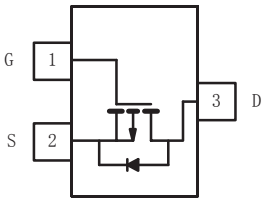
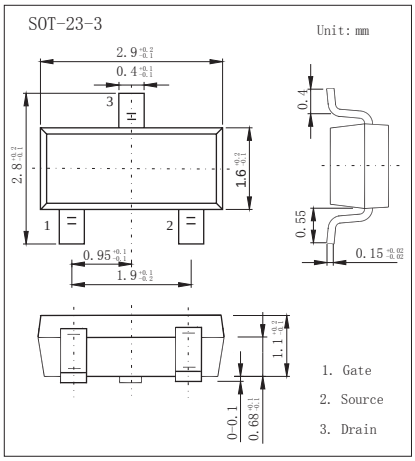
SI2301

P-Channel Enhancement MOSFET

- Features
- $V_{DS\ (V)}$ =-20V
- $R_{DS(ON)}$ < 100mΩ (V_{GS} =-4.5V)
- $R_{DS(ON)}$ < 150mΩ (V_{GS} =-2.5V)





Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	5 sec	Steady State	Unit
Drain-Source Voltage	V_{DS}	-20		V
Gate-Source Voltage	V_{GS}	±8		
Continuous Drain Current Ta=25℃ (T_J=150℃)*1	I_D	-3.2	-2.9	A
Ta=70℃		-2.5	-2.3	
Pulsed Drain Current *2	I_{DM}	-10		
Power Dissipation *1 Ta=25℃	P_D	0.9	0.7	W
Ta=70℃		0.57	0.45	
Thermal Resistance.Junction- to-Ambient *1	R_{thJA}	120	145	℃/W
*3		140	175	
Junction Temperature	T_J	150		℃
Storage Temperature Range	T_{stg}	-55 to 150		

*1 Surface Mounted on FR4 Board, t ≤ 5 sec.

*2 Pulse width limited by maximum junction temperature.

*3 Surface Mounted on FR4 Board.

Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=-250μA, V_{GS}=0V	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V			-1	μA
		V_{DS}=-20V, V_{GS}=0V, T_J=55℃			-10	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=-250μA	-0.45		-0.95	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-2.8A		80	100	mΩ
		V_{GS}=-2.5V, I_D=-2.0A		110	150	
On state drain current *1	$I_{D(ON)}$	V_{GS}=-4.5V, V_{DS} ≤ -5V	-6			A
		V_{GS}=-2.5V, V_{DS} ≤ -5V	-3			
Forward Transconductance *1	g_{FS}	V_{DS}=-5V, I_D=-2.8A		6.5		S
Input Capacitance *2	C_{iss}	V_{GS}=0V, V_{DS}=-6V, f=1MHz		375		pF
Output Capacitance *2	C_{oss}			95		
Reverse Transfer Capacitance *2	C_{rss}			65		
Total Gate Charge *2	Q_g	V_{GS}=-4.5V, V_{DS}=-6V, I_D=-2.8A		4.5	10	nC
Gate Source Charge *2	Q_{gs}			0.7		
Gate Drain Charge *2	Q_{gd}			1.1		
Turn-On DelayTime *3	$t_{d(on)}$	V_{GS}=-4.5V, V_{DS}=-6V, R_L=6Ω, R_{GEN}=6Ω I_D=-1.0A		20	30	ns
Turn-On Rise Time *3	t_r			40	60	
Turn-Off DelayTime *3	$t_{d(off)}$			30	45	
Turn-Off Fall Time *3	t_f			20	30	
Maximum Body-Diode Continuous Current	I_S	5 sec			-0.72	A
		Steady State			-0.6	
Diode Forward Voltage	V_{SD}	I_S=-0.75A,V_{GS}=0V		-0.8	-1.2	V

*1 Pulse test: PW ≤ 300us duty cycle ≤ 2%.

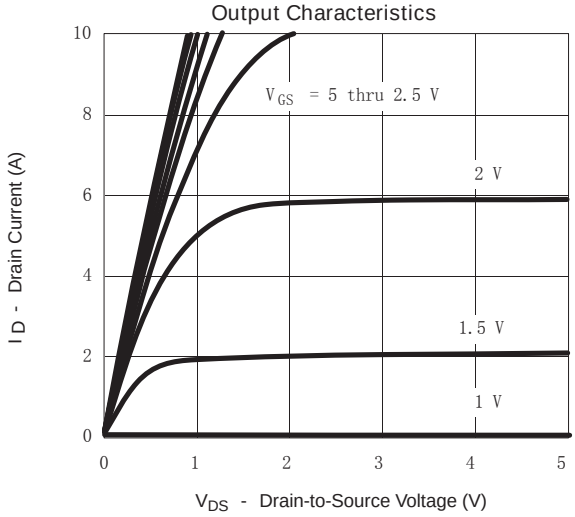
*2 For DESIGN AID ONLY, not subject to production testing.

*3 Switching time is essentially independent of operating temperature.

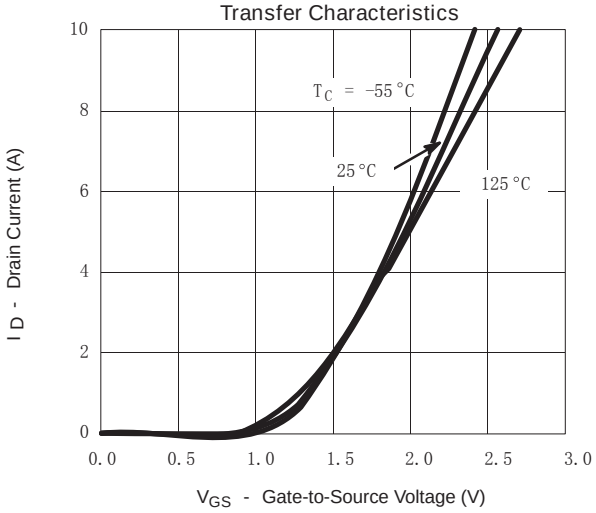
Marking

Marking	A1*

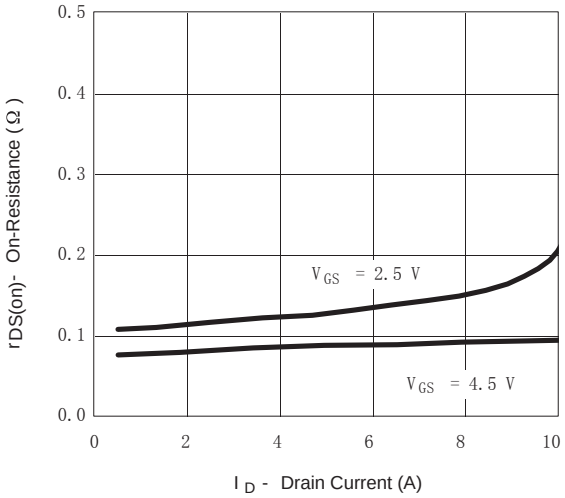
Output Characteristics



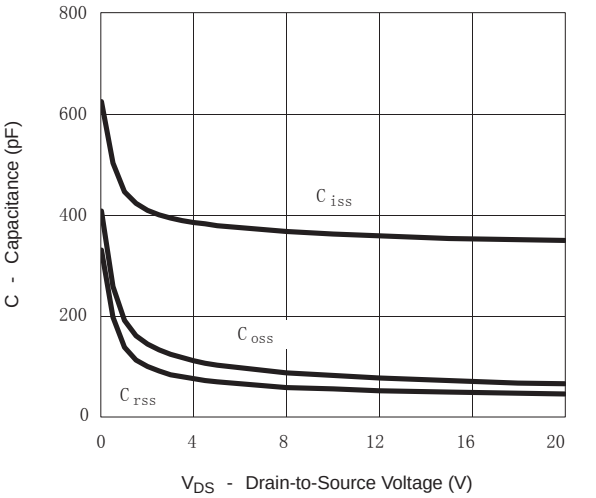
Transfer Characteristics



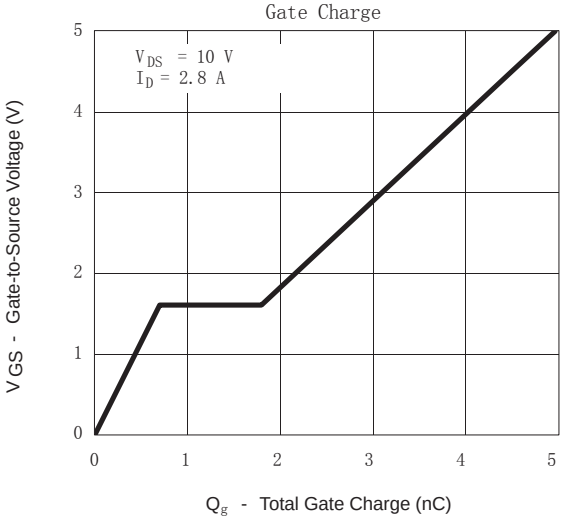
On-Resistance vs. Drain Current



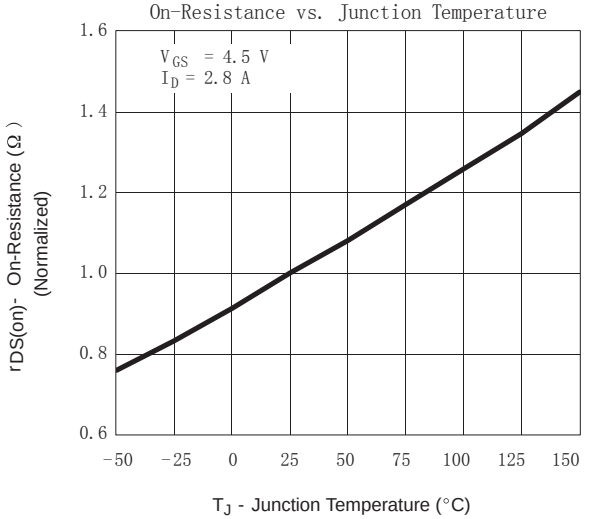
Capacitance



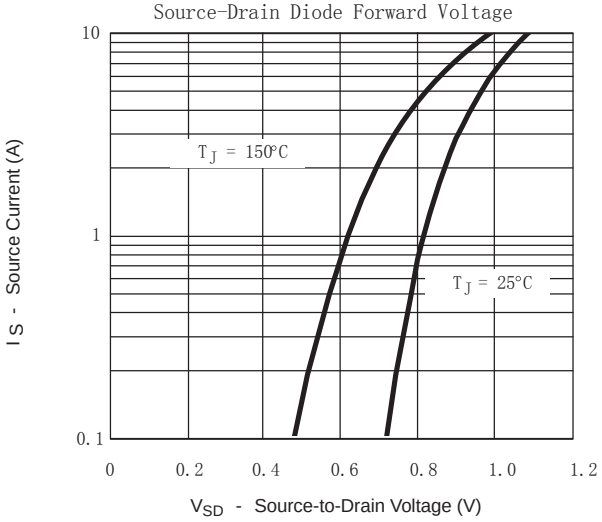
Gate Charge



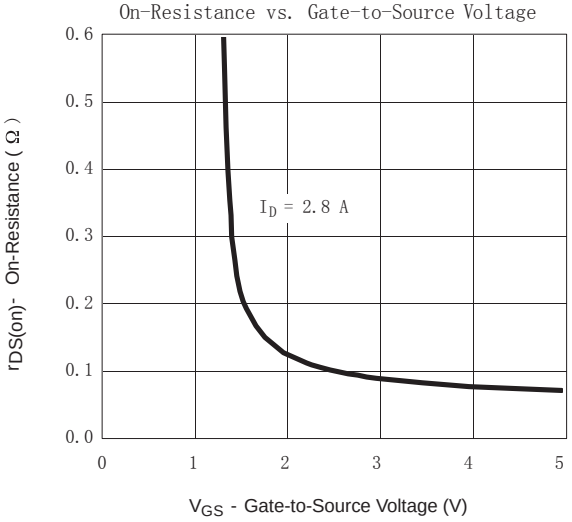
On-Resistance vs. Junction Temperature



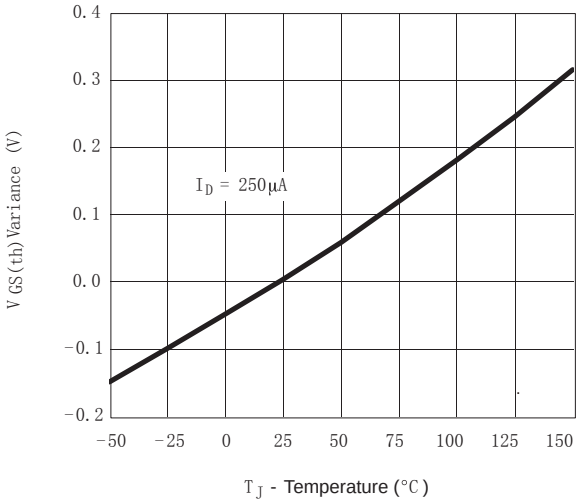
Source-Drain Diode Forward Voltage



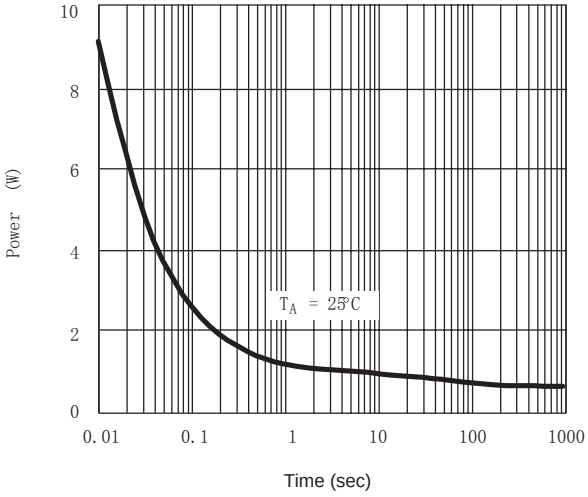
On-Resistance vs. Gate-to-Source Voltage



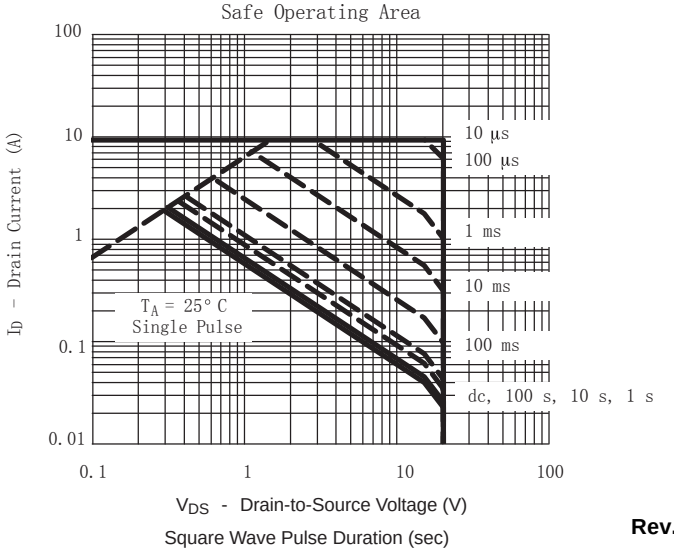
Threshold Voltage

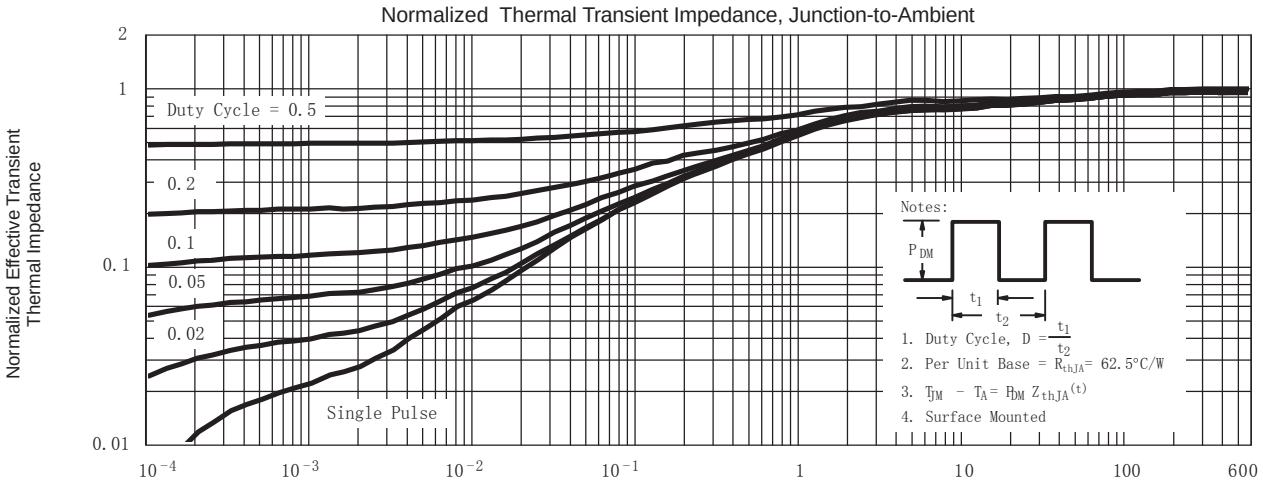


Single Pulse Power



Safe Operating Area




Normalized Thermal Transient Impedance, Junction-to-Ambient
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
Notes:
P DM
t1
t2
1. Duty Cycle, D = t1/t2
2. Per Unit Base = RthJA= 62.5°C/W
3. TJM - TA= PDM ZthJA(t)
4. Surface Mounted
10-4
10-3
10-2
10-1
1
10
100
600