

## General Description

The WSK180N04 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 WSK180N04 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

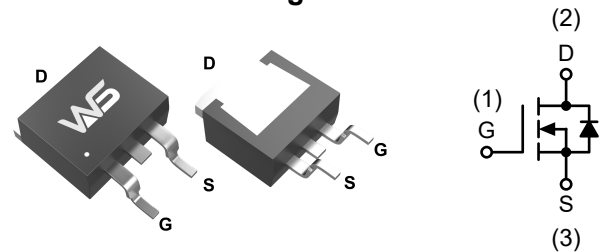
## Product Summary

BVDSS	RDSON	ID
40V	3.0mΩ	180A

## Applications

- Switching application
- Power Management for Inverter Systems.

## TO-263-2L Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (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	176	A
Mounted on Large Heat Sink				
I <sub>DM</sub>	Pulsed Drain Current *	T <sub>C</sub> =25°C	648 <sup>1,2</sup>	A
I <sub>D</sub>	Continuous Drain Current	T <sub>C</sub> =25°C	180	A
		T <sub>C</sub> =100°C	120	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C	192	W
		T <sub>C</sub> =100°C	96	
R <sub>θJC</sub>	Thermal Resistance-Junction to Case		0.78	°C/W
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient		62.5	
Avalanche Ratings				
E <sub>AS</sub>	Avalanche Energy, Single Pulsed	L=0.5mH	1.09 <sup>1,2</sup>	J

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

2, Drain current is limited by junction temperature

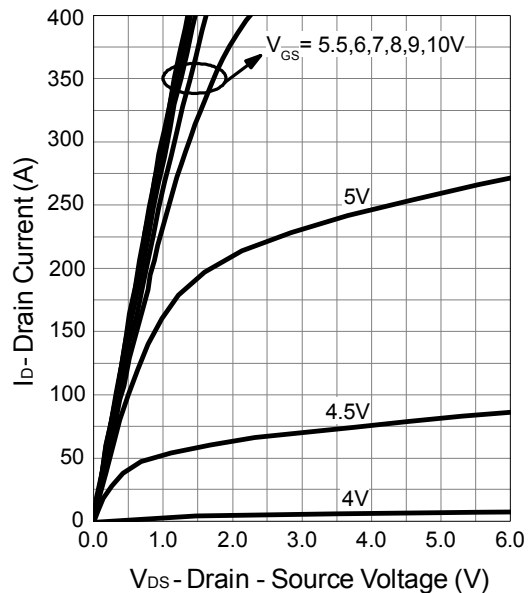
**Electrical Characteristics ( $T_J=25\text{ }^{\circ}\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV <sub>DSS</sub>	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> =88A	-	3.0	3.6	mΩ
Diode Characteristics						
V <sub>SD</sub> *	Diode Forward Voltage	I <sub>SD</sub> =88A, V <sub>GS</sub> =0V	-	0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =88A, dI <sub>SD</sub> /dt=100A/μs	-	27	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	50	-	nC
Dynamic Characteristics						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	1.1	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, Frequency=1.0MHz	-	4426	-	pF
C <sub>oss</sub>	Output Capacitance		-	1027	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	537	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, R <sub>G</sub> =6 Ω, I <sub>DS</sub> =88A, V <sub>GS</sub> =10V ,	-	27	-	ns
T <sub>r</sub>	Turn-on Rise Time		-	18	-	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	41	-	
T <sub>f</sub>	Turn-off Fall Time		-	53	-	
Gate Charge Characteristics						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =32V, V <sub>GS</sub> =10V, I <sub>DS</sub> =88A	-	121	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	28	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	34	-	

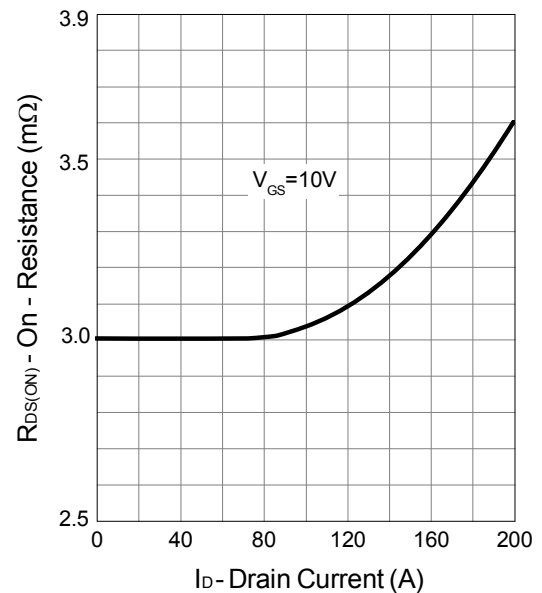
Note \* : Pulse test ; pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

## Typical Characteristics

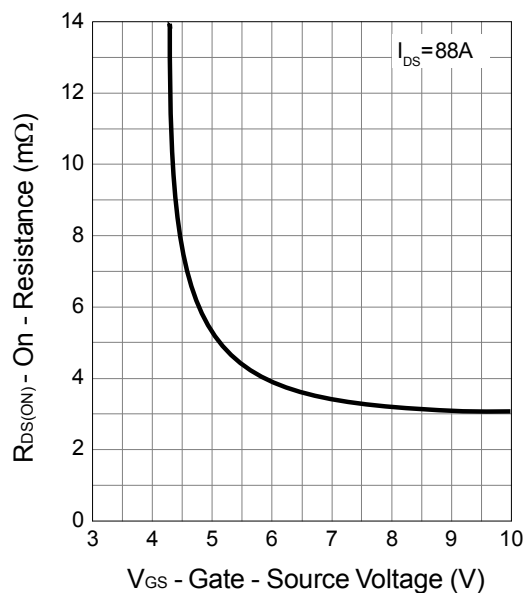
**Output Characteristics**



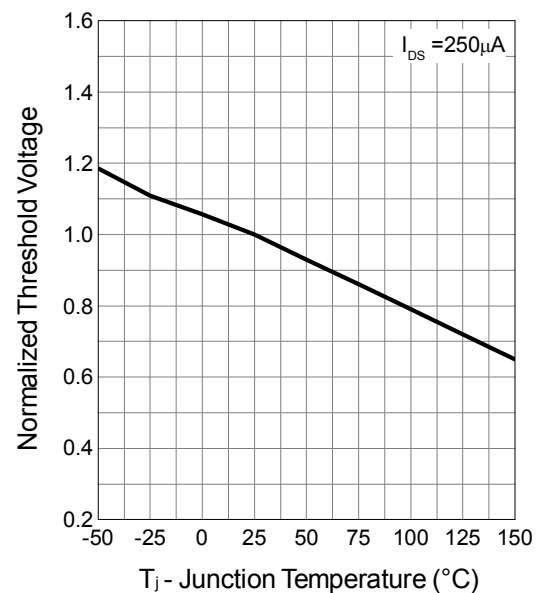
**Drain-Source On Resistance**



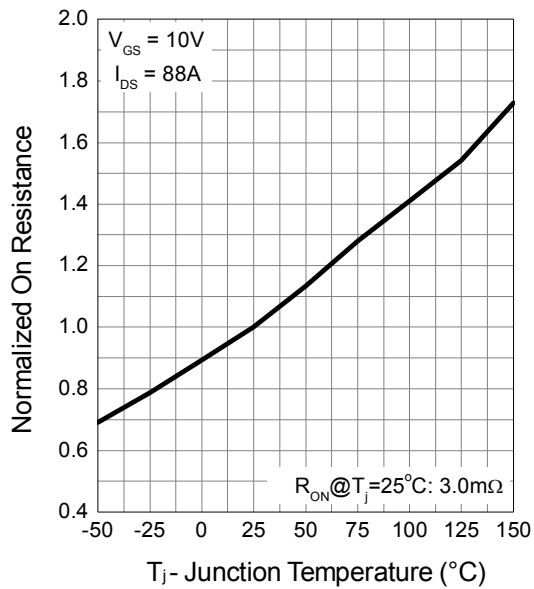
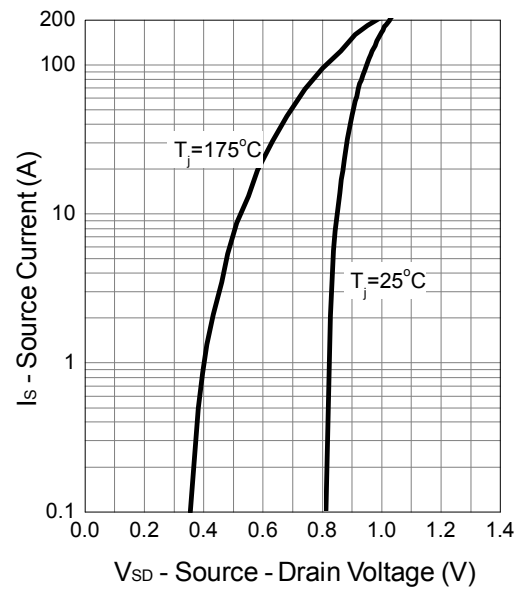
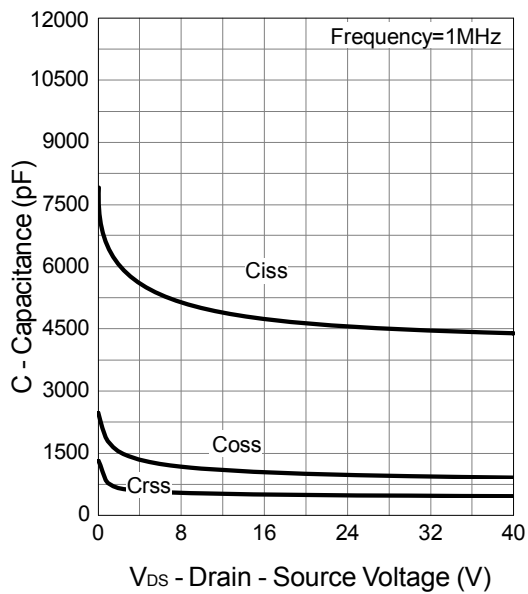
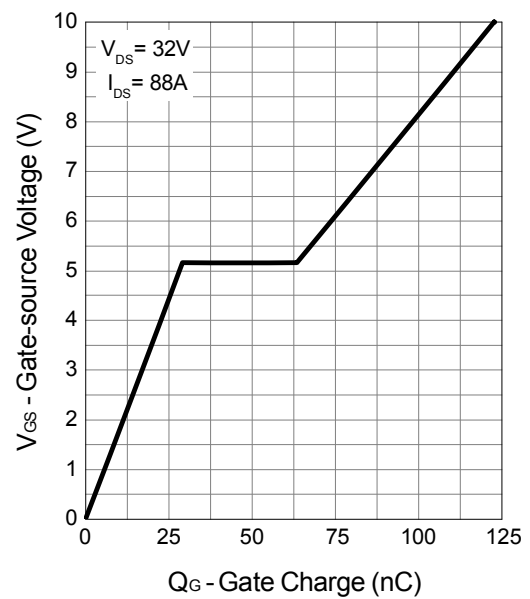
**Gate-Source On Resistance**



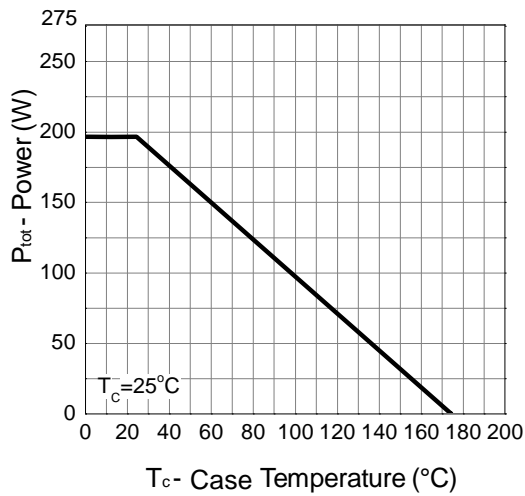
**Gate Threshold Voltage**



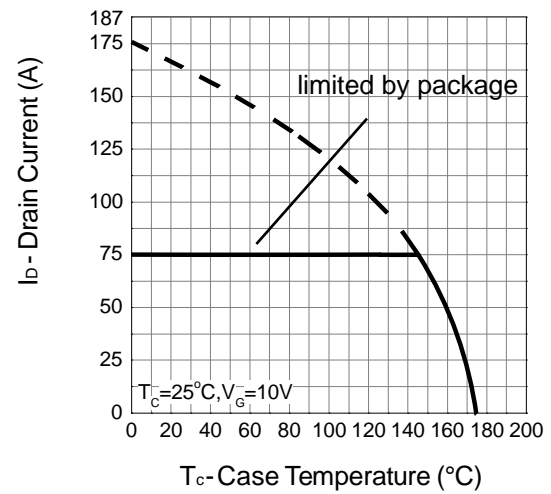
## Typical Characteristics

**Drain-Source On Resistance**

**Source-Drain Diode Forward**

**Capacitance**

**Gate Charge**


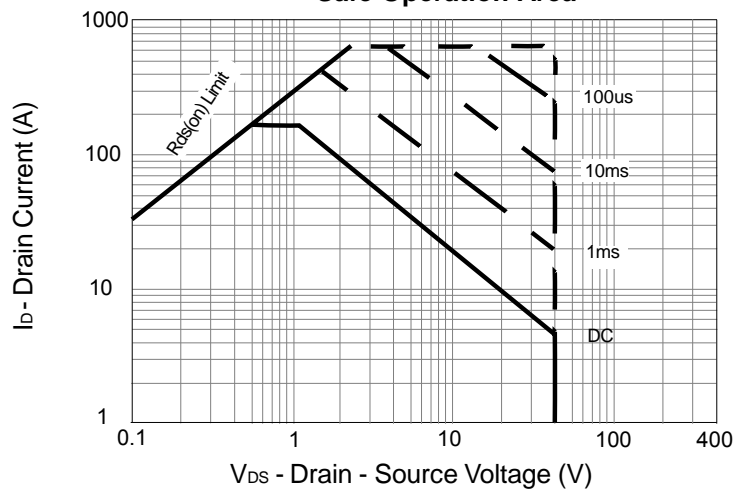
**Power Dissipation**



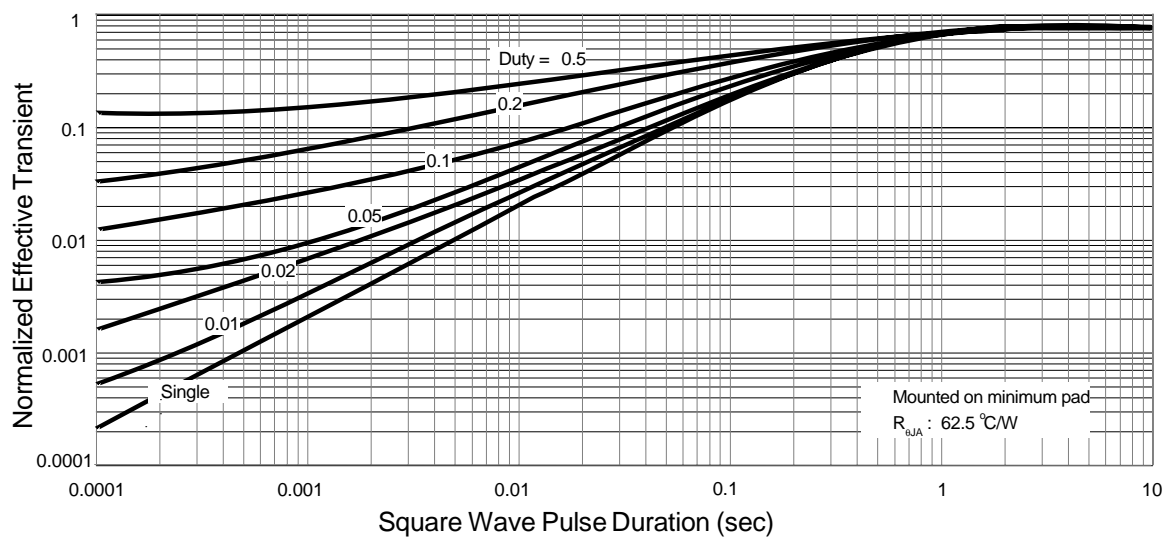
**Drain Current**



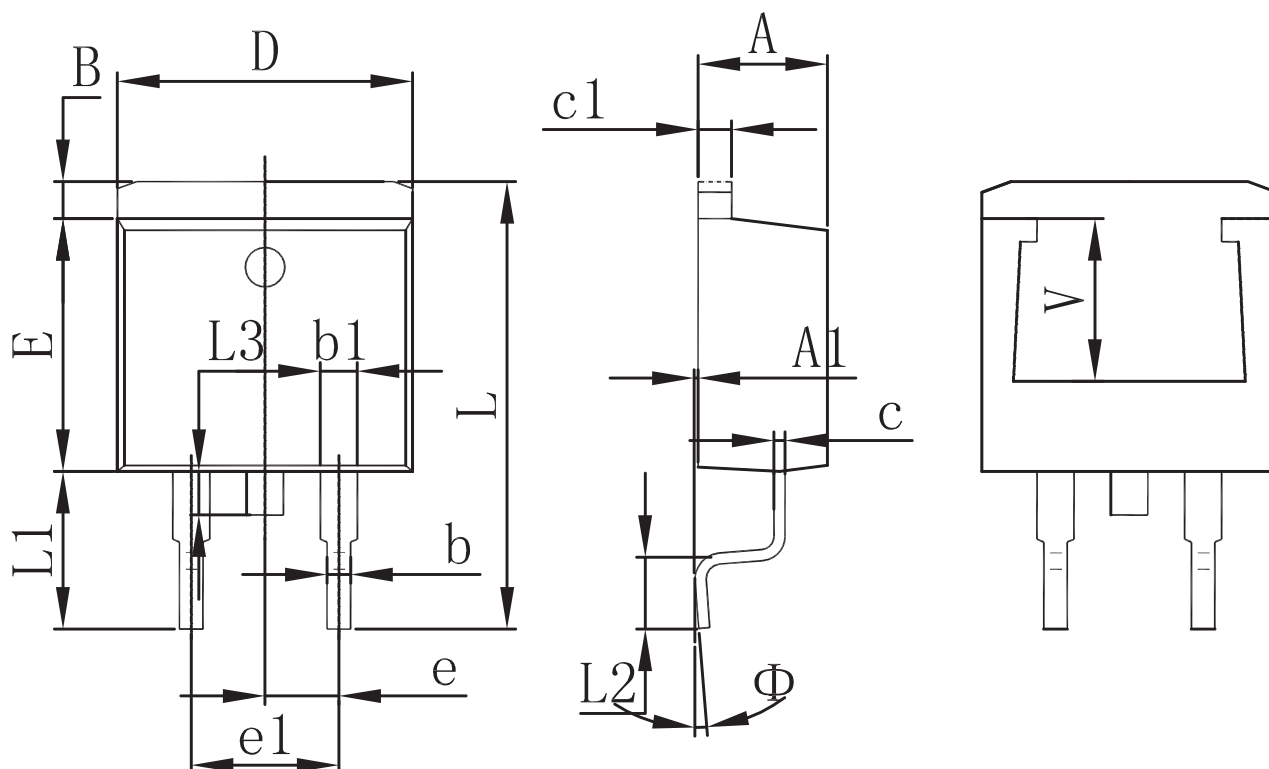
**Safe Operation Area**



**Thermal Transient Impedance**



# Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0°	8°	0°	8°
V	5.600 REF.		0.220REF.	

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