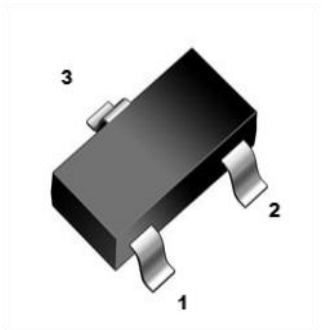
XN2305A

20V P-Channel MOSFET

Features

SOT-23

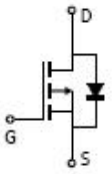


• TrenchFET Power MOSFET

Mechanical Data

• Case:Molded Plastic,SOT-23 .
• Epoxy:UL 94V-0 rate flame retardant
• Terminals:Plated Leads Solderable perMIL-STD-750,Method-2026.
• Marking: S5A
• Mounting Position : Any.
• Equivalent Circuit:

1 Gate
2 Source
3 Drain



Maximum Ratings and Electrical Characteristics

Rating at 25℃ ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	I_D	-4.2	A
Pulsed Drain Current [1]	I_{DM}	-16.8	A
Power Dissipation	P_D	1.25	W
Thermal Resistance from Junction to Ambient [2]	$R_{\theta JA}$	112	℃/W
Junction Temperature	T_J	-55~ +150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

Electrical Characteristics

Rating at 25℃ ambient temperature unless otherwise specified.

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-20			V
Gate-source threshold voltage[3]	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-0.4		-1	
Gate-source leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} =±10V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} =-20V,V_{GS} = 0V			-1	μA
Drain-source on-resistance[3]	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-3A		34	42	mΩ
		V_{GS} =-2.5V, I_D =-2A		42	54	
Dynamic Characteristics[4]						
Input capacitance	C_{iss}	V_{DS} =-10V,V_{GS} =0V,f =1MHz		854		pF
Output capacitance	C_{oss}			150		
Reverse transfer capacitance	C_{rss}			90		
Total gate charge	Q_g	V_{DS} =-10V,V_{GS} =-10V,I_D =-3A		9.6		nC
Gate-source charge	Q_{gs}			1.6		
Gate-drain charge	Q_{gd}			2		
Turn-on delay time	$t_{d(on)}$	V_{DS}=-15V,I_D=-1A V_{GS}=-4.5V,R_G=3Ω		11		ns
Turn-on rise time	t_r			34		
Turn-off delay time	$t_{d(off)}$			51		
Turn-off fall time	t_f			14		
Source-drain diode characteristics and maximum ratings						
Diode forward voltage[3]	V_{SD}	I_S= - 2A, VGS = 0V			-1.2	V

Note :

1. Repetitive rating：Pluse width limited by maximum junction temperature
2. Surface Mounted on FR4 board，t≤10 sec.
3. Pulse test : Pulse width≤300μs, duty cycle≤2%.
4. Guaranteed by design, not subject to production.

Rating And Characteristic Curves

Fig.1 Static Characteristic

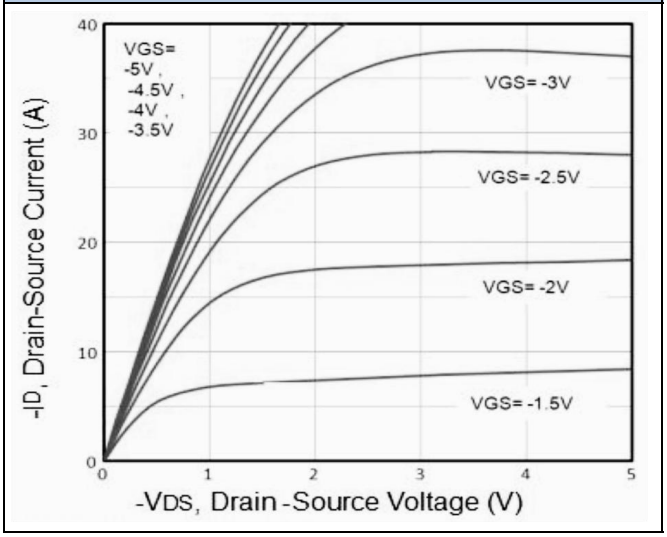


Fig.2 Normalized Threshold Voltage vs. Temperature

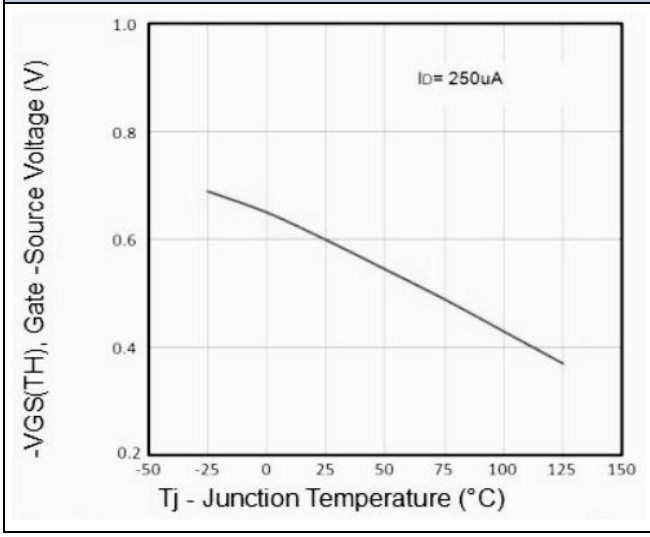


Fig.3 Typical Transfer Characteristics

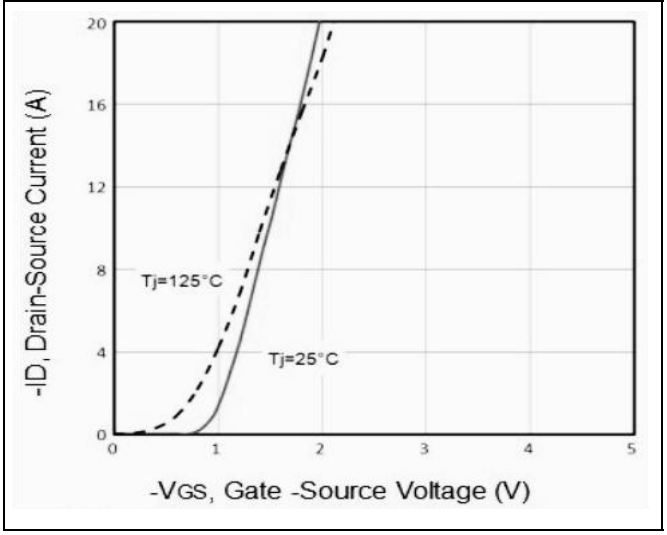


Fig.4 On-Resistance vs. Drain Current and Gate Voltage

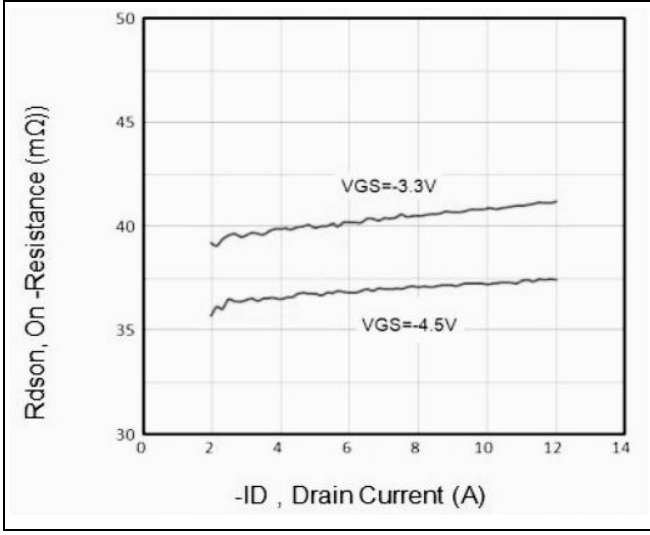


Fig.5 Typical Source-Drain Diode Forward Voltage

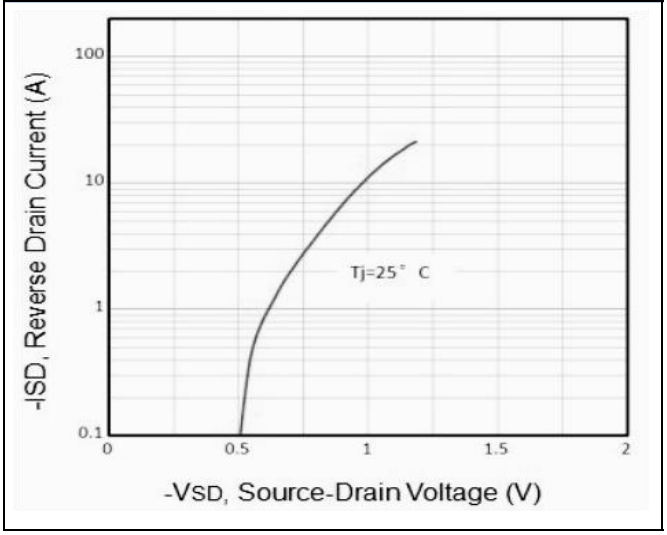
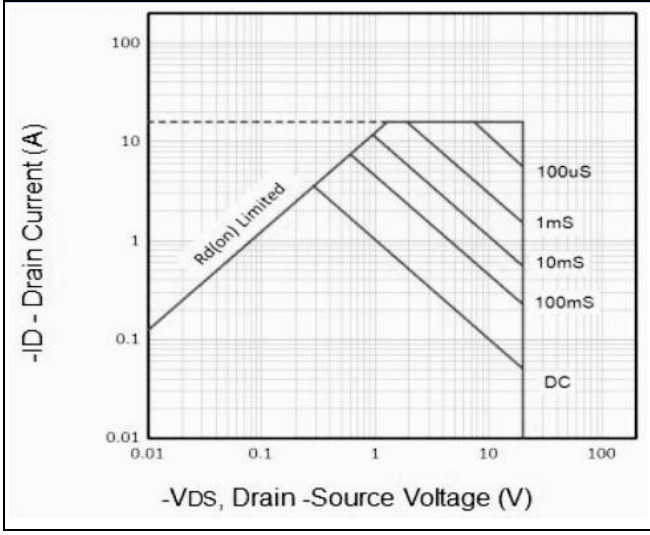


Fig.6 Maximum Safe Operating Area



Rating And Characteristic Curves

Fig.7 Typical Capacitance vs. Drain-Source Voltage

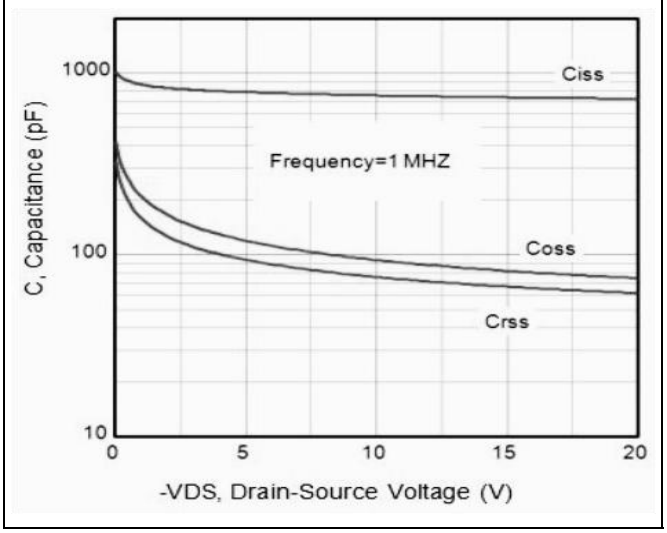
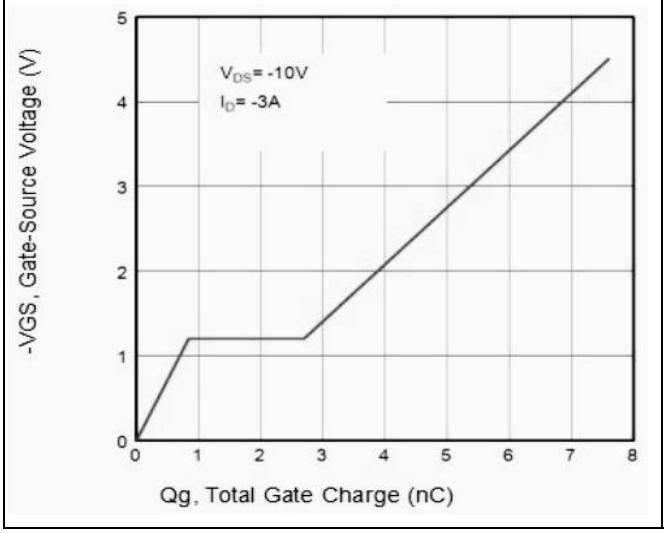
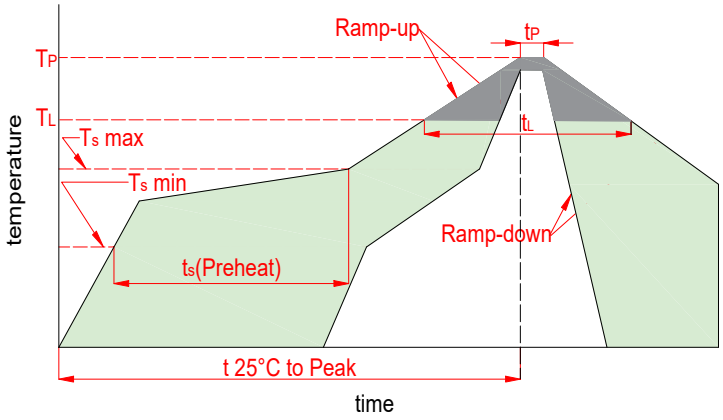


Fig.8 Typical Gate Vs. Gate-Source Voltage

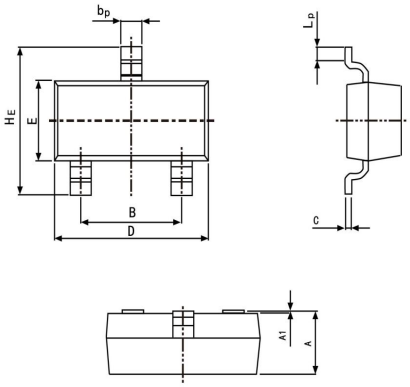


6. Soldering Parameters



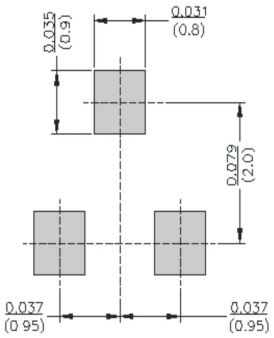
Reflow Condition		Lead-free
Pre Heat	Temp. min(T_s(min))	150℃
	Temp. max(T_s(min))	200℃
	Time(min to max)(t_s)	60~120s
Aver. ramp up rate(Liquidus Temp.)(T_L)to peak		3℃/s max
T_S(max) to T_L-Ramp-up Rate		3℃/s max
Reflow	Temp.(T_L)(Liquidus)	217℃
	Temp.(t_L)(Liquidus)	60~150s
Peak Temp.(T_P)		$260^{+0/-5}$℃
Time within actual peak Temp.(t_p)		30s max
Ramp-down Rate		6℃/s max
Time 25℃ to peak Tempe.(T_p)		8 minutes max
Do not exceed		260℃

7. Dimensions

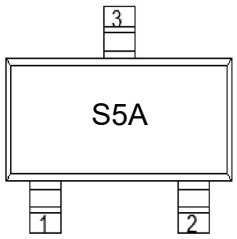


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.035	0.045	0.90	1.15
B	0.070	0.081	1.78	2.05
bp	0.012	0.020	0.30	0.51
C	0.003	0.007	0.08	0.18
D	0.110	0.118	2.80	3.00
E	0.047	0.055	1.20	1.40
HE	0.087	0.110	2.20	2.80
A1	0.000	0.004	0.00	0.10
LP	0.008	0.020	0.20	0.50

Mounting PAD Layout



8. Part Marking System



9. Package Information

Package	Part Number	Tape Width(mm)	Quantity(pcs)
SOT-23	XN2305A	8	3000

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