General Description

The WSK45N65 is CoolFET II MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance.

WSK45N65 is suitable for applications which require superior power density and outstanding efficiency.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
650V	150mΩ	45A

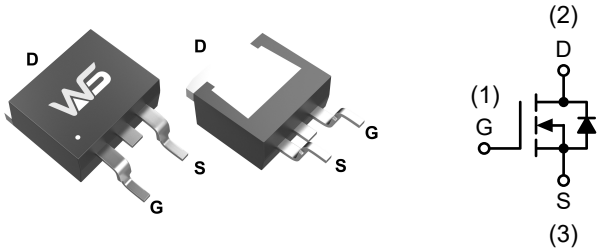
Applications

- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)

Features

- Super Low Gate Charge
- 100% E_{AS} Guaranteed
- Green Device Available

TO-263-2L Pin Configuration



Absolute Maximum Ratings (T_C=25°C, Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	650	V
V_{GS}	Gate-Source Voltage	±30	
I_D	Continuous Drain Current	45	A
I_{DM}	Pulsed Drain Current [1]	50	
E_{AS}	Single Pulse Avalanche Energy [2]	500	mJ
P_D	Power Dissipation (T_C=25°C)	151	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Rating	Units
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.82	

Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	650	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	I_D=250μA, Reference to 25°C	---	0.7	---	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=3.2A	---	150	190	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250μA	2.5	3.3	4.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=650V , V_{GS}=0V	---	---	1.0	μA
		V_{DS}=520V , T_C=125°C	---	---	50	
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge	V_{DS}=480V , V_{GS}=10V , I_D=11A	---	7.27	---	nC
Q_{gs}	Gate-Source Charge		---	17.4	---	
Q_{gd}	Gate-Drain Charge		---	43.9	---	
$T_{d(on)}$	Turn-on Delay Time	V_{DS}=400V , I_D=13A , R_G=4.7Ω , V_{GS}=13V	---	10	---	ns
T_r	Rise Time		---	19.8	---	
$T_{d(off)}$	Turn-off Delay Time		---	45.4	---	
T_f	Fall Time		---	41.4	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=1MHz	---	1510	---	pF
C_{oss}	Output Capacitance		---	65	---	
C_{rss}	Reverse Transfer Capacitance		---	2.4	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	V_G=V_D=0V, Force Current	---	---	21	A
I_{SM}	Pulsed Source Current		---	---	63	
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=7.3A	---	0.812	1.5	V
t_{rr}	Reverse Recovery Time	I_S=11A , V_{GS}=0V , V_{DD}=400V , di_F/dt=100A/μs	---	288	---	ns
Q_{rr}	Reverse Recovery Charge		---	3.66	---	nC

Note:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The E_{AS} data shows Max. rating . L=0.5mH, I_{AS}=7A, V_{DD}=50V, R_G=25Ω
3. The test condition is Pulse Test: I_{SD} ≤ I_D , di/dt=100A/μs , V_{DD} ≤ BV_{DSS} , Starting at T_J=25°C.
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

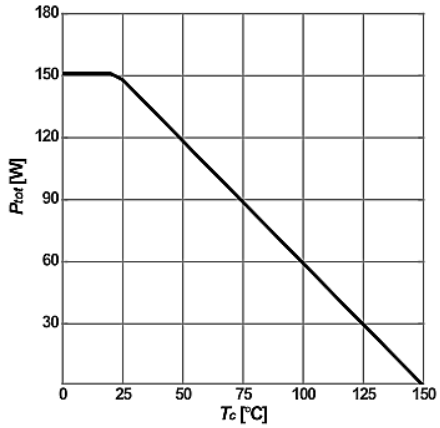


Figure1: Power dissipation

$P_{tot}=f(T_C)$

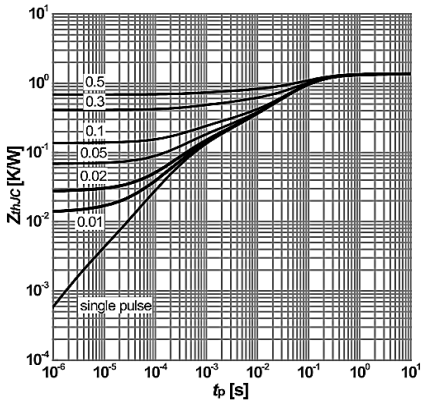


Figure2: Max. transient thermal impedance

$Z_{thJC}=f(t_p)$; parameter: D= t_p/T

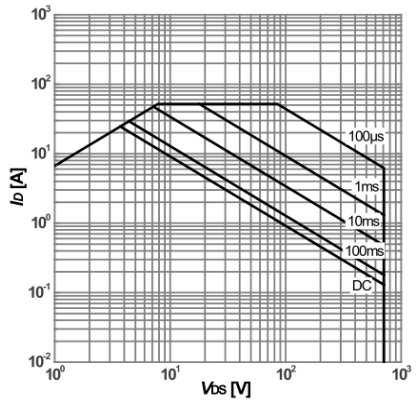


Figure3 : TSafe operating area

$R_{DS}(on)=f(I_D)$; $T_j=25°C$; parameter: V_{GS}

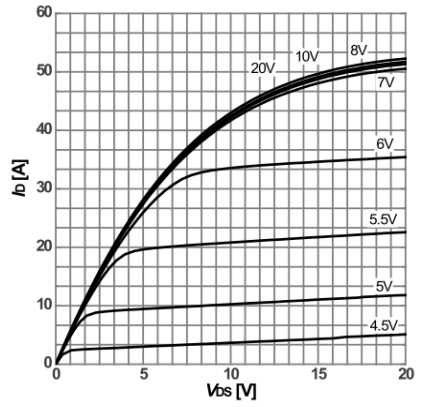


Figure 4: Typ. output characteristics

$R_{DS}(on)=f(T_j)$; $I_D=3.2A$; $V_{GS}=10V$

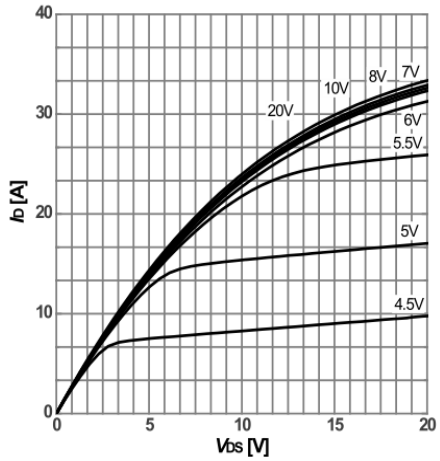


Figure 5: Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=125°C$; parameter: V_{GS}

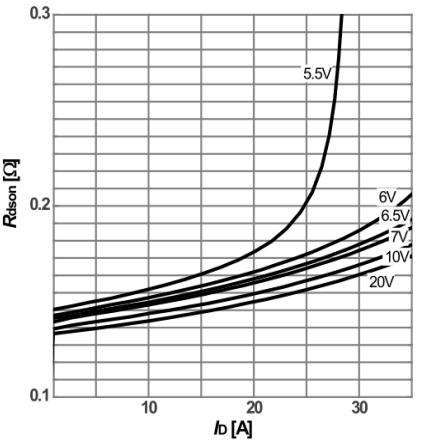
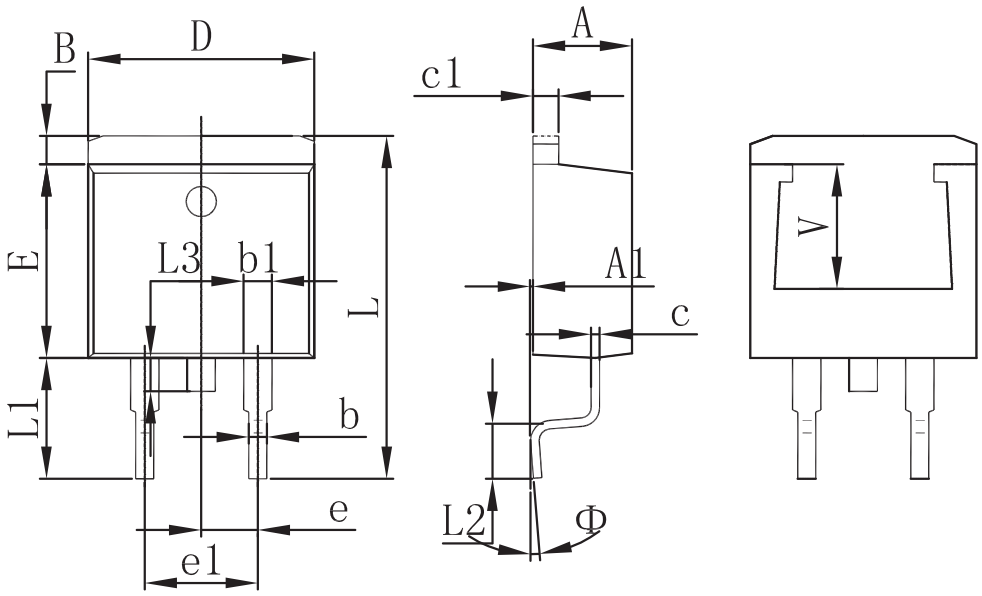


Figure 6: Type. gate charge

$R_{DS}(on)=f(I_D)$; $T_j=25°C$; parameter: V_{GS}

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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