



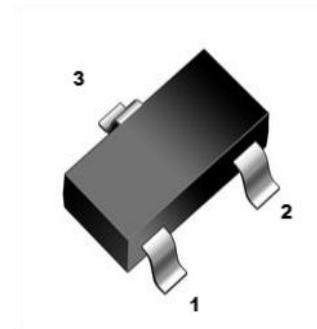
1. Features

- TrenchFET Power MOSFET
- Excellent RDS(on) and Low Gate Charge
- ESD Protected Up to 2.0KV (HBM)

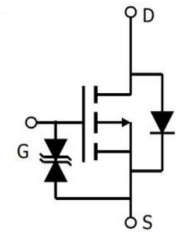
2. Mechanical Data

- Case:Molded Plastic,SOT-523 .
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable perMIL-STD-750,Method-2026.
- Marking: 39A
- Mounting Position : Any.
- Equivalent Circuit:

SOT-523



- 1 Gate
- 2 Source
- 3 Drain



3. Maximum Ratings and Electrical Characteristics

Rating at 25°C 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	-0.5	A
Pulsed Drain Current ($t=300\mu s$)	I_{DM}	-2.6	A
Power Dissipation	P_D	0.18	W
Junction Temperature	T_J	-55~ +150	°C
Storage Temperature	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
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	-20			V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	-0.3	-0.6	-1	
Gate-source leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 10V$			± 10	μA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -20V, V_{GS} = 0V$			-1	μA
Drain-source on-resistance (note 1)	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -0.5A$		0.58	0.85	Ω
		$V_{GS} = -2.5V, I_D = -0.3A$		0.85	1.2	
Dynamic Characteristics (note 2,3)						
Input capacitance	C_{iss}	$V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$		71		pF
Output capacitance	C_{oss}			20		
Reverse transfer capacitance	C_{rss}			15		
Total gate charge	Q_g	$v_{DS} = -10V, V_{GS} = -4.5V, I_D = -0.2A$		1.2		nC
Gate-source charge	Q_{gs}			0.37		
Gate-drain charge	Q_{gd}			0.27		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -10V, I_D = -0.2A,$ $V_{GS} = -4.5V, R_G = 10\Omega$		4		ns
Turn-on rise time	t_r			19		
Turn-off delay time	$t_{d(off)}$			16		
Turn-off fall time	t_f			25		
Source-drain diode characteristics and maximum ratings						
Continuous source-drain diode	I_S	$T_C = 25^\circ C$			-0.5	A
Diode forward voltage	V_{SD}	$V_{GS} = 0V, I_S = -1A$		-0.7	-1.2	V

Note :

1. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
2. Guaranteed by design, not subject to production testing.
3. These parameters have no way to verify.



5. Rating And Characteristic Curves

Fig1: Output Characteristics

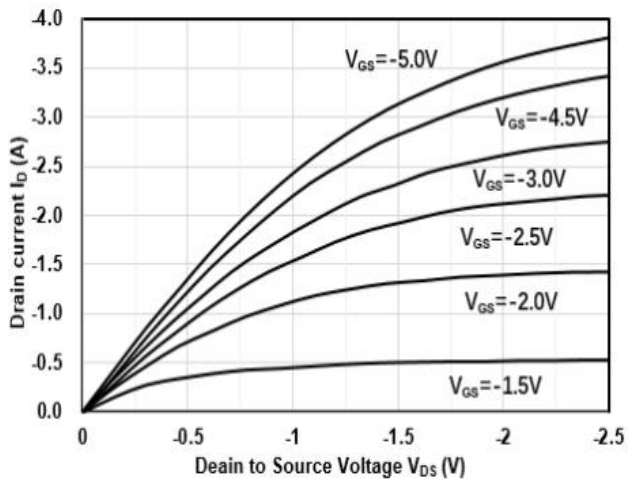


Fig2: Transfer Characteristics

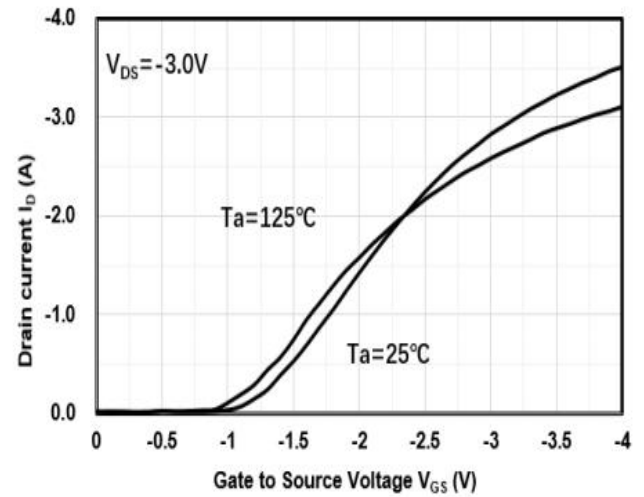


Fig.3 Capacitance Characteristics

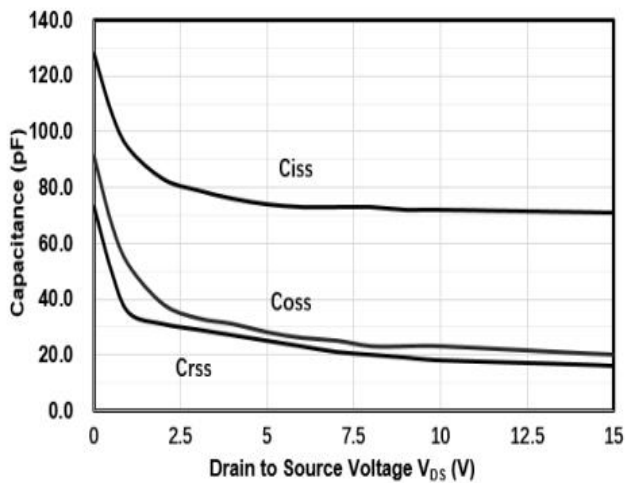


Fig4: Gate Charge

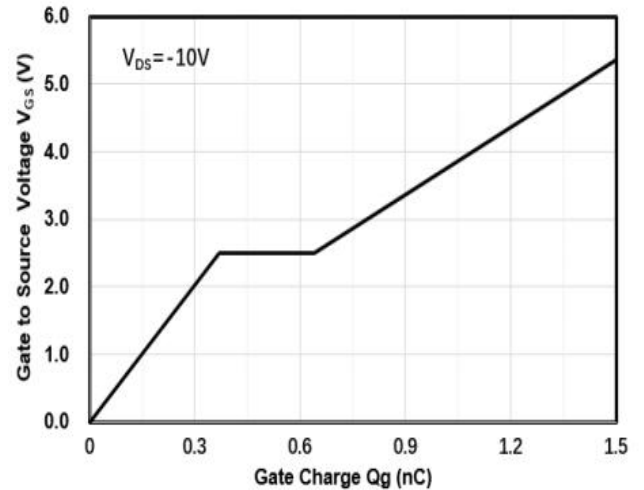


Fig.5 Drain-Source on Resistance

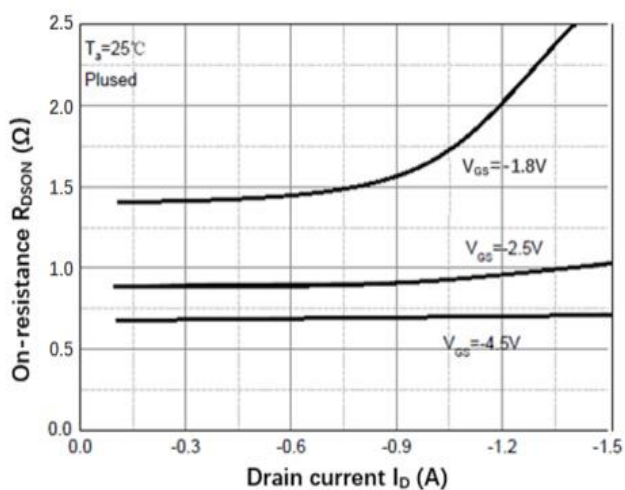
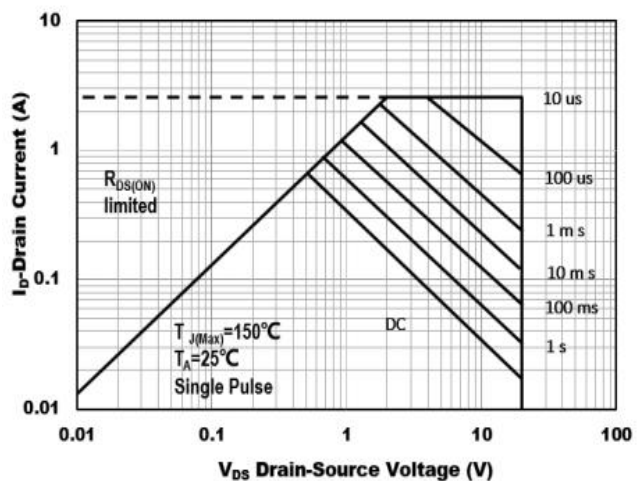
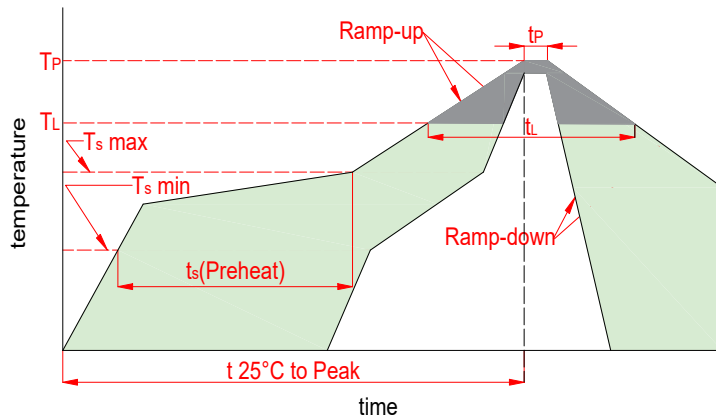


Fig.6 Safe Operating Area



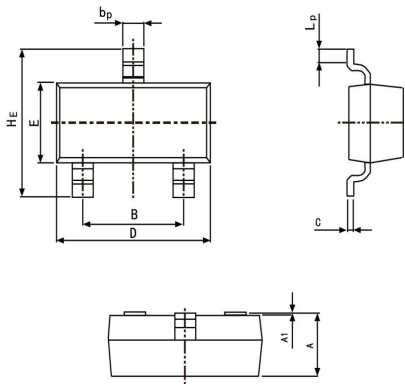


6. Soldering Parameters



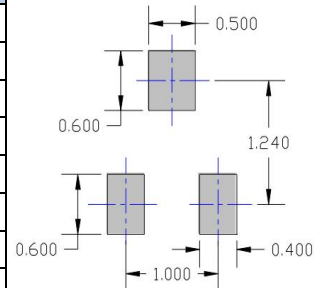
Reflow Condition		Lead-free
Pre Heat	Temp. min(T_s (min))	150℃
	Temp. max(T_s (min))	200℃
	Time(min to max)(t_s)	60~120s
Aver. ramp up rate(Liquidus Temp.)(T_L)to peak		3℃/s max
T_s (max) to T_L -Ramp-up Rate		3℃/s max
Reflow	Temp. (T_L)(Liquidus)	217℃
	Temp. (t_L)(Liquidus)	60~150s
Peak Temp. (T_P)		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



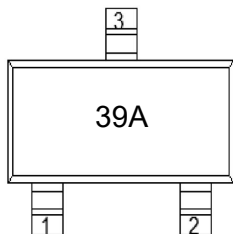
Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.028	0.035	0.70	0.90
B	0.035	0.043	0.90	1.10
bp	0.006	0.014	0.15	0.35
C	0.004	0.008	0.10	0.20
D	0.059	0.067	1.50	1.70
E	0.028	0.035	0.70	0.90
HE	0.057	0.069	1.45	1.75
A1	0.000	0.004	0.00	0.10
LP	0.010	0.018	0.26	0.46

Mounting PAD Layout



Unit: mm

8. Part Marking System



9. Package Information

Package	Part Number	Tape Width(mm)	Quantity(pcs)
SOT-523	XN3139KT	8	3000



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