

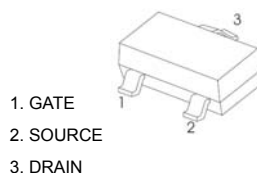
FEATURES

- High density cell design for low $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability

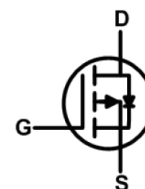
V_{DSS} -12 V
 I_D -6.0 A
 $R_{DS(ON)}$ 28 m Ω

S33

SOT-23



Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-12	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current	I_D	-6 ^a	A
Pulsed Drain Current ($t=300\mu\text{s}$)	I_{DM}	-20	A
Power Dissipation	P_D	0.35 ^b	W
		1.1 ^a	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	357 ^b	$^\circ\text{C/W}$
		113 ^a	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

- a. Device mounted on FR-4 substrate board, with minimum recommended pad layout, single side.
b. Device mounted on no heat sink.

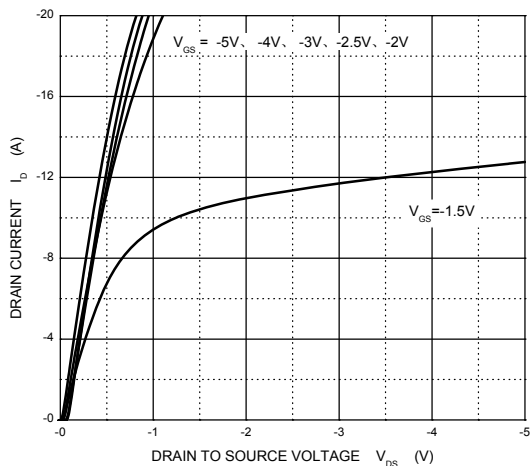
$T_a=25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =-250μA	-12			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-12V, V _{GS} = 0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±8V, V _{DS} = 0V			±0.1	μA
Gate threshold voltage (note 1)	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.4		-1	V
Drain-source on-resistance (note 1)	R _{DS(on)}	V _{GS} =-4.5V, I _D =-5A			28	mΩ
		V _{GS} =-3.7V, I _D =-4.6A			32	
		V _{GS} =-2.5V, I _D =-4.3A			40	
		V _{GS} =-1.8V, I _D =-1A			63	
		V _{GS} =-1.5V, I _D =-0.5A			150	
Forward tranconductance (note 1)	g _{FS}	V _{DS} =-5V, I _D =-5A		18		S
Dynamic characteristics (note 2)						
Input Capacitance	C _{iss}	V _{DS} =-6V, V _{GS} =0V, f =1MHz		1275		pF
Output Capacitance	C _{oss}			255		pF
Reverse Transfer Capacitance	C _{rss}			236		pF
Gate resistance	R _g	f =1MHz	1.9		19	Ω
Total Gate Charge	Q _g	V _{DS} =-6V, V _{GS} =-4.5V, I _D =-5A		14	21	nC
Gate-Source Charge	Q _{gs}			2.3		nC
Gate-Drain Charge	Q _{gd}			3.6		nC
Turn-on delay time	t _{d(on)}	V _{DD} =-6V, V _{GEN} =-4.5V, I _D =-4A R _L =6Ω, R _{GEN} =1Ω		26	40	ns
Turn-on rise time	t _r			24	40	ns
Turn-off delay time	t _{d(off)}			45	70	ns
Turn-off fall time	t _f			20	35	ns
Source-Drain Diode characteristics						
Diode forward current	I _S	T _C =25°C			-1.4	A
Diode pulsed forward current	I _{SM}				-20	A
Diode Forward voltage (note 1)	V _{DS}	V _{GS} =0V, I _S =-4A			-1.2	V
Diode reverse recovery time (note 2)	t _{rr}	I _F =-4A, dI/dt =100A/μs		24	48	ns
Diode reverse recovery charge (note 2)	Q _{rr}			8	16	nC

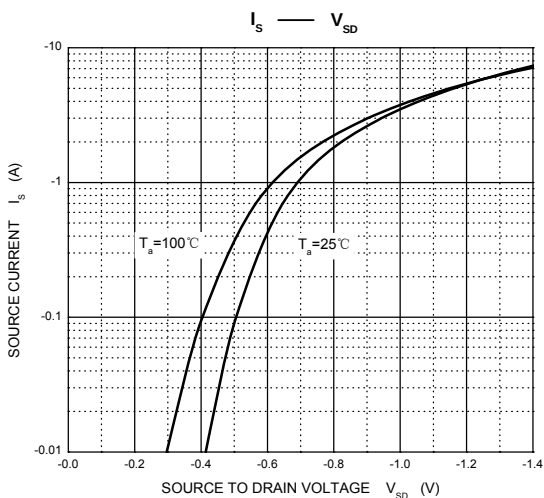
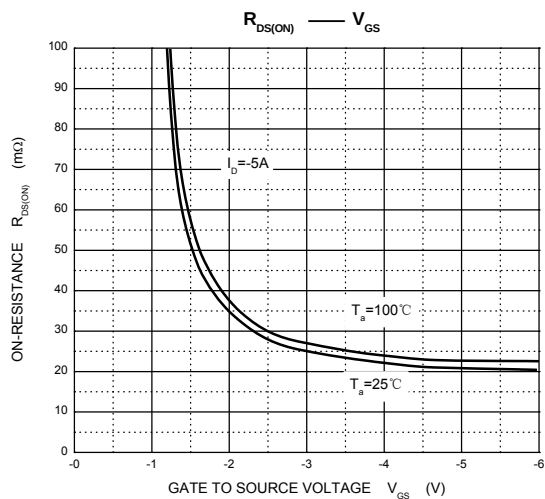
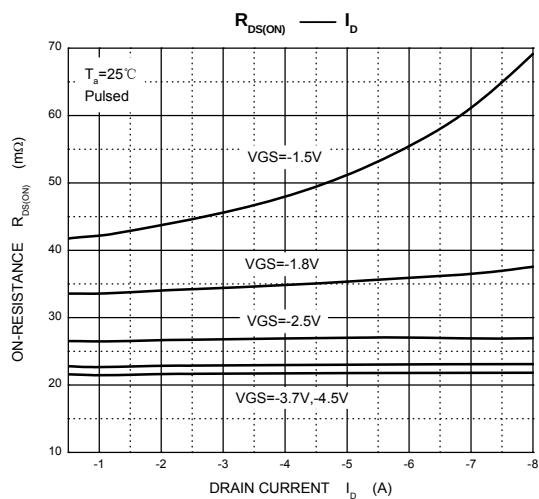
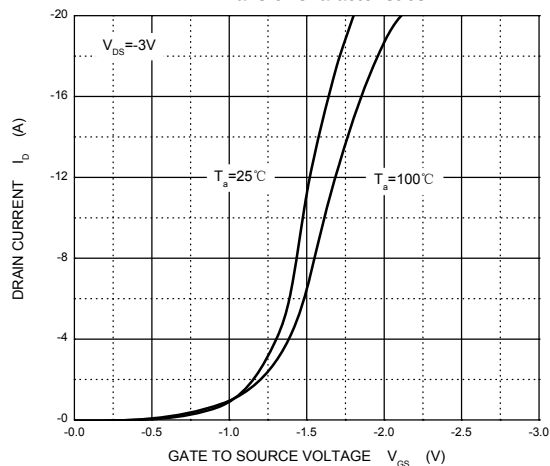
Notes : 1. Pulse test; pulse width $\leq 300\mu s$, duty cycles $\leq 2\%$.
2. Guaranteed by design, not subject to production testing.

RATING AND CHARACTERISTIC CURVES

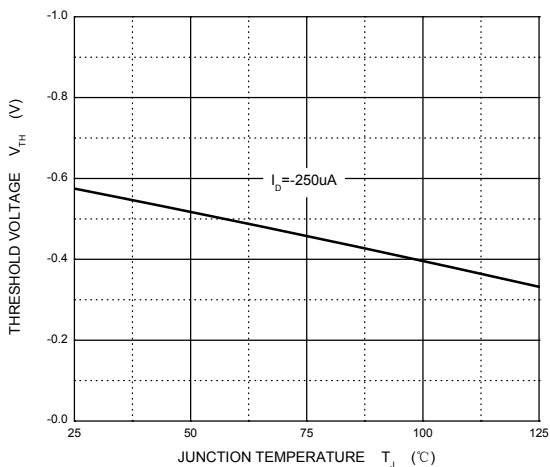
Output Characteristics



Transfer Characteristics

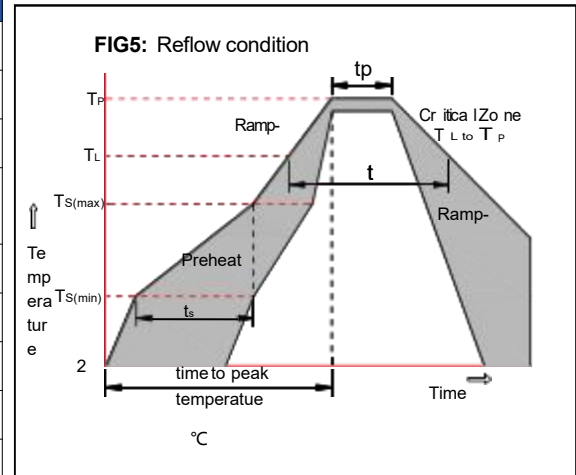


Threshold Voltage



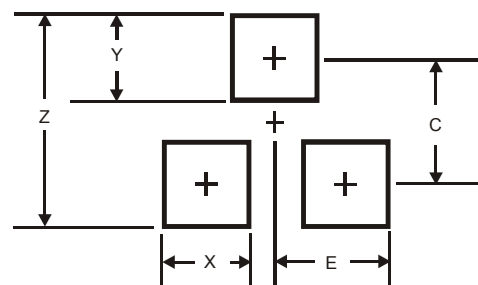
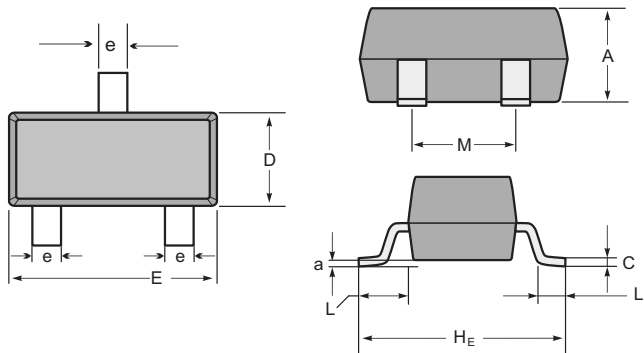
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C



Package Dimensions & Suggested Pad Layout

SOT23

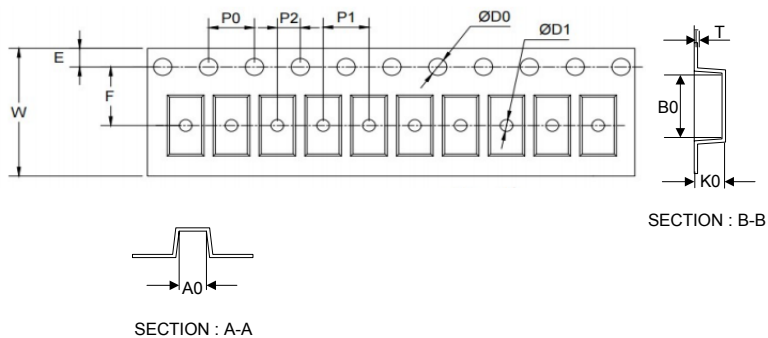


SOT-23 mechanical data

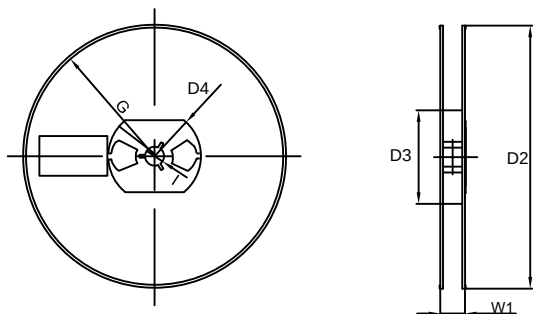
UNIT		A	C	D	E	H _E	e	M	L	L ₁	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Dimensions	SOT23
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

Tape



7" Reel



Symbol	Dimension (mm)
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
D0	1.55±0.10
D1	1.05±0.10
E	1.55±0.10
F	3.60±0.10
W	8.00±0.10
A0	3.80±0.20
B0	3.25±0.20
K0	1.45±0.10
T	0.25±0.05
D2	178.0±3.0
D3	55Min.
D4	R24.0±3.0
G	R82.0±3.0
I	13.0±2.0
W1	11.0±3.0

Quantity: 3000PCS