

## General Description

The WSK220N04 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 WSK220N04 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
- 100% EAS Guaranteed
- Green Device Available

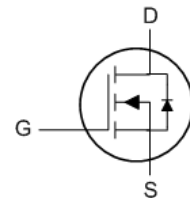
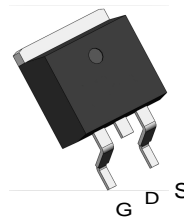
## Product Summary

BVDSS	RDSON	ID
40V	2.5mΩ	220A

## Applications

- Switching application
- Power Management for Inverter Systems.

## TO-263 Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> (T <sub>C</sub> =25°C Unless Otherwise Noted)			
V <sub>DSS</sub>	Drain-Source Voltage	40	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	
T <sub>J</sub>	Maximum Junction Temperature	175	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 175	°C
I <sub>S</sub>	Diode Continuous Forward Current	T <sub>C</sub> =25°C 208	A
<b>Mounted on Large Heat Sink</b>			
I <sub>DM</sub>	Pulsed Drain Current *	T <sub>C</sub> =25°C 760 <sup>1,2</sup>	A
I <sub>D</sub>	Continuous Drain Current	T <sub>C</sub> =25°C 220	A
		T <sub>C</sub> =100°C 139	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C 218	W
		T <sub>C</sub> =100°C 109	
R <sub>θJC</sub>	Thermal Resistance-Junction to Case	0.55	°C/W
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	62.5	
<b>Avalanche Ratings</b>			
E <sub>AS</sub>	Avalanche Energy, Single Pulsed	L=0.5mH 1.4 <sup>1,2</sup>	J

NOTE: 1, Repetitive rating; pulse width limited by junction temperature

2, Drain current is limited by junction temperature

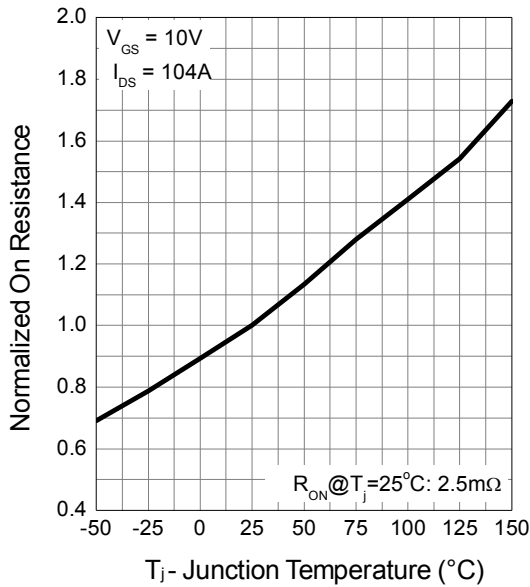
**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V	-	-	1	μA
		T <sub>J</sub> =85°C	-	-	10	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	2.0	3.0	4.0	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)</sub> *	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =104A	-	2.5	3.2	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub> *	Diode Forward Voltage	I <sub>SD</sub> =104A, V <sub>GS</sub> =0V	-	0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =104A, dI <sub>SD</sub> /	-	36	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dt=100A/μs	-	59	-	nC
<b>Dynamic Characteristics</b>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	1.0	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, Frequency=1.0MHz	-	5710	-	pF
C <sub>oss</sub>	Output Capacitance		-	1463	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	595	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, R <sub>G</sub> =6 Ω, I <sub>DS</sub> =104A, V <sub>GS</sub> =10V ,	-	34	-	ns
T <sub>r</sub>	Turn-on Rise Time		-	19	-	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	44	-	
T <sub>f</sub>	Turn-off Fall Time		-	61	-	
<b>Gate Charge Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =32V, V <sub>GS</sub> =10V, I <sub>DS</sub> =104A	-	156	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	28	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	65	-	

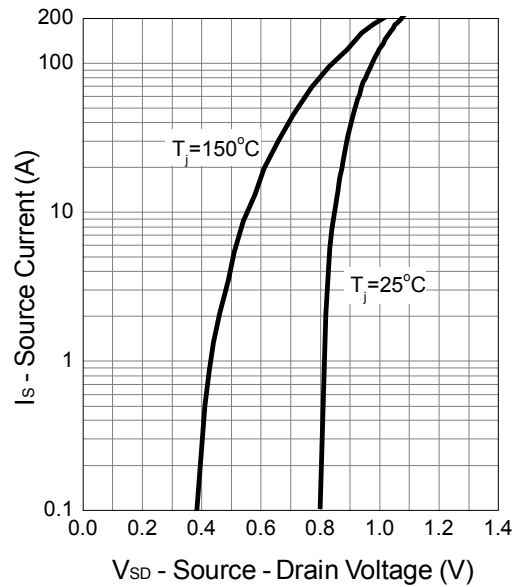
Note \* : Pulse test ; pulse width ≤300μs, duty cycle ≤2%.

**Typical Characteristics**

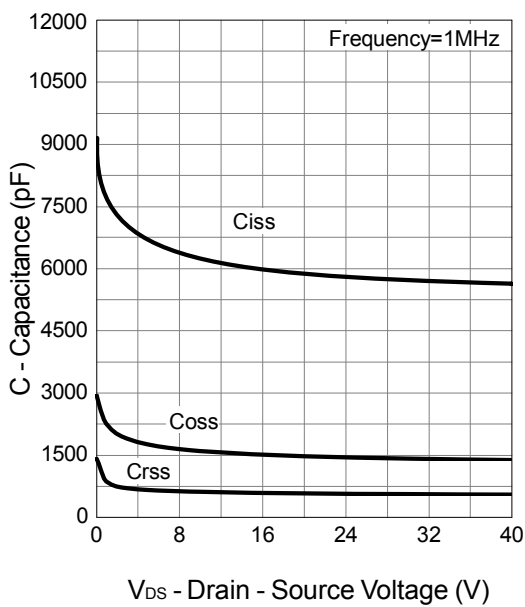
**Drain-Source On Resistance**



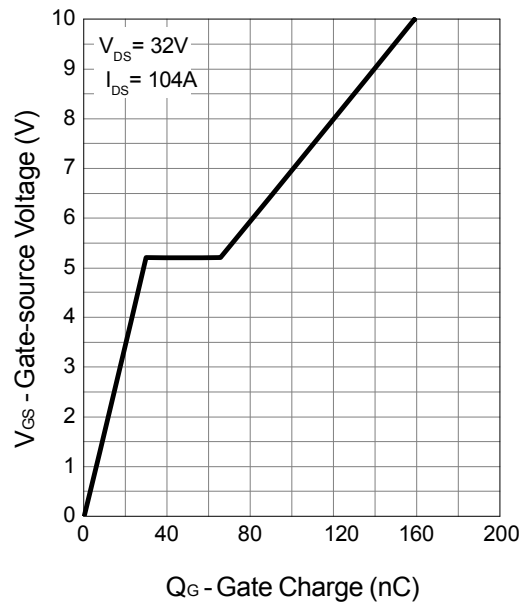
**Source-Drain Diode Forward**



**Capacitance**

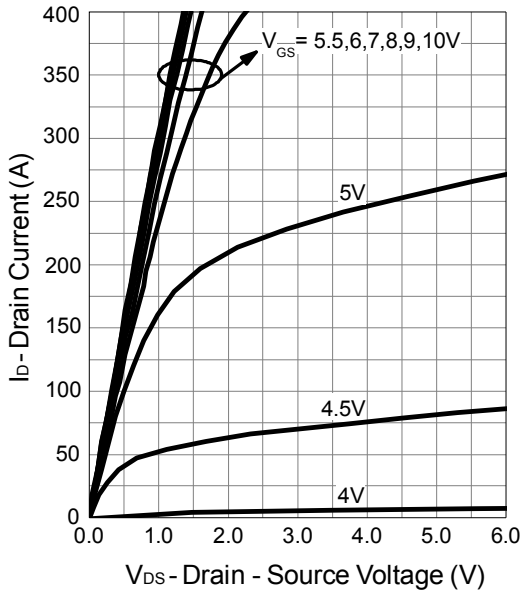


**Gate Charge**

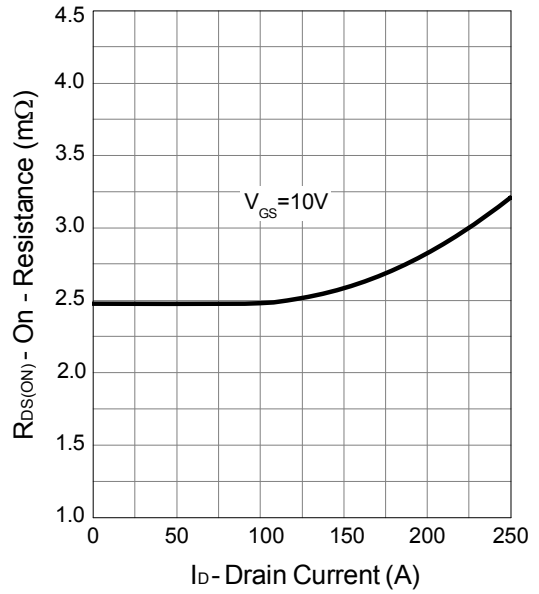


**Typical Characteristics**

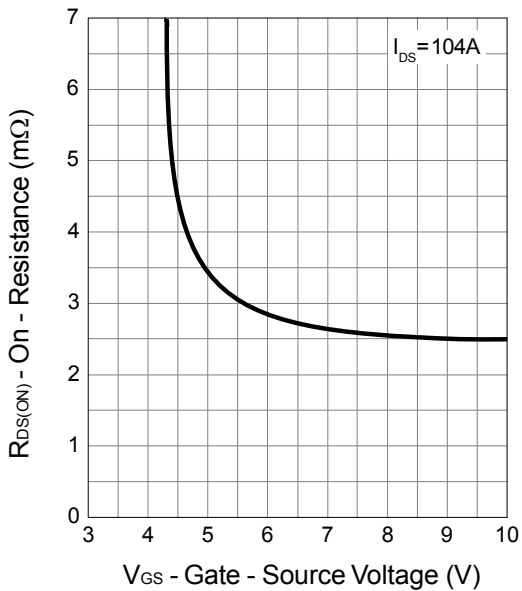
**Output Characteristics**



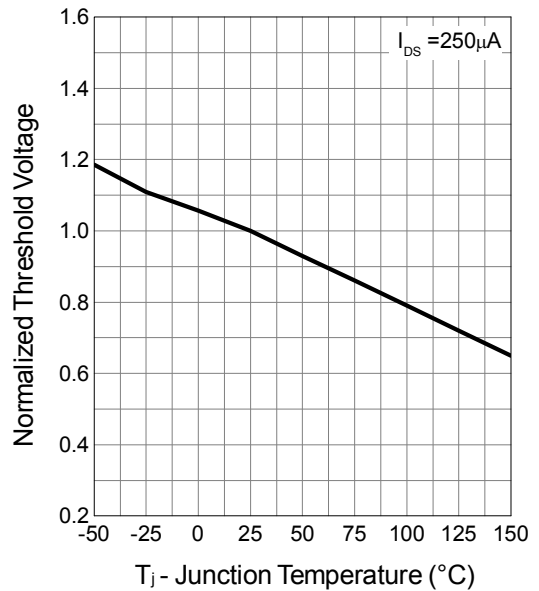
**Drain-Source On Resistance**



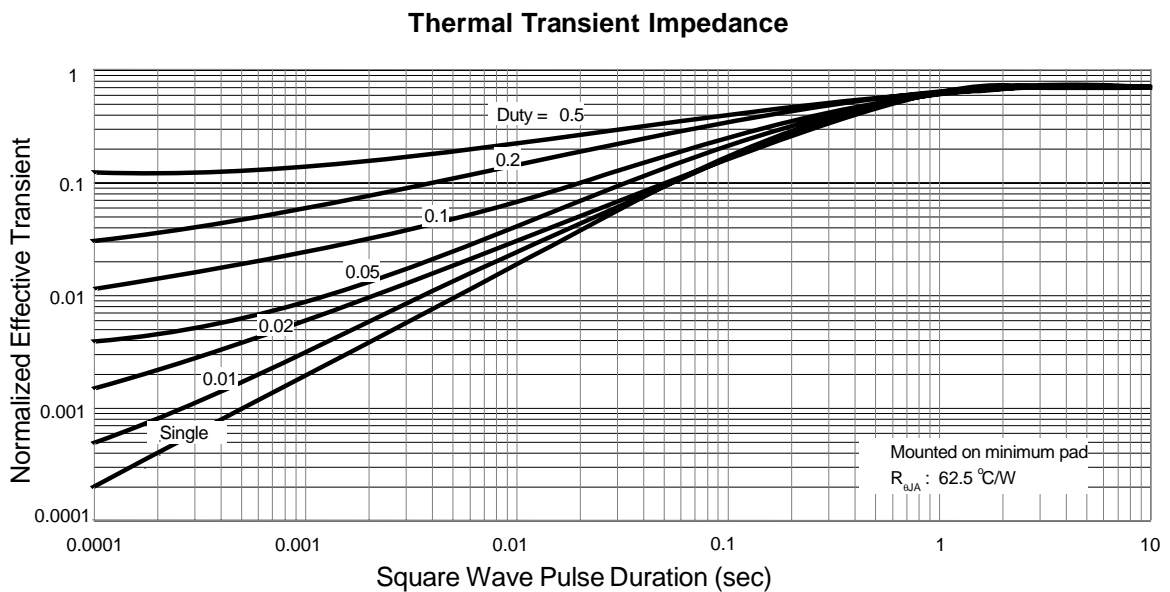
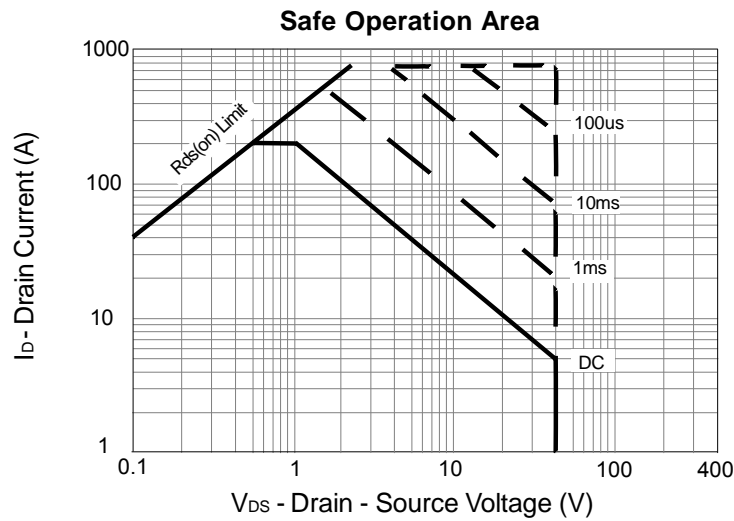
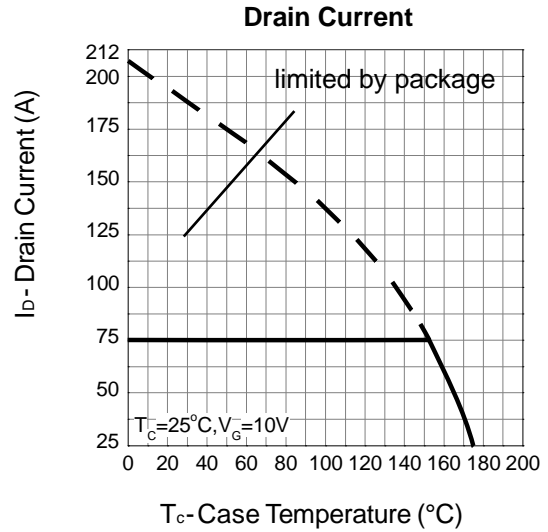
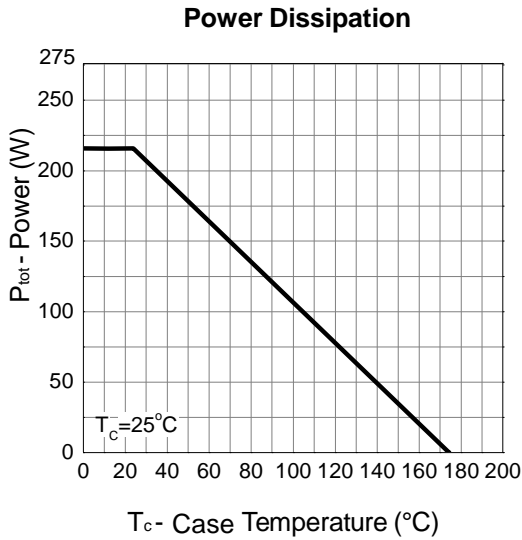
**Gate-Source On Resistance**



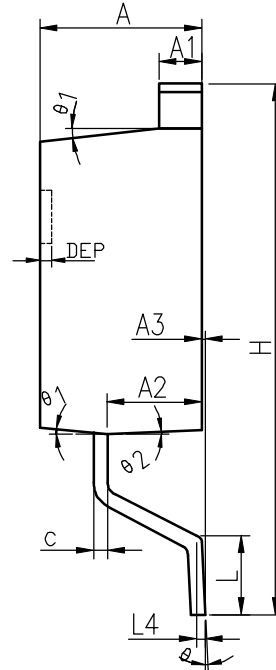
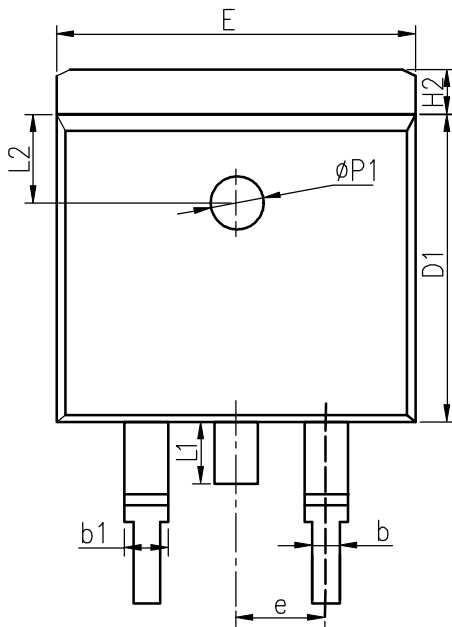
**Gate Threshold Voltage**



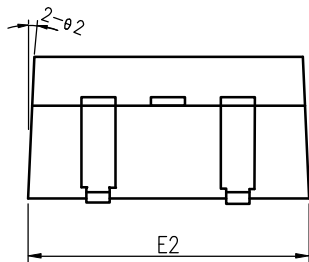
**Typical Characteristics**



**TO-263-2L**



COMMON DIMENSIONS



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.22	1.27	1.32	0.048	0.050	0.052
A2	2.59	2.69	2.79	0.102	0.106	0.110
A3	0.00	0.10	0.20	0.000	0.004	0.008
b	0.77	0.813	0.90	0.030	0.032	0.035
b1	1.20	1.270	1.36	0.047	0.050	0.054
c	0.34	0.381	0.47	0.013	0.015	0.019
D1	8.60	8.70	8.80	0.339	0.343	0.346
E	10.00	10.16	10.26	0.394	0.400	0.404
E2	10.00	10.10	10.20	0.394	0.398	0.402
e	2.54 BSC			0.100 BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L2	2.50 REF			0.098 REF		
L4	0.25 BSC			0.010 BSC		
	0°	5°	8°	0°	5°	8°
1	5°	7°	9°	5°	7°	9°
2	1°	3°	5°	1°	3°	5°
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
DEP	0.05	0.10	0.20	0.002	0.004	0.008



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