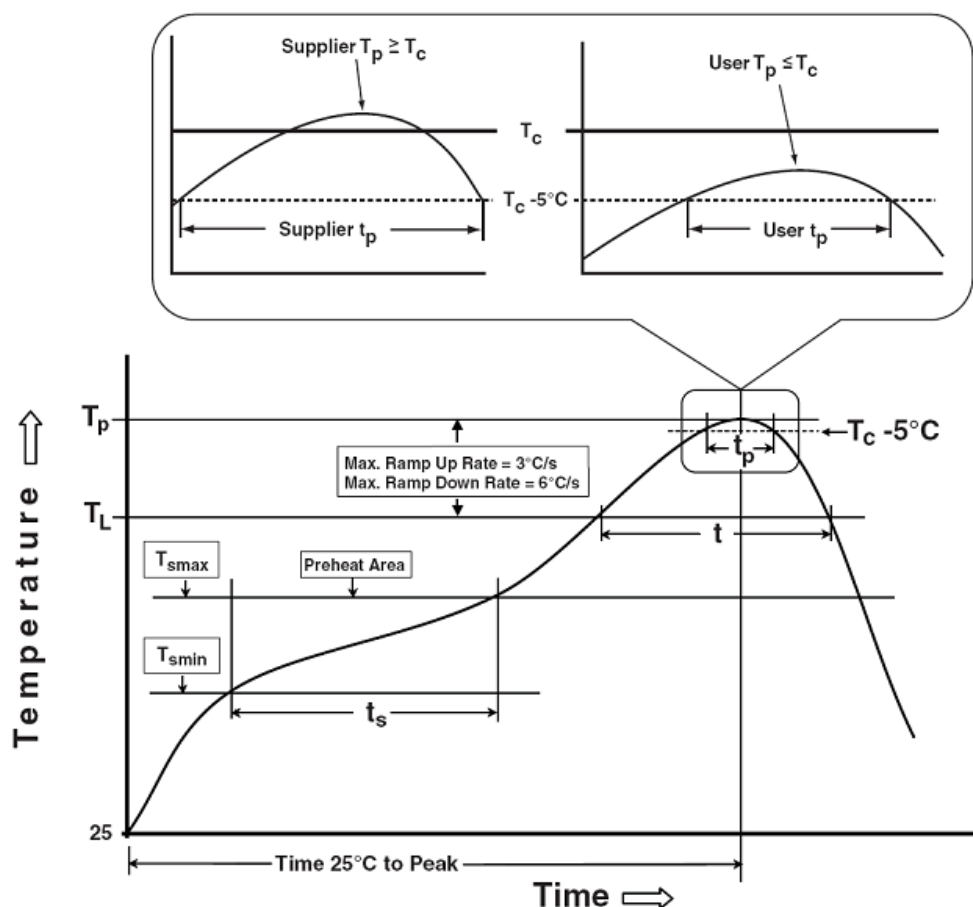
Device Per Unit

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
Preheat & Soak		
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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