

General Description

The WSK120P06 is the highest performance SGT P-Channel MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSK120P06 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Features

- 100% UIS + R_g Tested.
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

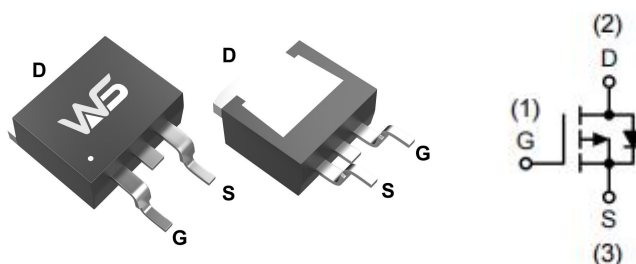
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
-60V	3.5mΩ	-120A

Applications

- Power Management for Industrial DC/DC Converters
- Load switch
- Battery protection

TO-263-2L Pin Configuration



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

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		-60	V
V_{GS}	Gate-Source Voltage		± 20	
I_D ⁷	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	-120	A
		$T_C=100^{\circ}\text{C}$	-95	
I_{DM} ³	Pulse Drain Current		-580	
P_D ²	Power Dissipation	$T_C=25^{\circ}\text{C}$	185	W
I_{AS} ³	Single pulse Avalanche Current		-90	A
E_{AS} ³	Single pulse Avalanche Energy	$L=0.3\text{mH}$	2025	mJ
T_{STG}	Storage Temperature Range		-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range		-55 to 150	
$R_{\theta JA}$ ^{1,4}	Thermal Resistance-Junction to Ambient	$t \leq 10\text{s}$	20	$^{\circ}\text{C/W}$
		Steady State	60	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.68	

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V$, $I_D=-20A$	---	3.5	4.2	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-2.0	-2.4	-3.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-60V$, $V_{GS}=0V$	---	---	-1.0	μA
I_{GSS}	Gate-Source Leakage Current	$V_{DS}=0V$, $V_{GS}=\pm 20V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V$, $I_D=-20A$	---	50	---	S
R_G	Gate Resistance	$f=1.0\text{MHz}$	---	2.5	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=-30V$, $V_{GS}=-10V$, $I_D=-20A$	---	135	---	nC
Q_{gs}	Gate-Source Charge		---	29	---	
Q_{gd}	Gate-Drain Charge		---	23	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=-30V$, $V_{GS}=-10V$, $I_D=-20A$ $R_L=1\Omega$, $R_{GEN}=3\Omega$	---	70	---	ns
T_r	Rise Time		---	45	---	
$T_{d(off)}$	Turn-Off Delay Time		---	168	---	
T_f	Fall Time		---	50	---	
C_{iss}	Input Capacitance	$V_{DS}=-30V$, $V_{GS}=0V$, $f=1.0\text{MHz}$	---	9200	---	pF
C_{oss}	Output Capacitance		---	1600	---	
C_{rss}	Reverse Transfer Capacitance		---	89	---	

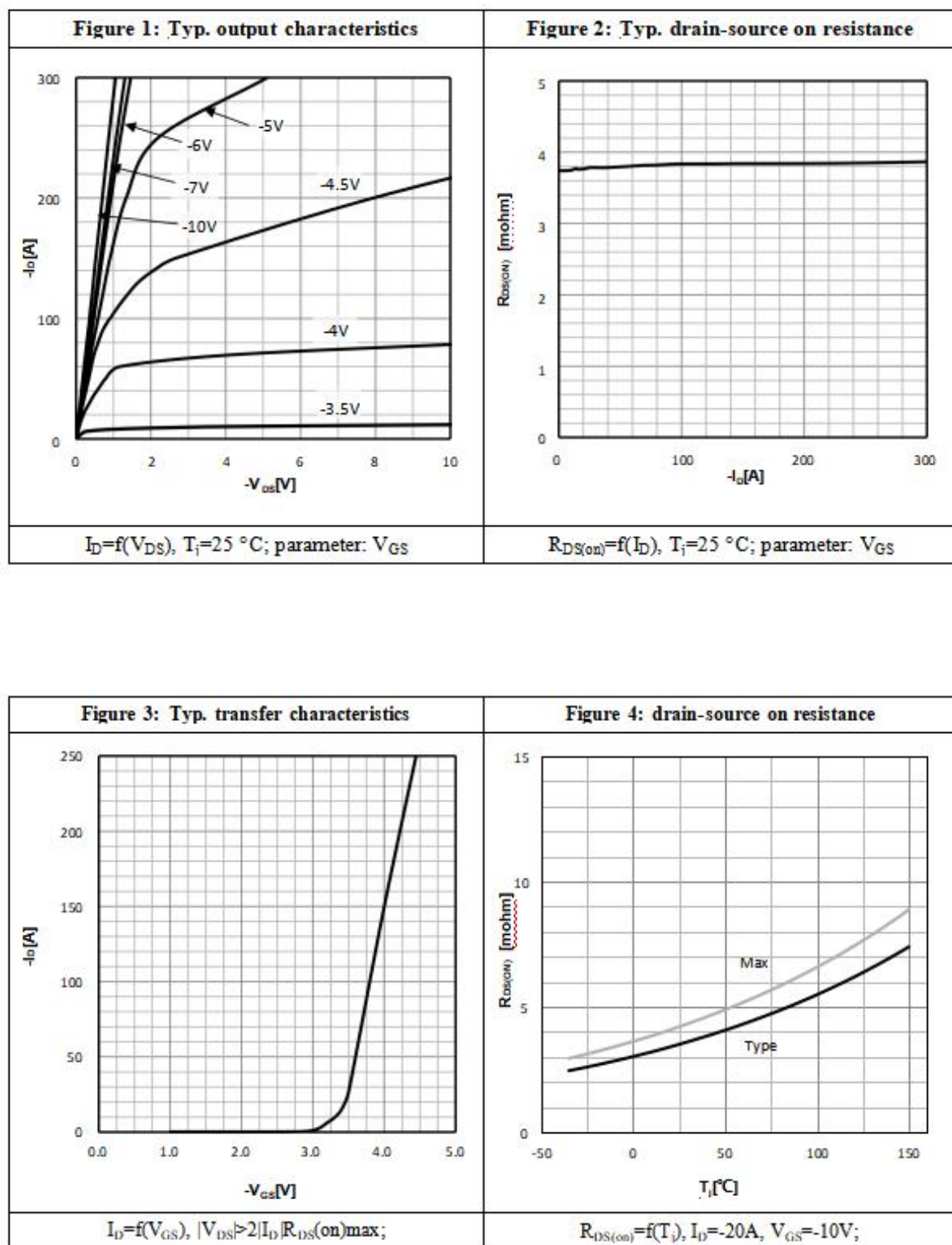
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S^7	Continuous Source Current		---	---	-120	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=-1A$	---	-0.7	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-20A$, $di/dt=500A/\mu s$	---	46	---	ns
Q_{rr}	Reverse Recovery Charge		---	102	---	nC

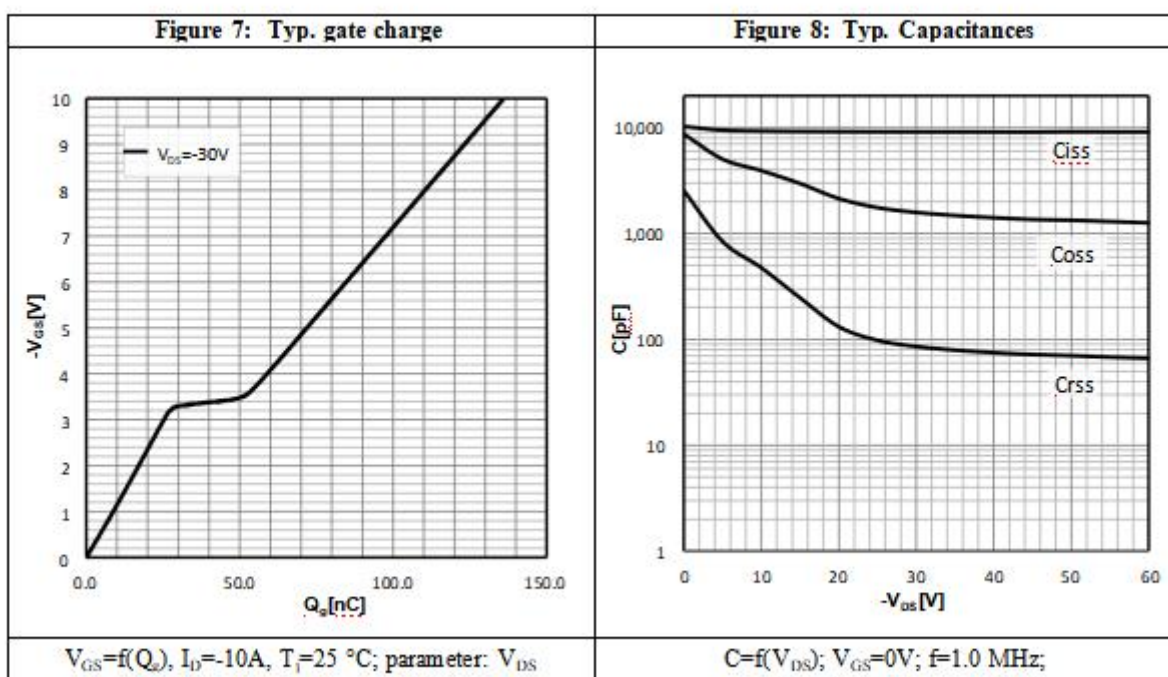
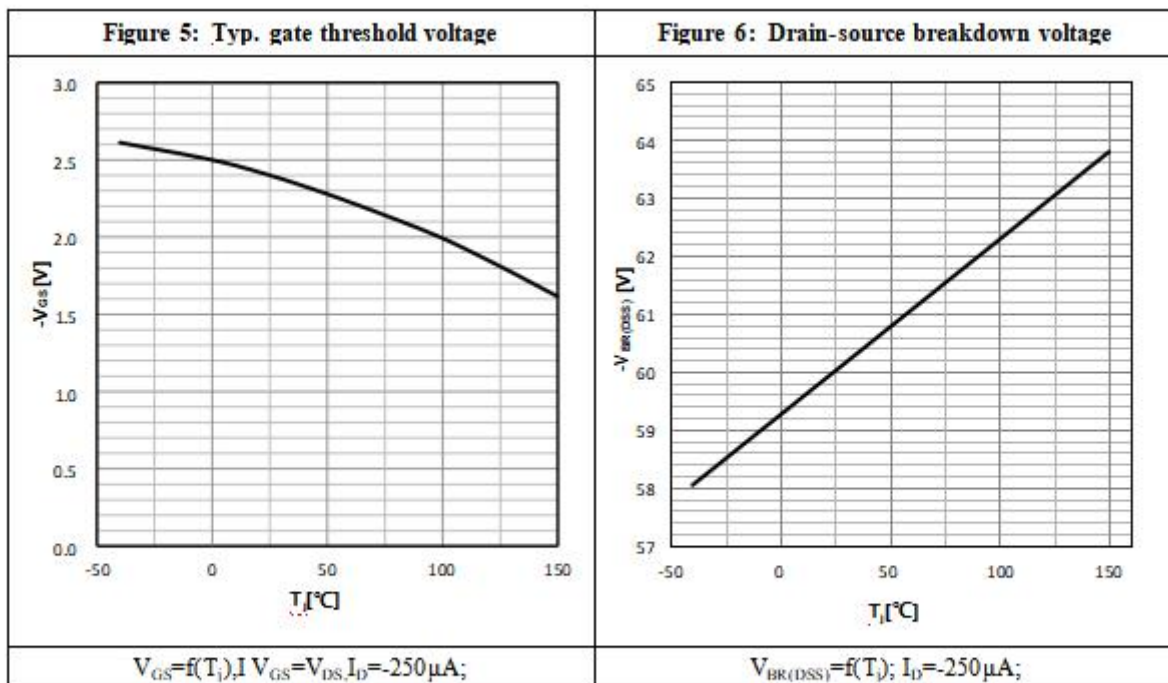
Note:

- The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} \leq 10s$ and the maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.
- The power dissipation P_D is based on $T_{J(MAX)}=150^{\circ}\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- Single pulse width limited by junction temperature $T_{J(MAX)}=150^{\circ}\text{C}$.
- The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
- The static characteristics in Figures 1 to 6 are obtained using $<300\mu s$ pulses, duty cycle 0.5% max.
- These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}=150^{\circ}\text{C}$. The SOA curve provides a single pulse rating.
- The maximum current rating is package limited.
- These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$.
- The maximum current rating is silicon limited

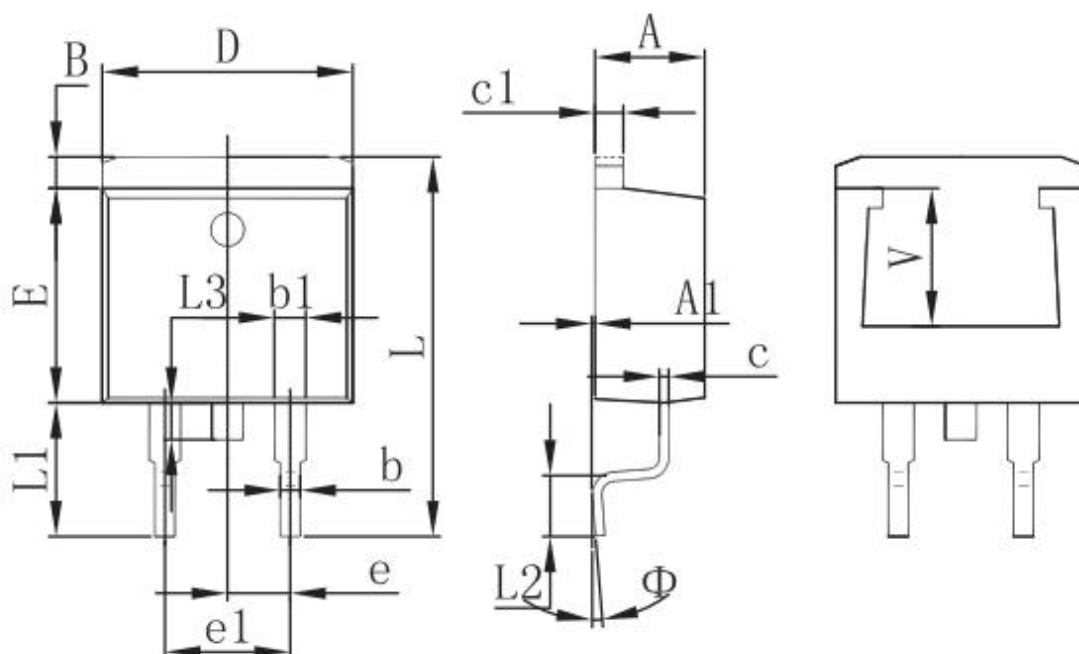
Typical Characteristics



Typical Characteristics (Cont.)



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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