General Description

The WSM150P06G 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 WSM150P06G 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 Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
-60V	3.2mΩ	-150A

Applications

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

TOLL-8L Pin Configuration

Absolute Maximum Ratings (T_A=25°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°C	-150	A
		T_C=100°C	-100	
I_{DM} [3]	Pulse Drain Current		-650	
P_D [2]	Power Dissipation	T_C=25°C	185	W
I_{AS} [3]	Single pulse Avalanche Current		-90	A
E_{AS} [3]	Single pulse Avalanche Energy	L=0.3mH	2025	mJ
T_{STG}	Storage Temperature Range		-55 to 150	°C
T_J	Operating Junction Temperature Range		-55 to 150	
$R_{\theta JA}$ [1,4]	Thermal Resistance-Junction to Ambient	t≤10s	20	°C/W
		Steady State	60	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.68	

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	-60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-20A	---	3.2	4.2	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=-250μA	-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}=±20V	---	---	±100	nA
g_{fs}	Forward Transconductance	V_{DS}=-5V , I_D=-20A	---	50	---	S
R_G	Gate Resistance	f=1.0MHz	---	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=1Ω , R_{GEN}=3Ω	---	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=1.0MHz	---	9200	---	pF
C_{oss}	Output Capacitance		---	1600	---	
C_{rss}	Reverse Transfer Capacitance		---	89	---	

Diode Characteristics

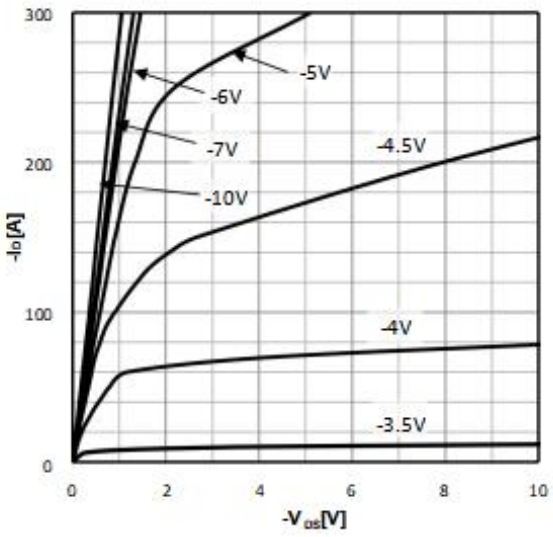
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S [7]	Continuous Source Current		---	---	-150	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A	---	-0.7	-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-20A , di/dt=500A/μs	---	46	---	ns
Q_{rr}	Reverse Recovery Charge		---	102	---	nC

Note:

1. 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°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
2. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3. Single pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
4. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
5. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
6. 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°C. The SOA curve provides a single pulse rating.
7. The maximum current rating is package limited.
8. 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°C.
9. The maximum current rating is silicon limited

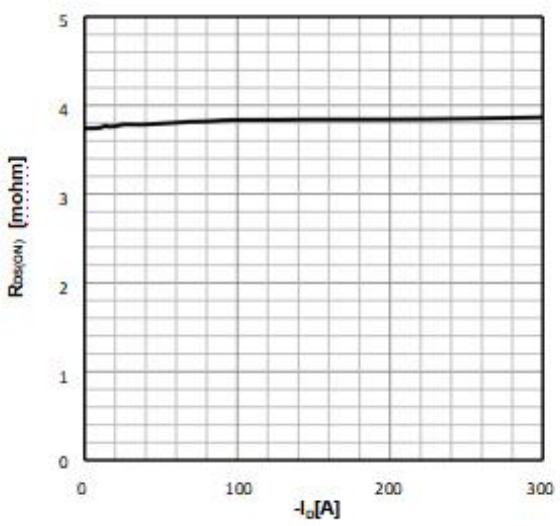
Typical Characteristics

Figure 1: Typ. output characteristics



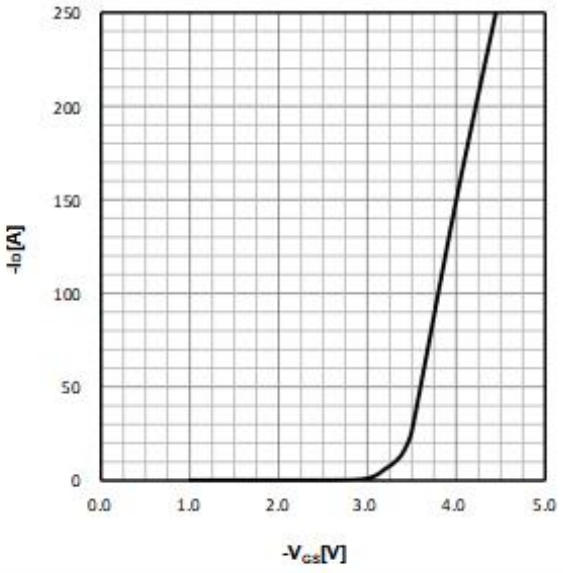
$I_D=f(V_{DS})$, $T_j=25$ °C; parameter: V_{GS}

Figure 2: Typ. drain-source on resistance



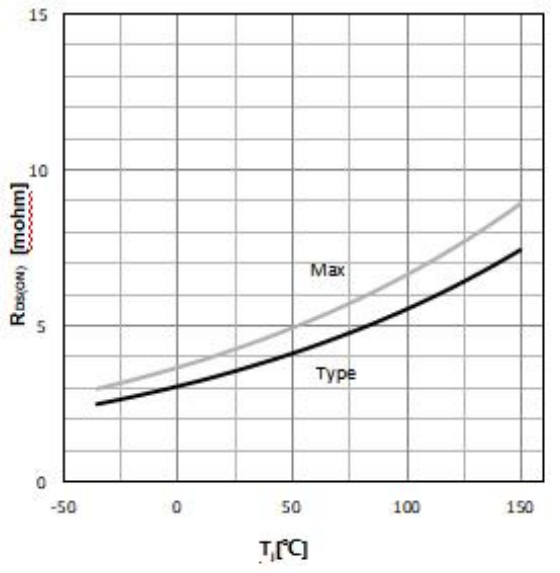
$R_{DS(on)}=f(I_D)$, $T_j=25$ °C; parameter: V_{GS}

Figure 3: Typ. transfer characteristics



$I_D=f(V_{GS})$, $|V_{DS}|>2|I_D|R_{DS}(on)max$;

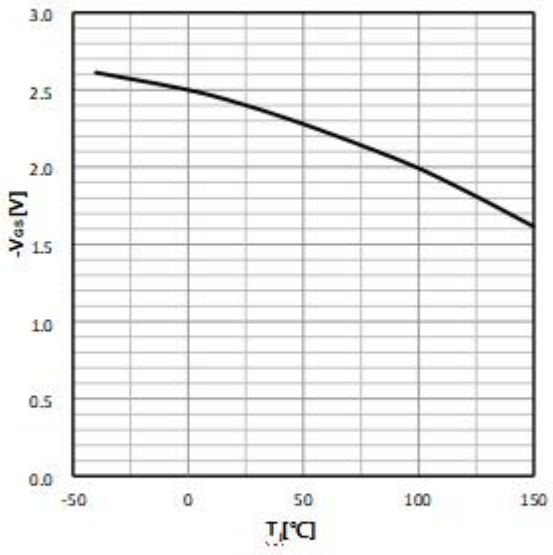
Figure 4: drain-source on resistance



$R_{DS(on)}=f(T_j)$, $I_D=-20A$, $V_{GS}=-10V$;

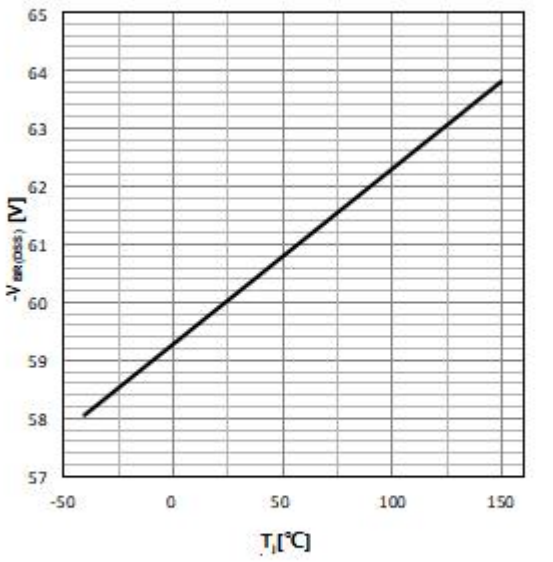
Typical Characteristics (Cont.)

Figure 5: Typ. gate threshold voltage



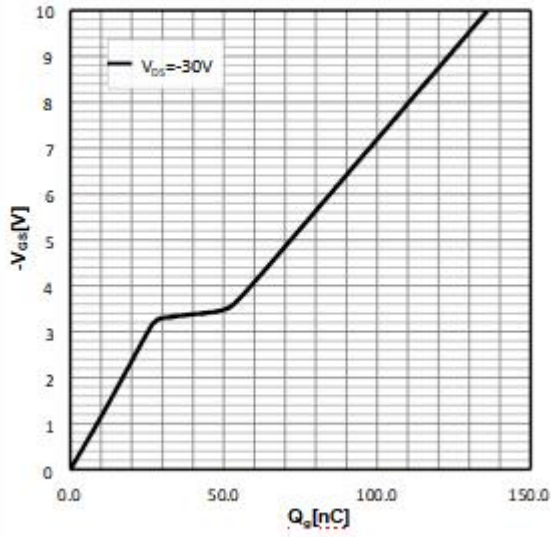
V_{GS}=f(T_j),I V_{GS}=V_{DS},I_D=-250μA;

Figure 6: Drain-source breakdown voltage



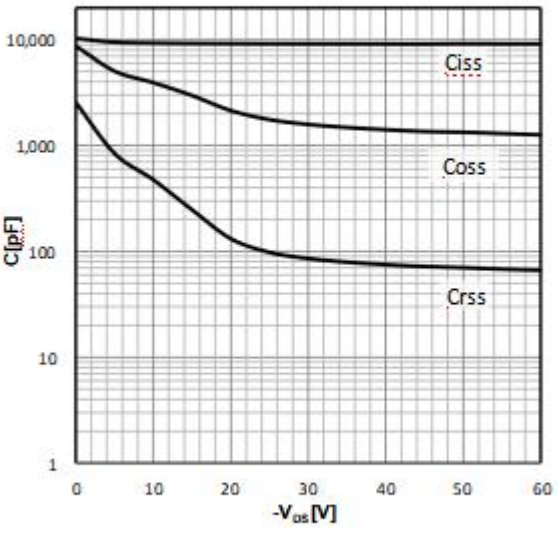
$V_{BR(DSS)}$=f(T_j); I_D=-250μA;

Figure 7: Typ. gate charge



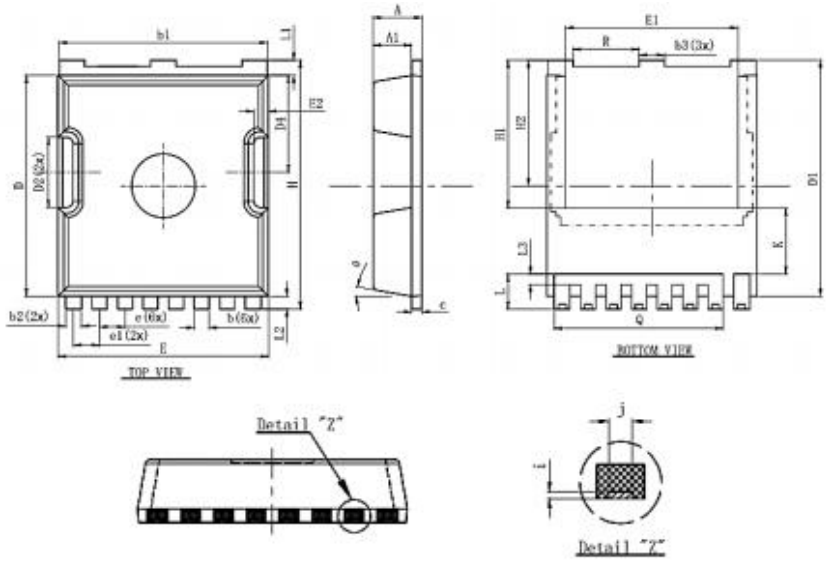
V_{GS}=f(Q_g), I_D=-10A, T_j=25 °C; parameter: V_{DS}

Figure 8: Typ. Capacitances



C=f(V_{DS}); V_{GS}=0V; f=1.0 MHz;

Packaging information



Symbol	Dimensions In Millimeters		
	Min.	Nom	Max.
A	2.2	2.3	2.4
A1	1.7	1.8	1.9
b	0.6	0.7	0.8
b1	9.7	9.8	9.9
b2	0.65	0.75	0.85
b3	1.1	1.2	1.3
C	0.4	0.5	0.6
D	10.3	10.4	10.5
D1	11.0	11.1	11.2
D2	3.2	3.3	3.4
D4	4.47	4.57	4.67
E	9.8	9.9	10.0
E1	8.0	8.1	8.2
E2	0.5	0.6	0.7
e	1.200（BSC）		
e1	1.225（BSC）		
H	11.6	11.7	11.8
H1	6.95BSC		
H2	5.9BSC		
i	0.1REF		
j	0.350REF		
K	3.100REF		
L	1.55	1.65	1.75
L1	0.6	0.7	0.8
L2	0.5	0.6	0.7
L3	0.4	0.5	0.6
Q	7.95REF		
R	3.0	3.1	3.2
θ	10°REG		

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