V_{DSS}	20	V
I_D	4	A
$R_{DS(ON)}$	30 m	Ω

FEATURES

20V, 4A, RDS(ON) =30mΩ@VGS = 4.5V
Improved dv/dt capability
Fast switching
Green Device Available

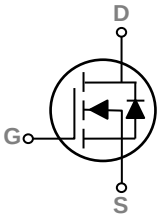
3414

APPLICATION

Notebook
Load Switch
Hend-Held Instruments

SOT23-3L top view

Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current – Continuous (T_C=25℃)	4	A
	Drain Current – Continuous (T_C=100℃)	3.2	A
I_{DM}	Drain Current – Pulsed[1]	20	A
P_D	Power Dissipation (T_C=25℃)	1.56	W
	Power Dissipation – Derate above 25℃	0.012	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	80	℃/W

Electrical Characteristics T_J=25°C unless otherwise noted

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , I_D=1mA	---	0.02	---	V/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=125°C	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=4.5V, I_D=4A	---	30	45	mΩ
		V_{GS}=2.5V , I_D=3A	---	46	55	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.4	0.6	1	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2	---	mV/°C
gfs	Forward Transconductance	V_{DS}=10V , I_S=2A	---	4.4	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=10V , V_{GS}=4.5V , I_D=4A	---	5.8	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	0.6	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	1.5	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=10V , V_{GS}=4.5V , R_G=25Ω I_D=1A	---	2.9	---	ns
T_r	Rise Time[2,3]		---	8.4	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	19.2	---	
T_f	Fall Time[2,3]		---	5.6	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	315	---	pF
C_{oss}	Output Capacitance		---	50	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	4	A
I_{SM}	Pulsed Source Current		---	---	8	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1.2	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=1mH,I_{AS}=8A.,R_G=25Ω,Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES

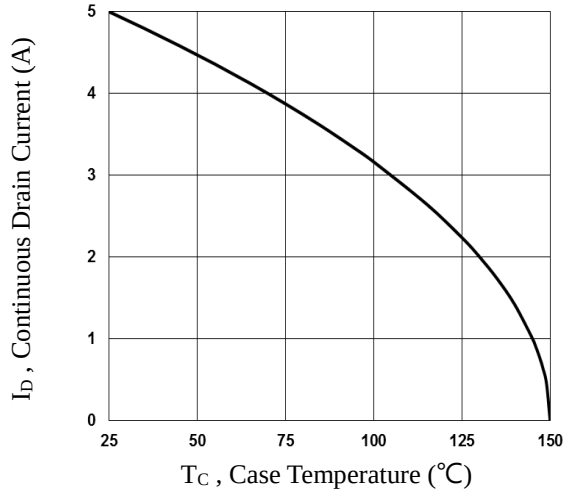


Fig.1 Continuous Drain Current vs. T_C

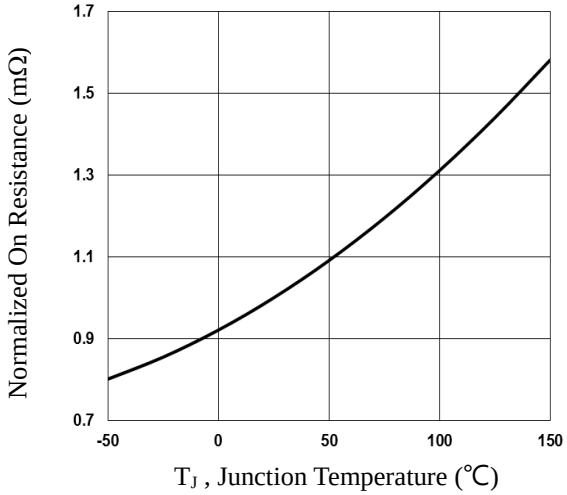


Fig.2 Normalized RDSON vs. T_J

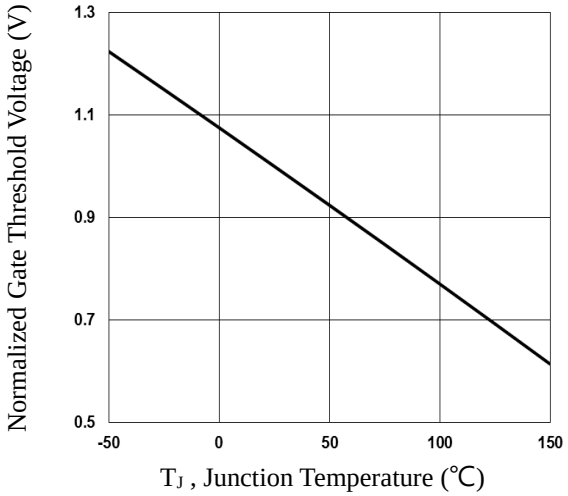


Fig.3 Normalized V_{th} vs. T_J

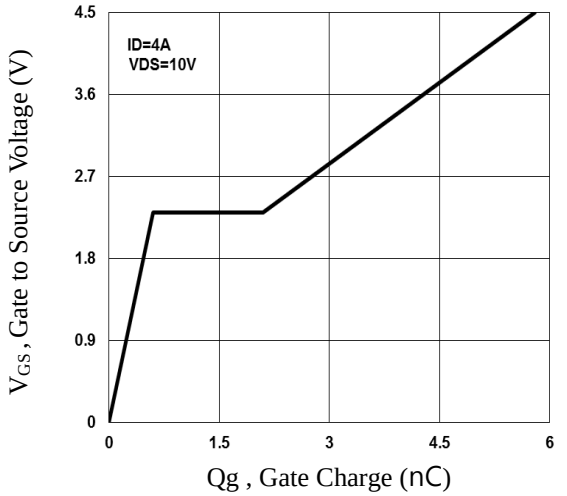


Fig.4 Gate Charge Waveform

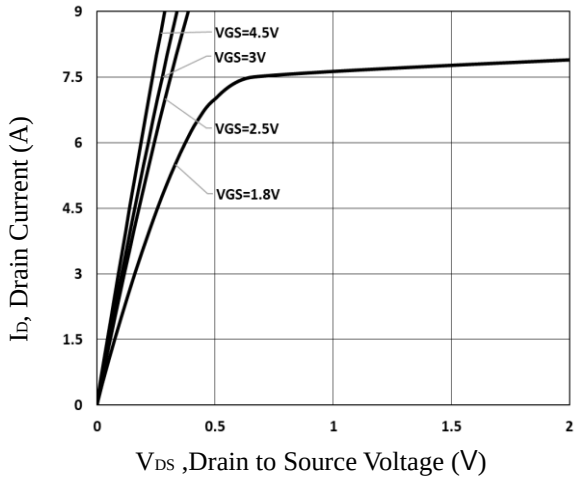


Fig.5 Typical Output Characteristics

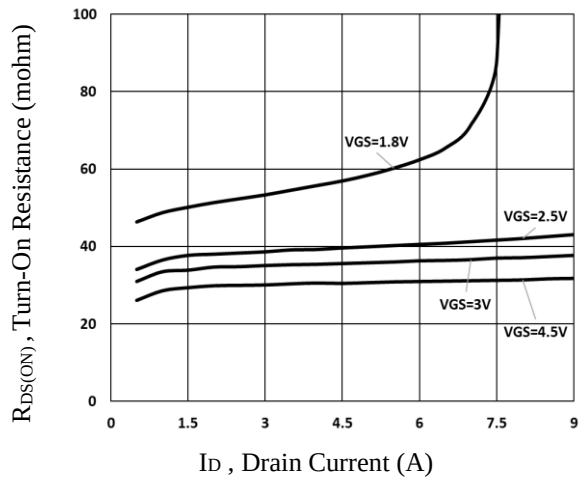


Fig.6 Turn-On Resistance vs. I_D

RATING AND CHARACTERISTIC CURVES

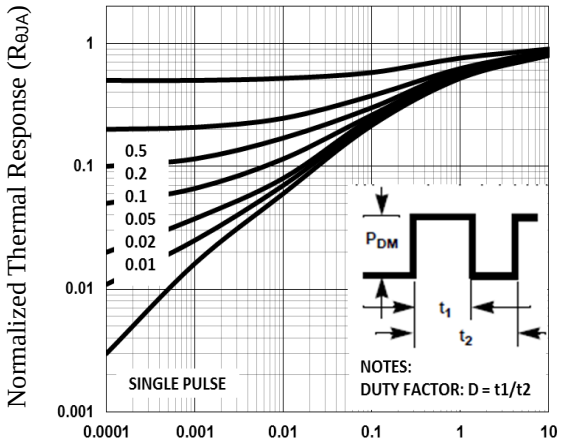


Fig.7 Normalized Transient Impedance

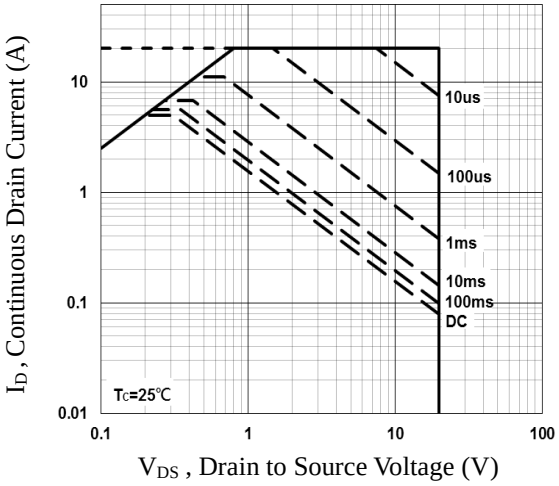


Fig.8 Maximum Safe Operation Area

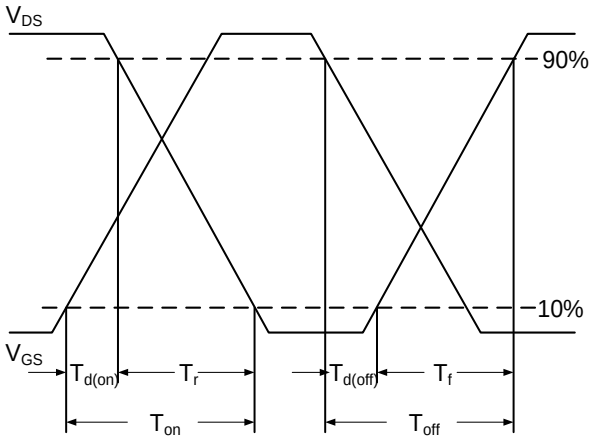


Fig.9 Switching Time Waveform

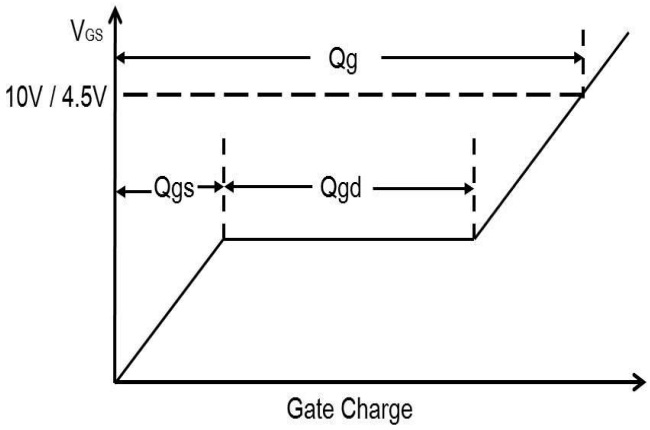
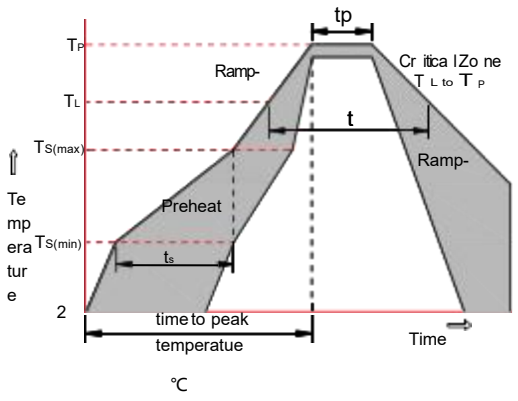


Fig.10 Gate Charge Waveform

Soldering parameters

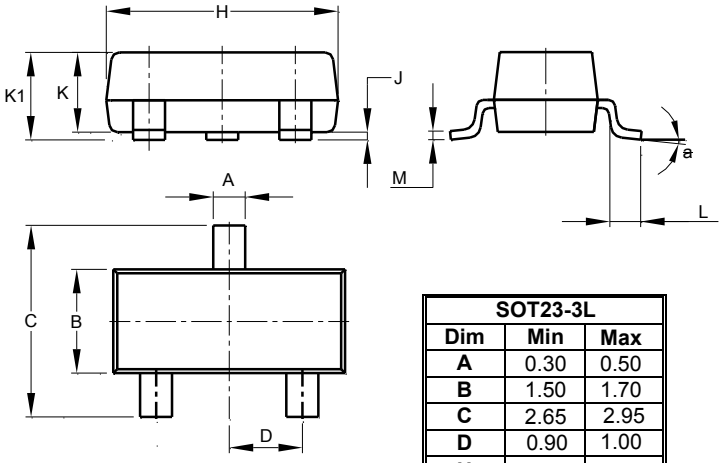
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid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

FIG5: Reflow condition

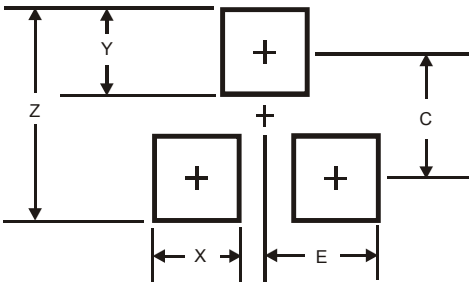


Package Dimensions & Suggested Pad Layout

SOT23-3L



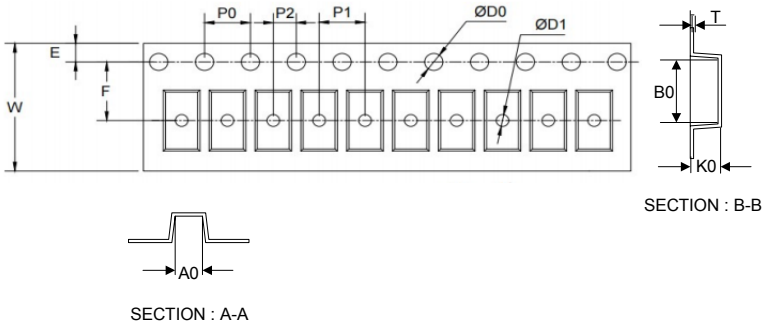
SOT23-3L		
Dim	**Min**	**Max**
A	0.30	0.50
B	1.50	1.70
C	2.65	2.95
D	0.90	1.00
H	2.82	3.02
J		0.10
K	1.05	1.15
K1	1.05	1.25
L	0.30	0.60
M	0.10	0.20
a	0°	8°
All Dimensions in mm		



Dimensions	SOT23-3L
Z	3.3
X	0.9
Y	1.0
C	2.3
E	1.40

Tape & rell specification

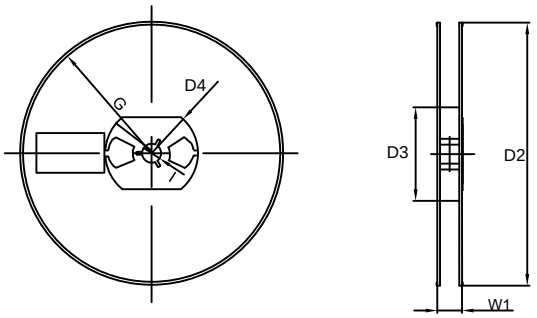
Tape



SECTION : B-B

SECTION : A-A

7” Reel



Symbol	Dimension (mm)
P0	4.00±0.20
P1	4.00±0.20
P2	2.00±0.20
D0	1.55±0.20
D1	1.05±0.20
E	1.55±0.20
F	3.60±0.20
W	8.00±0.20
A0	3.80±0.20
B0	3.50±0.20
K0	1.55±0.20
T	0.25±0.15
D2	178.0±5.0
D3	55Min.
D4	R24.0±3.0
G	R82.0±3.0
I	13.0±2.0
W1	11.0±3.0
Quantity: 3000PCS	