SHENZHEN HAOLIN ELECTRONICS TECHNOLOGY CO., LTD

SOT-23 Plastic-Encapsulate MOSFET

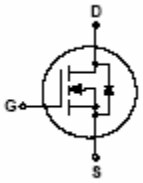
HL2300 MOSFET (N-Channel)

SOT-23

1. GATE
2. SOURCE
3. DRAIN

FEATURES

- 20V, 4A, $R_{DS(ON)}$ =55mΩ @V_{GS}=4.5V.
  20V, 3.4A, $R_{DS(ON)}$=70mΩ @V_{GS}=2.5V.
  20V, 2.8A, $R_{DS(ON)}$=90mΩ @V_{GS}=1.8V.
- High dense cell design for extremely low $R_{DS(ON)}$.
- Exceptional on-resistance and maximum DC current capability



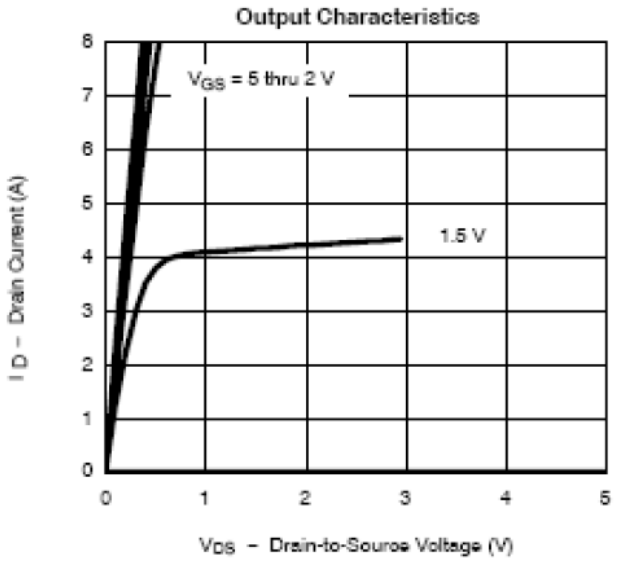
MAXIMUM RATINGS (T_A=25℃ unless otherwise noted)

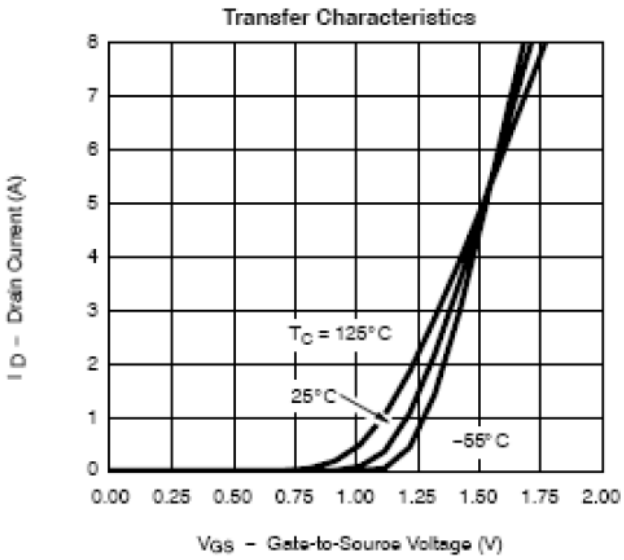
Symbol	Parameter	Value	Units
V_{DS}	Drain-Source voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current	4	A
I_{DM}	Drain Current-Pulsed	10	A
P_D	Power Dissipation	0.25	W
T_J	Junction Temperature	150	℃
T_{stg}	Storage Temperature	-55-150	℃
RθJA	Thermal Resistance, Junction-to-Ambient	500	℃ /W

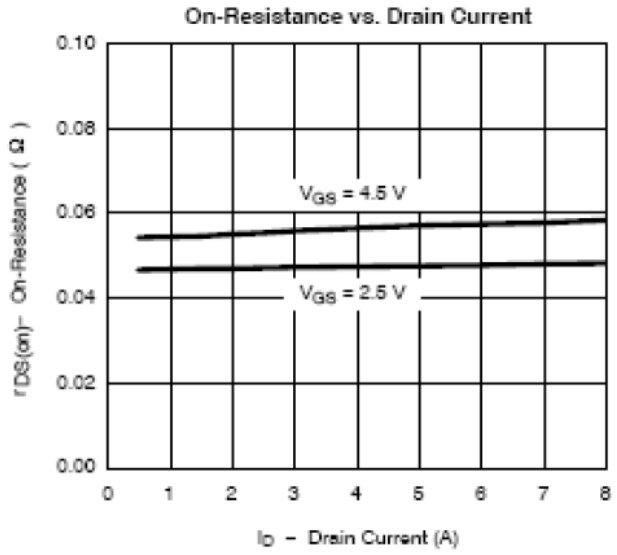
ELECTRICAL CHARACTERISTICS (Tamb=25℃ unless otherwise specified)

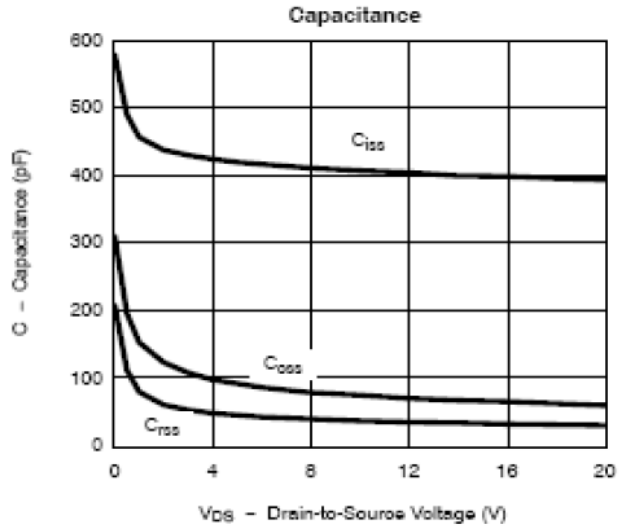
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D =250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =20V, V_{GS} =0			1	μA
Gate Body Leakage Current, Forward	I_{GSSF}	V_{GS} = 12V, V_{DS} = 0V			100	nA
Gate Body Leakage Current, Reverse	I_{GSSR}	V_{GS} = -12V, V_{DS} = 0V			-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D =250μA	0.4		1	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} =4.5V, I_D =4A			55	mΩ
		V_{GS} =2.5V, I_D =3.4A			70	mΩ
		V_{GS} =1.8V, I_D =2.8A			90	mΩ
Forward Transconductance	g_{FS}	V_{DS} =5V, I_D =-3.6A	6			S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} =6, V_{GS} = 0V, f = 1 MHz		485		pF
Output Capacitance	C_{oss}			85		pF
Reverse Transfer Capacitance	C_{rss}			40		pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} =6V, I_D =1A, V_{GEN} =4.5V, R_G=6Ω, R_L=6Ω			14	ns
Turn-On Rise Time	t_r				18	ns
Turn-Off Delay Time	$t_{d(off)}$				35	ns
Turn-Off Fall Time	t_f				16	ns
Total Gate Charge	Q_g	V_{DS} =6V, I_D =2.8A, V_{GS} =4.5V		4.8	8	nC
Gate-Source Charge	Q_{gs}			1.0		nC
Gate-Drain Charge	Q_{gd}			1.0		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S =1.6A			1.2	V

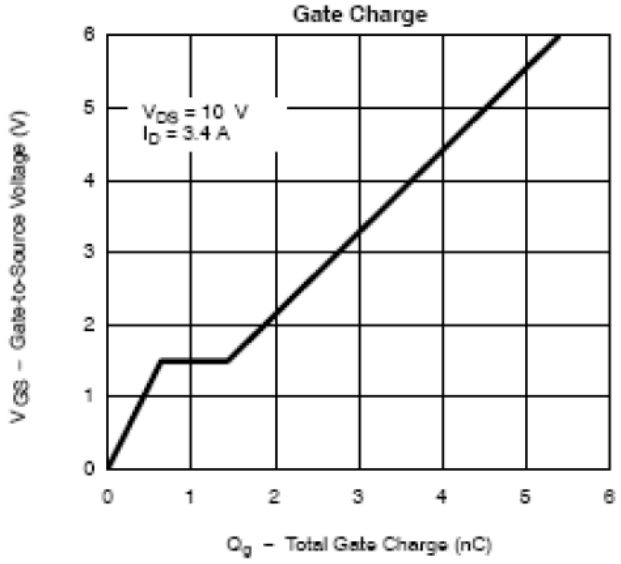
Typical characteristics

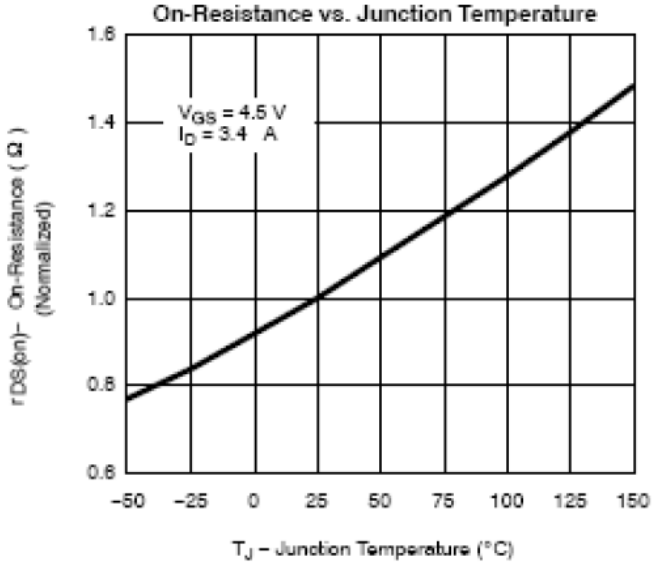


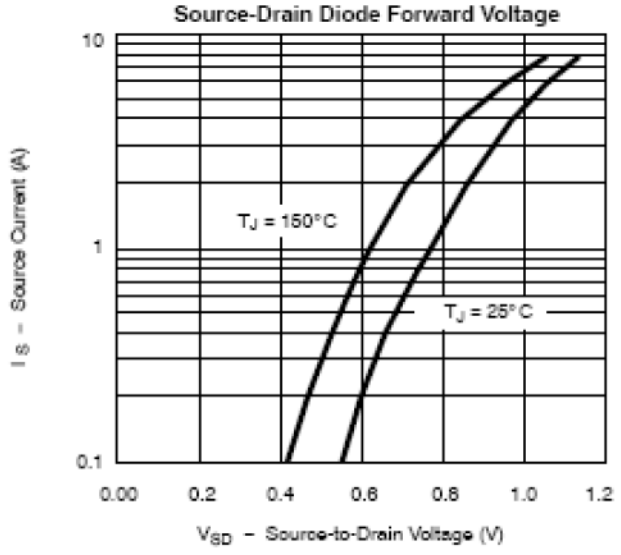


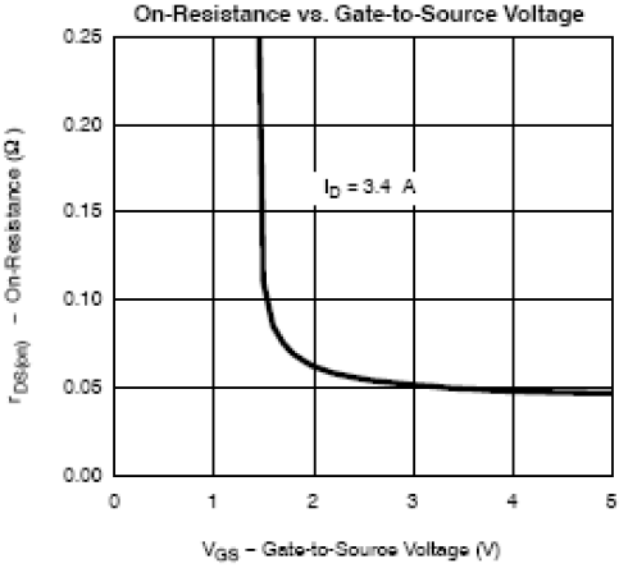


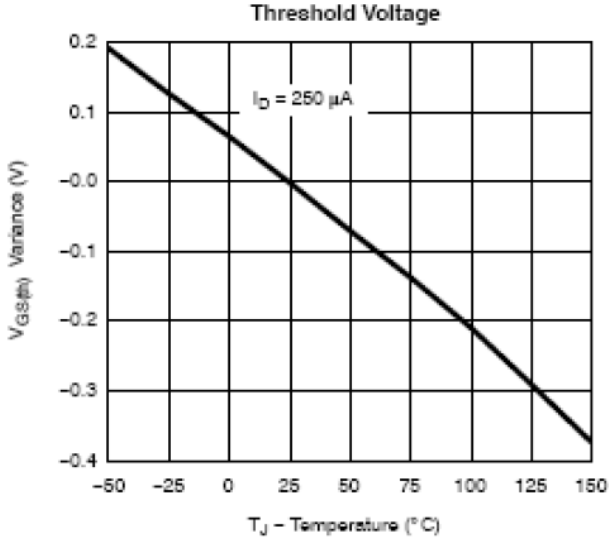


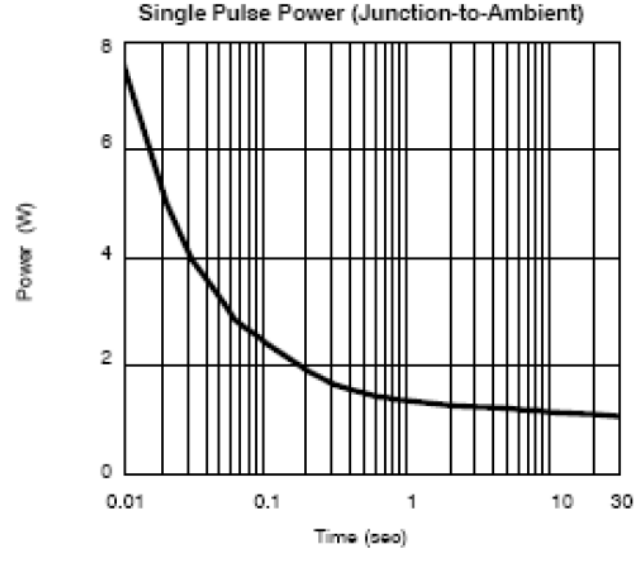

Gate Charge
V_{DS} = 10 V
I_D = 3.4 A
V_{GS} – Gate-to-Source Voltage (V)
Q_g – Total Gate Charge (nC)

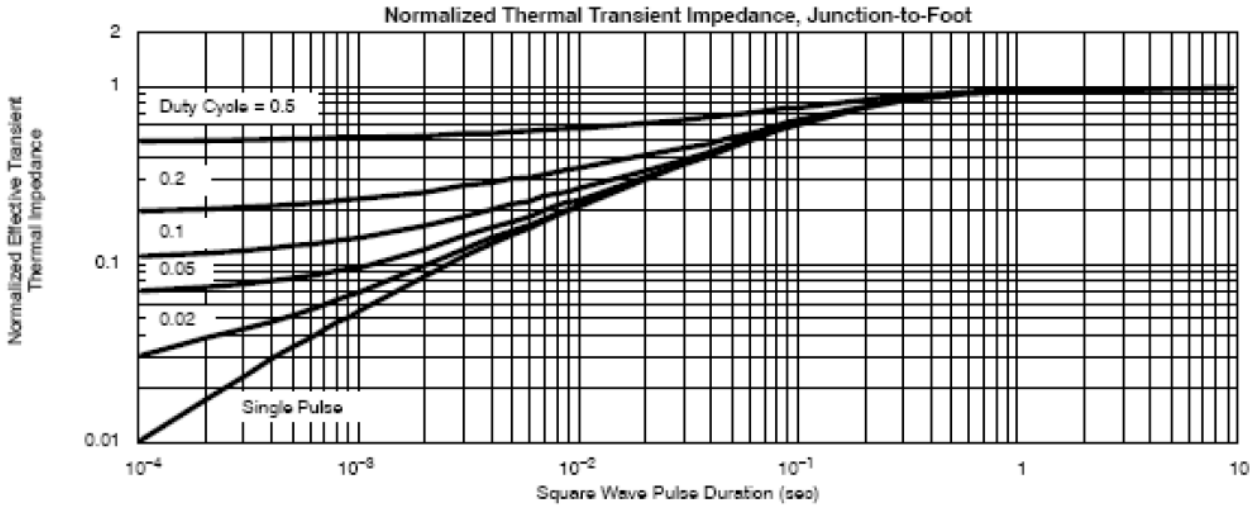

On-Resistance vs. Junction Temperature
V_{GS} = 4.5 V
I_D = 3.4 A
$r_{DS(on)}$ – On-Resistance (Ω) (Normalized)
T_J – Junction Temperature (°C)


Source-Drain Diode Forward Voltage
T_J = 150°C
T_J = 25°C
I_S – Source Current (A)
V_{SD} – Source-to-Drain Voltage (V)


On-Resistance vs. Gate-to-Source Voltage
I_D = 3.4 A
$r_{DS(on)}$ – On-Resistance (Ω)
V_{GS} – Gate-to-Source Voltage (V)


Threshold Voltage
I_D = 250 µA
$V_{GS(th)}$ Variance (V)
T_J – Temperature (°C)


Single Pulse Power (Junction-to-Ambient)
Power (W)
Time (sec)


Normalized Thermal Transient Impedance, Junction-to-Foot
Normalized Effective Transient Thermal Impedance
2
1
0.1
0.01
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
10
Square Wave Pulse Duration (sec)