



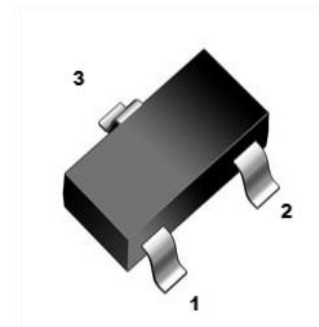
1. Features

- TrenchFET Power MOSFET
- Excellent RDS(on) and Low Gate Charge

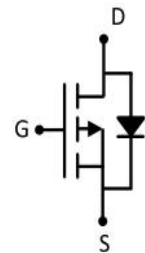
2. Mechanical Data

- Case: Molded Plastic, SOT-23 .
- Epoxy: UL 94V-0 rate flame retardant
- Terminals: Plated Leads Solderable per MIL-STD-750, Method-2026.
- Marking: R1
- Mounting Position : Any.

SOT-23



- 1 Gate
2 Source
3 Drain



3. Maximum Ratings and Electrical Characteristics

Rating at 25°C ambient temperature unless otherwise specified.

Parameter		Symbol	Value	UNIT
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current ^{1,4}	$T_A=25^{\circ}\text{C}$	I_D	-4.4	A
Pulsed Drain Current ²		I_{DM}	-18	A
Power Dissipation ^{4,5}	$T_A=25^{\circ}\text{C}$	P_D	1.4	W
Thermal Resistance from Junction to Ambient ⁵		$R_{\theta JA}$	104	°C/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	5	°C/W
Junction and Storage Temperature Range		T_J, T_{STG}	-55~ +150	°C

**4. Electrical Characteristics**

Rating at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$			-1	μA
Gate-Body leakage current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$			± 100	nA
On characteristics ³						
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -4A$		41	50	m Ω
		$V_{GS} = -4.5V, I_D = -3.5A$		50	65	m Ω
		$V_{GS} = -2.5V, I_D = -1A$		60	90	m Ω
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$		-0.7	-1.4	V
Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$		640		pF
Output capacitance	C_{oss}			80		pF
Reverse transfer capacitance	C_{rss}			55		pF
Gate resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		7		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = -15V, V_{GS} = -10V, I_D = -4A$		14		nC
Gate-source Charge	Q_{gs}			1.5		
Gate-drain Charge	Q_{gd}			1.6		
Turn-on delay time	$t_{d(on)}$	$V_{GS} = -10V, V_{DS} = -15V,$ $R_G = 3\Omega, I_D = -1A$		6.5		ns
Turn-on rise time	t_r			3.5		ns
Turn-off delay time	$t_{d(off)}$			41		ns
Turn-off fall time	t_f			9		ns
Source-drain diode characteristics and maximum ratings						
Diode forward voltage ³	V_{SD}	$I_S = -1A, V_{GS} = 0V$		-0.72	-1.4	V

Notes :

1. The maximum current rating is limited by package.
2. Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
3. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. The power dissipation P_D is limited by $T_{J(MAX)} = 150^\circ C$.
5. Device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ C$.



5. Rating And Characteristic Curves

Fig1: Output Characteristics

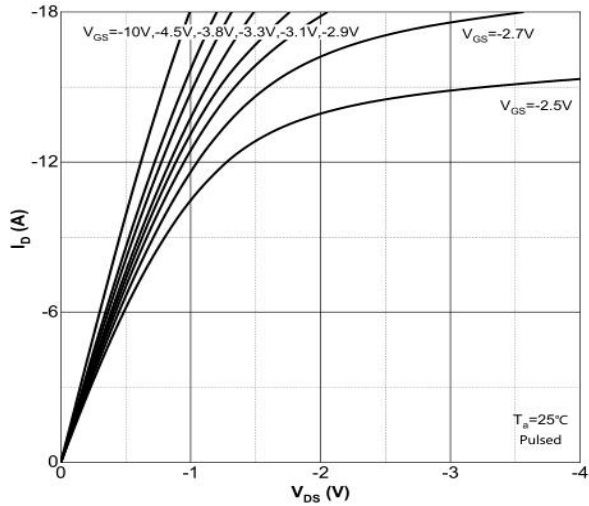


Fig2: Transfer Characteristics

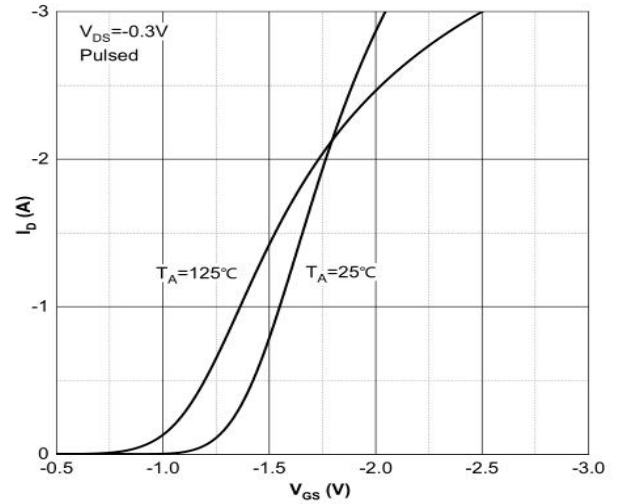


Fig.3 $R_{DS(on)}$ - I_D

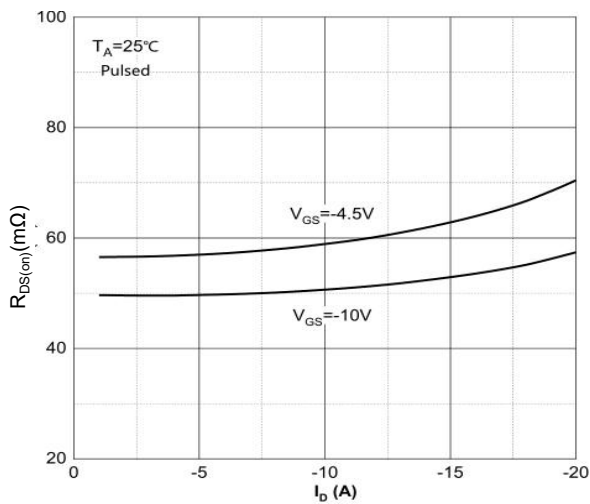


Fig.4 $R_{DS(on)}$ - V_{GS}

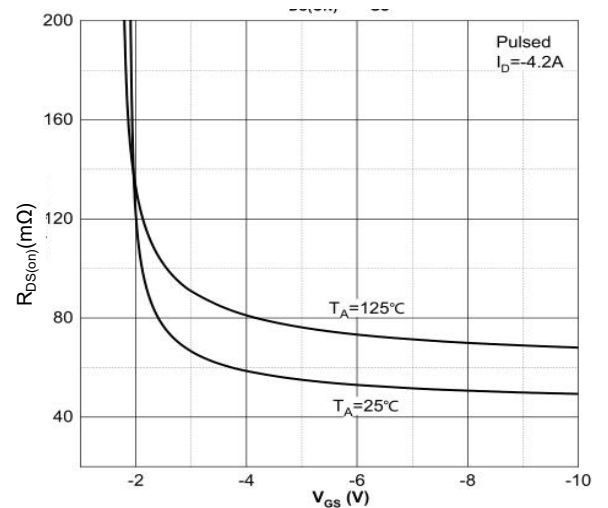


Fig.5 I_S - V_{SD}

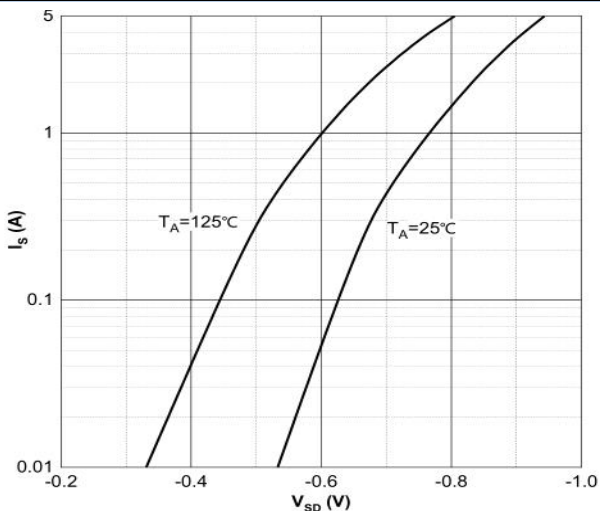
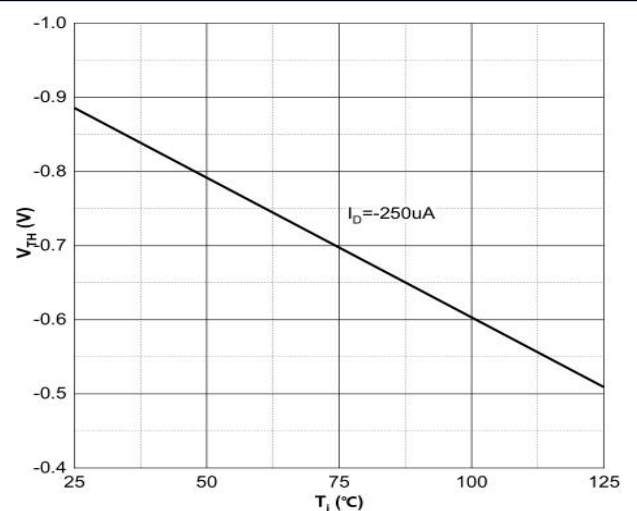
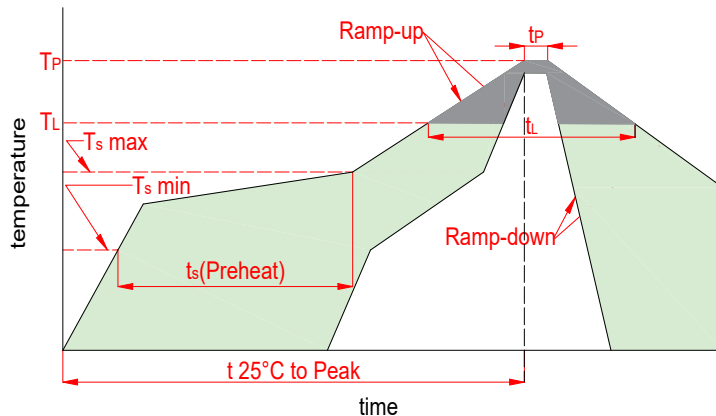


Fig.6 Threshold Voltage



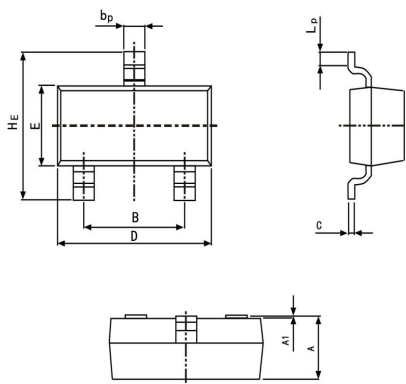


6. Soldering Parameters



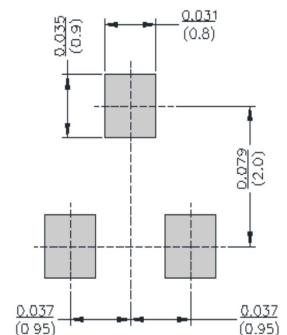
Reflow Condition		Lead-free
Pre Heat	Temp. min(T_s (min))	150°C
	Temp. max(T_s (min))	200°C
	Time(min to max)(t_s)	60~120s
Aver. ramp up rate(Liquidus Temp.)(T_L)to peak		3°C/s max
T_s (max) to T_L -Ramp-up Rate		3°C/s max
Reflow	Temp. (T_L)(Liquidus)	217°C
	Temp. (t_L)(Liquidus)	60~150s
Peak Temp. (T_p)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

7. Dimensions

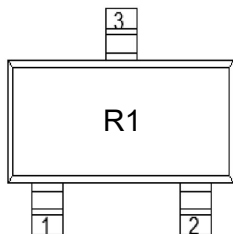


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.035	0.045	0.90	1.15
B	0.070	0.081	1.78	2.05
bp	0.012	0.020	0.30	0.51
C	0.003	0.007	0.08	0.18
D	0.110	0.118	2.80	3.00
E	0.047	0.055	1.20	1.40
HE	0.087	0.110	2.20	2.80
A1	0.000	0.004	0.00	0.10
LP	0.008	0.020	0.20	0.50

Mounting PAD Layout



8. Part Marking System



9. Package Information

Package	Part Number	Tape Width(mm)	Quantity(pcs)
SOT-23	XN3401	8	3000



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