

## General Description

The WSK40200 use advanced SGT MOSFET technology to provide low  $R_{DS(ON)}$ , low gate charge, fast switching, and excellent avalanche characteristics.

This device is specially designed to get better ruggedness and suitable to use in Synchronous-rectification applications.

## Features

- Low  $R_{DS(ON)}$  & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery
- Invertors
- Synchronous-rectification applications

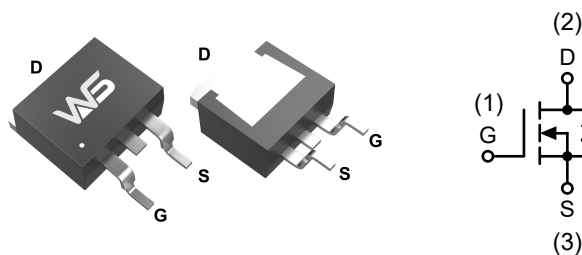
## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
40V	1.5m $\Omega$	200A

## Applications

- Consumer electronic power supply
- Motor control
- Synchronous rectification
- Isolated DC
- Synchronous-rectification applications

## TO-263-2L Pin Configuration



## Absolute Maximum Ratings ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	
$I_D$	Continuous Drain Current <sup>1</sup>	200	A
$I_{DP}$	Pulsed Drain Current <sup>2</sup>	390	
$E_{AS}$	Single Pulse Avalanche Energy <sup>4</sup>	300	mJ
$P_D$	Power Dissipation <sup>3</sup>	140	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	

## Thermal Data

Symbol	Parameter	Rating	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>5</sup>	62	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	0.89	

**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V$ , $I_D=250\mu A$	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$ , $I_D=55A$	---	1.5	2.0	m $\Omega$
		$V_{GS}=4.5V$ , $I_D=55A$	---	2.5	3.0	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$ , $I_D=250\mu A$	1.3	1.7	2.5	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=40V$ , $V_{GS}=0V$	---	---	1.0	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA
$Q_g$	Total Gate Charge	$V_{DS}=20V$ , $V_{GS}=10V$ , $I_D=20A$	---	96.8	---	nC
$Q_{gs}$	Gate-Source Charge		---	14.5	---	
$Q_{gd}$	Gate-Drain Charge		---	18.4	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=20V$ , $V_{GS}=10V$ , $R_G=2\Omega$ , $I_D=20A$	---	26.6	---	ns
$T_r$	Rise Time		---	9.3	---	
$T_{d(off)}$	Turn-off Delay Time		---	96	---	
$T_f$	Fall Time		---	39.3	---	
$C_{iss}$	Input Capacitance	$V_{DS}=20V$ , $V_{GS}=0V$ , $f=100\text{KHz}$	---	6587	---	pF
$C_{oss}$	Output Capacitance		---	2537	---	
$C_{rss}$	Reverse Transfer Capacitance		---	178	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current	---	---	130	A
$I_{SP}$	Pulsed Source Current		---	---	390	
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V$ , $I_S=20A$	---	---	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_S=20A$ , $di/dt=100A/\mu s$	---	205	---	ns
$Q_{rr}$	Reverse Recovery Charge		---	557.4	---	nC

**Note:**

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating: pulse width limited by max. junction temperature.
3.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
4.  $V_{DD}=30V$ ,  $R_G=6\Omega$ ,  $L=0.3mH$ , starting  $T_J=25^{\circ}\text{C}$ .
5. The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ .

## Typical Characteristics

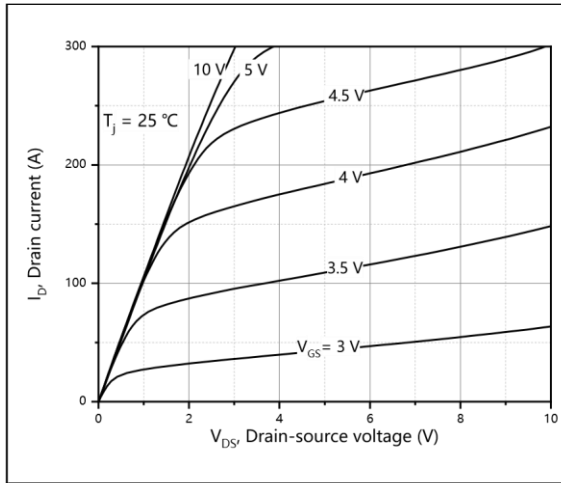


Figure 1, Typ. output characteristics

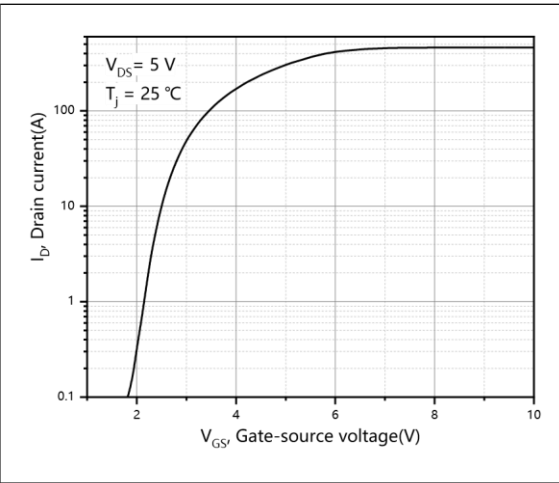


Figure 2, Typ. transfer characteristics

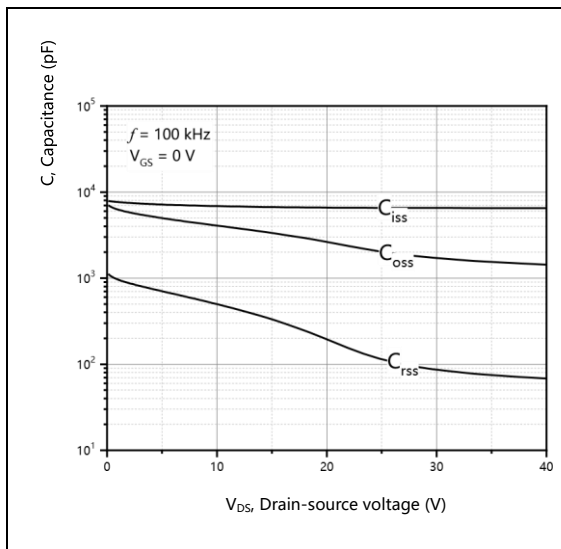


Figure 3, Typ. capacitances

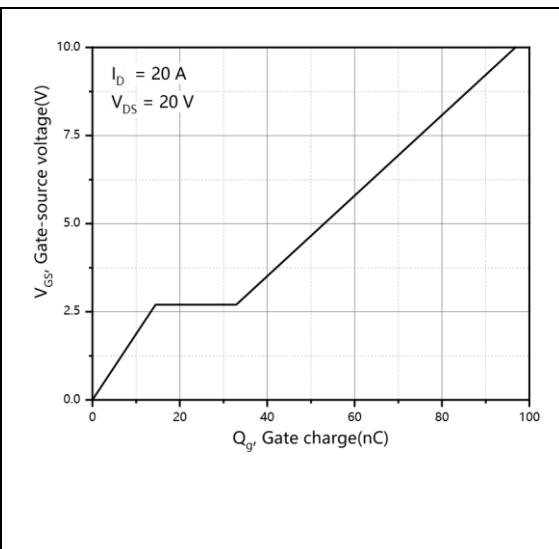


Figure 4, Typ. gate charge

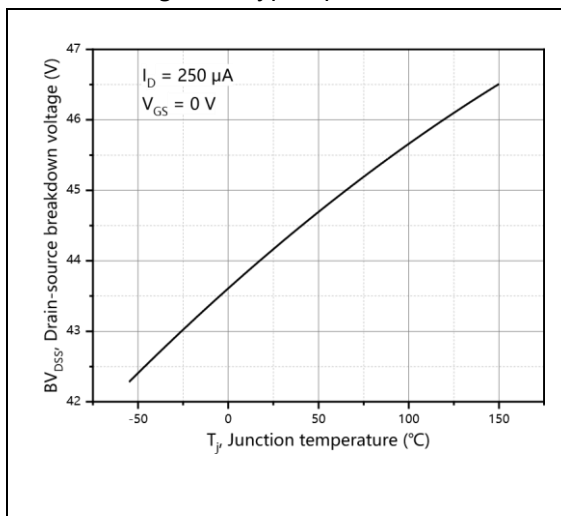


Figure 5, Drain-source breakdown voltage

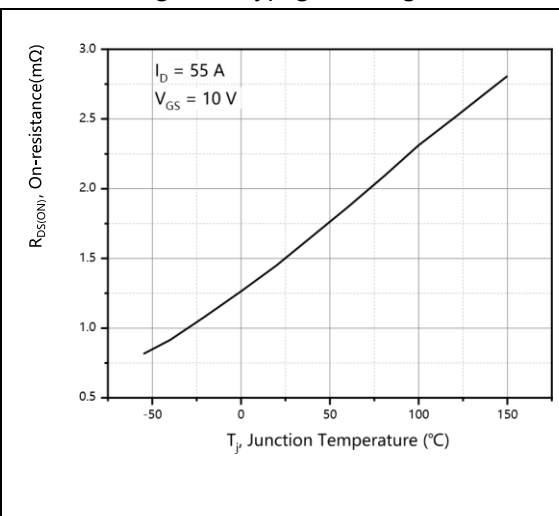


Figure 6, Drain-source on-state resistance

## Typical Characteristics (Cont.)

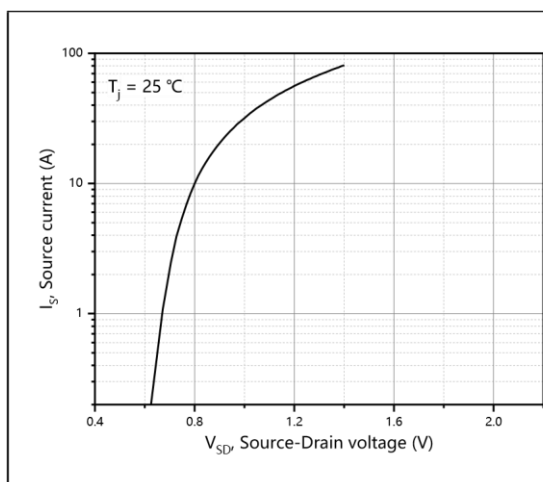


Figure 7, Forward characteristic of body diode

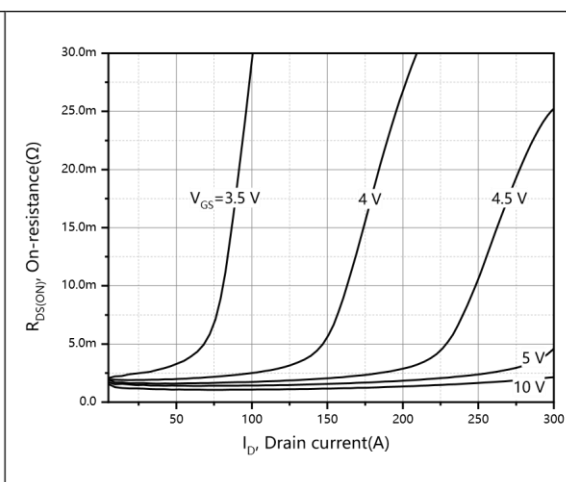


Figure 8, Drain-source on-state resistance

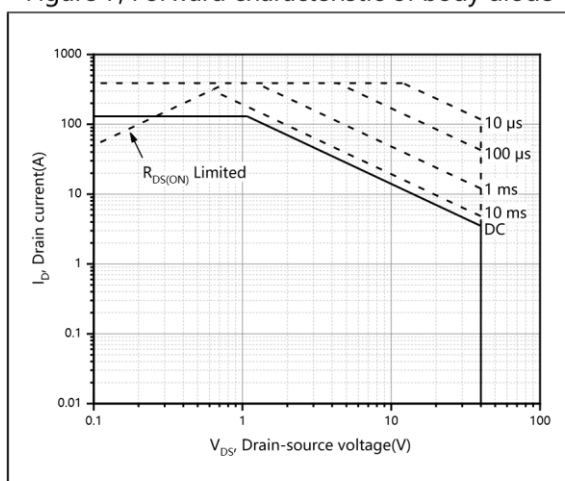
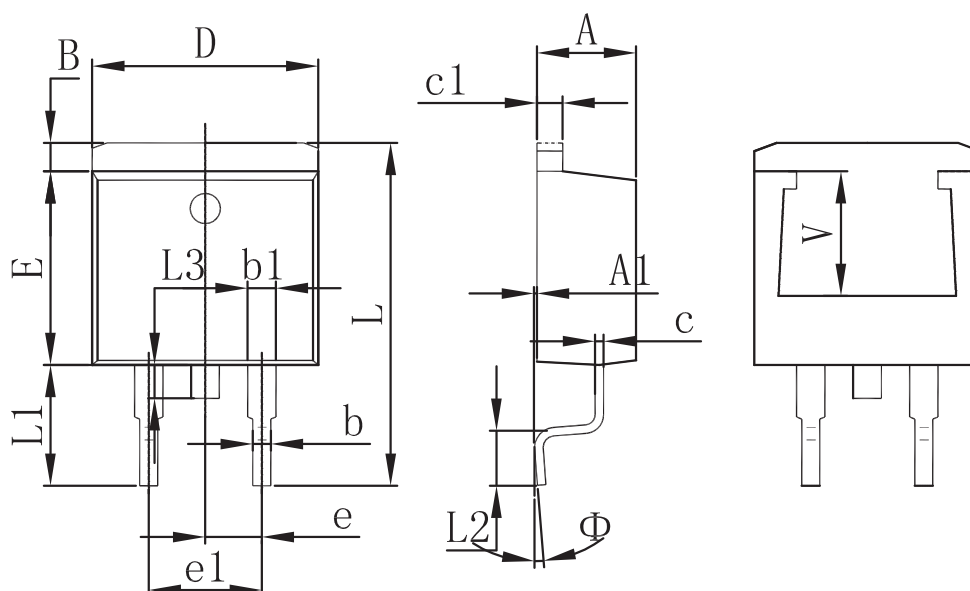


Figure 9, Safe operation area  $T_C=25\text{ }^{\circ}\text{C}$

## 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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