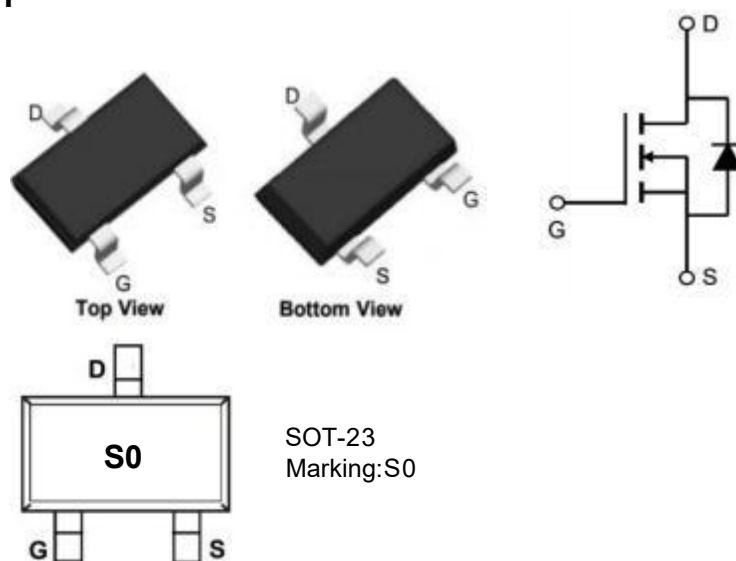


N-Channel Enhancement Mode MOSFET

Features

- Advanced Trench Process Technology
- Low Threshold Voltage
- Fast Switching Speed
- Halogen-Free & Lead-Free



Application

- Load Switch for Portable Devices
- Voltage controlled small signal switch

SOT-23
Marking:S0

Absolute Maximum Ratings (at Ta = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	6	A
Peak Drain Current, Pulsed ¹⁾	I_{DM}	30	A
Power Dissipation	P_{tot}	1.25	W
Operating Junction	T_J	-55~150	°C
Storage Temperature Range	T_{stg}	-55~150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Lead	$R_{\theta JL}$	80	°C/W
Thermal Resistance from Junction to Ambient ²⁾	$R_{\theta JA}$	100	°C/W

Note:

¹⁾ Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep Initial $T_J = 25^\circ\text{C}$.

²⁾ The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper.

Characteristics at Ta = 25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $V_{GS}=0V$, $I_D=250\mu A$	BV_{DSS}	20			V
Drain-Source Leakage Current at $V_{DS}=20V$, $V_{GS}=0V$	I_{DSS}			1	μA
Gate Leakage Current at $V_{DS}=0V$, $V_{GS}=\pm 10V$	I_{GSS}			± 100	nA
Gate-Source Threshold Voltage at $V_{DS}=V_{GS}$, $I_D=250\mu A$	$V_{GS(th)}$	0.5		1.0	V
Drain-Source On-State Resistance at $V_{GS}=4.5V$, $I_D=6.8A$ at $V_{GS}=2.5V$, $I_D=3A$	$R_{DS(on)}$		16 20	21 30	m Ω
DYNAMIC PARAMETERS					
Gate resistance at $V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	R_g			2.6	Ω
Forward Transconductance at $V_{DS}=5V$, $I_D=6A$	g_{fs}		25		S
Input Capacitance at $V_{DS}=10V$, $V_{GS}=0V$, $f=1MHz$	C_{iss}		525		pF
Output Capacitance at $V_{DS}=10V$, $V_{GS}=0V$, $f=1MHz$	C_{oss}		95		pF
Reverse Transfer Capacitance at $V_{DS}=10V$, $V_{GS}=0V$, $f=1MHz$	C_{rss}		75		pF
Gate charge total at $V_{DS}=10V$, $I_D=6A$, $V_{GS}=10V$ at $V_{DS}=10V$, $I_D=6A$, $V_{GS}=4.5V$	Q_g		12.5 6		nC
Gate to Source Charge at $V_{DS}=10V$, $I_D=6A$, $V_{GS}=10V$	Q_{gs}		1		nC
Gate to Drain Charge at $V_{DS}=10V$, $I_D=6A$, $V_{GS}=10V$	Q_{gd}		2		nC
Turn-On Delay Time at $V_{DS}=10V$, $R_L=1.7\Omega$, $R_{GEN}=3\Omega$, $V_{GS}=10V$	$t_{d(on)}$		3		nS
Turn-On Rise Time at $V_{DS}=10V$, $R_L=1.7\Omega$, $R_{GEN}=3\Omega$, $V_{GS}=10V$	t_r		7.5		nS
Turn-Off Delay Time at $V_{DS}=10V$, $R_L=1.7\Omega$, $R_{GEN}=3\Omega$, $V_{GS}=10V$	$t_{d(off)}$		20		nS
Turn-Off Fall Time at $V_{DS}=10V$, $R_L=1.7\Omega$, $R_{GEN}=3\Omega$, $V_{GS}=10V$	t_f		6		nS
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S=1A$, $V_{GS}=0V$	V_{SD}			1	V
Body Diode Reverse Recovery Time at $I_F=6A$, $di/dt=100A/\mu s$	t_{rr}		14		nS
Body Diode Reverse Recovery Charge at $I_F=6A$, $di/dt=100A/\mu s$	Q_{rr}		6		nC

Electrical Characteristics Curves

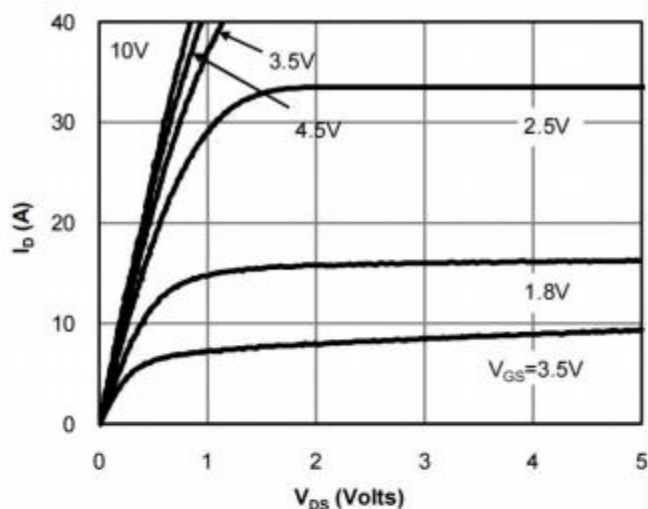


Fig 1: On-Region Characteristics (Note E)

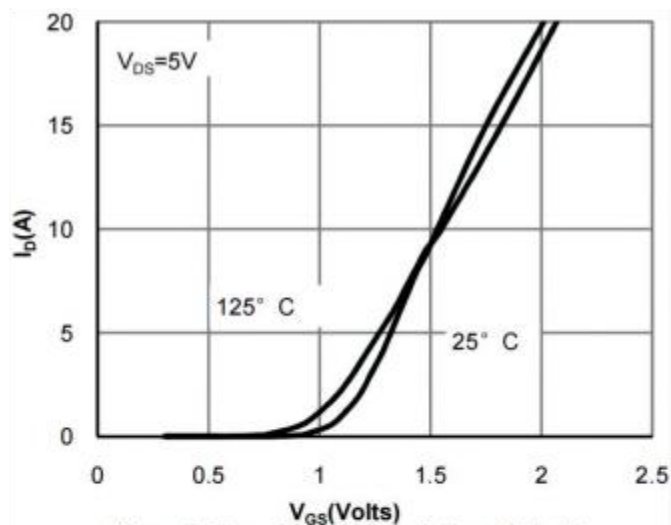


Figure 2: Transfer Characteristics (Note E)

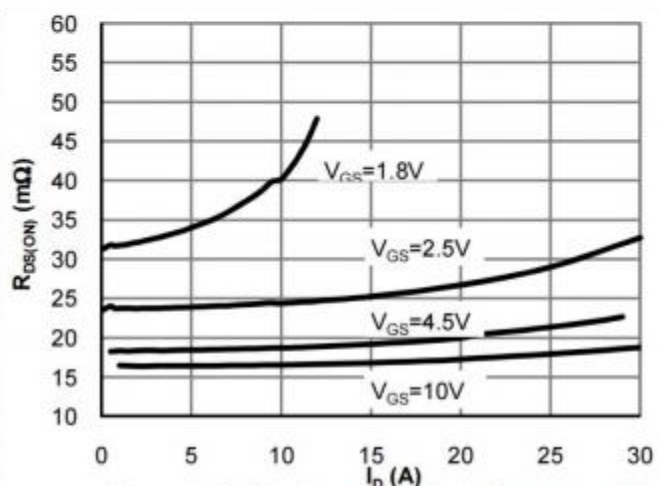


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

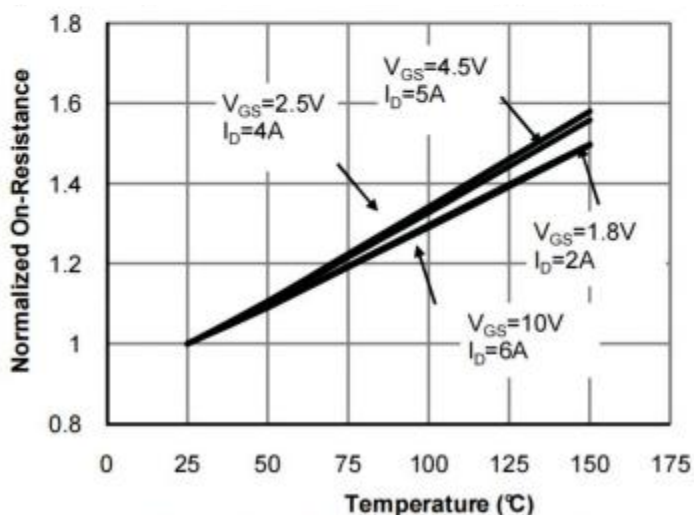


Figure 4: On-Resistance vs. Junction Temperature (Note E)

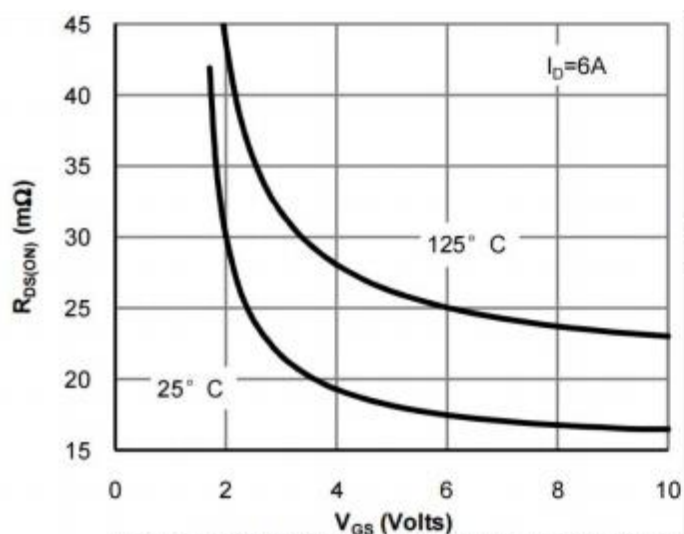


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

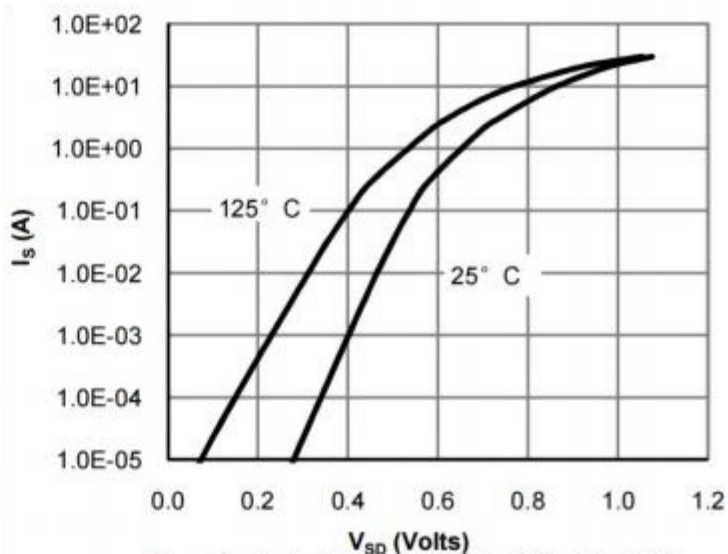
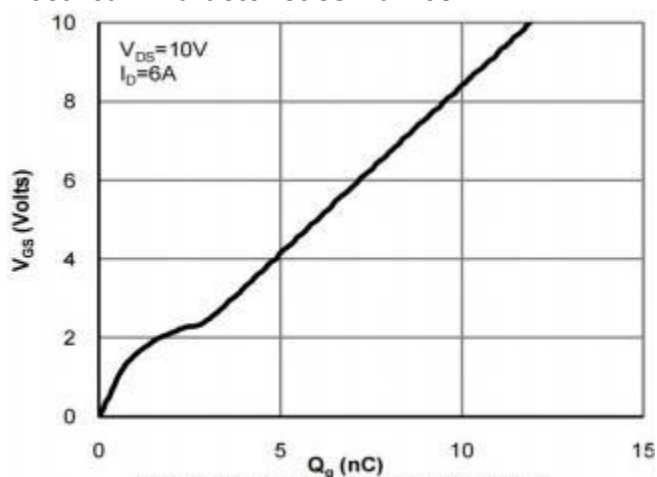
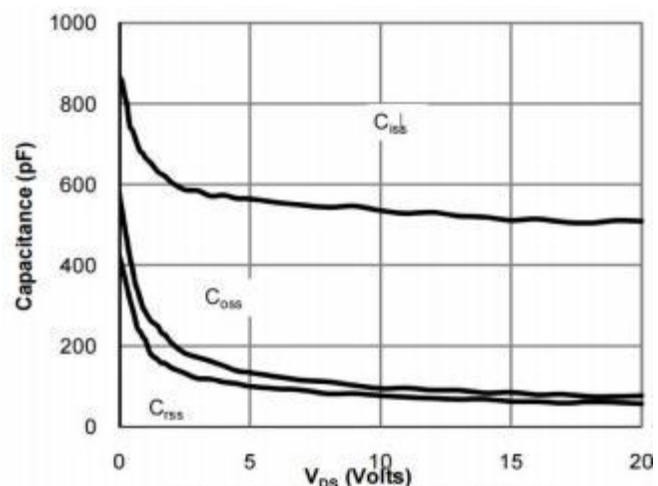
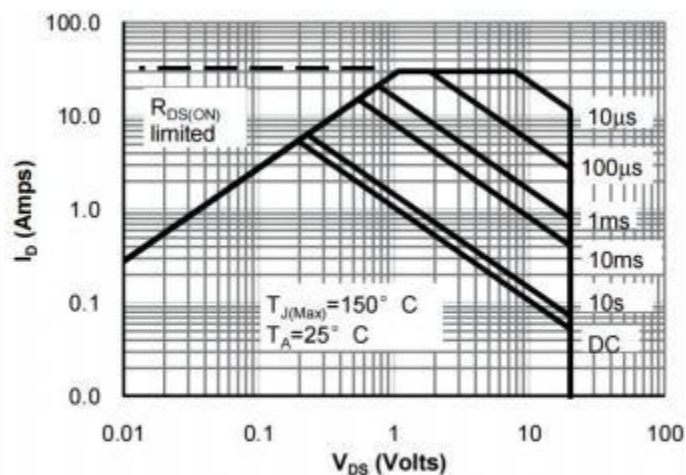
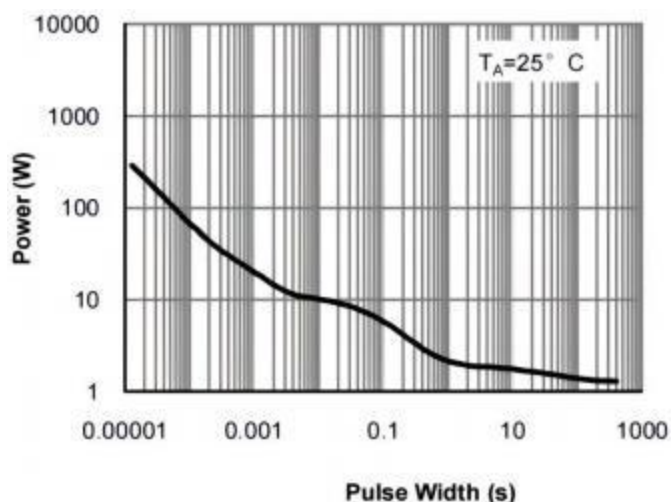
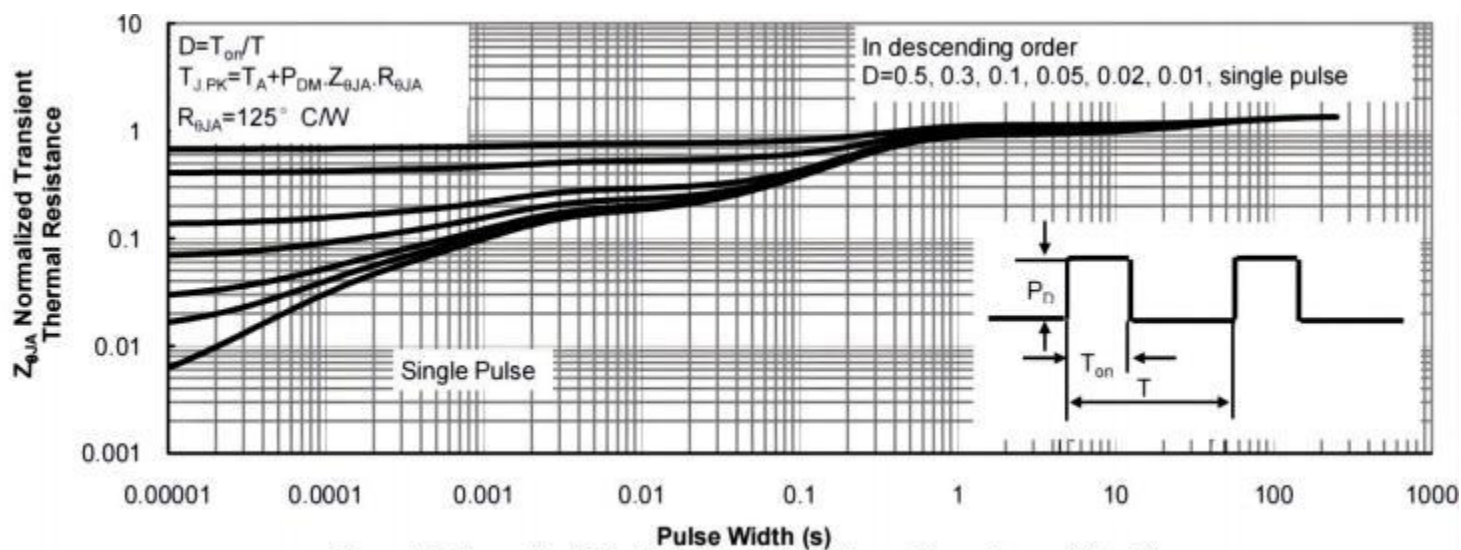


Figure 6: Body-Diode Characteristics (Note E)

Electrical Characteristics Curves

Figure 7: Gate-Charge Characteristics

Figure 8: Capacitance Characteristics

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Test Circuits

Fig.1- 1 Switching times test circuit

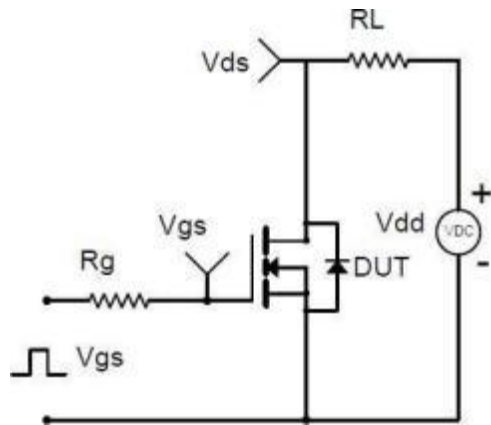


Fig.1-2 Switching Waveform

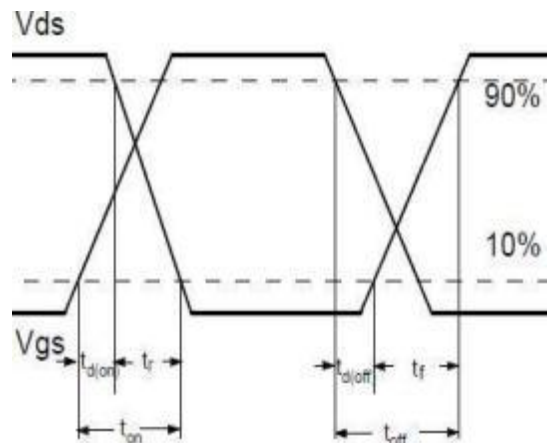


Fig.2- 1 Gate charge test circuit

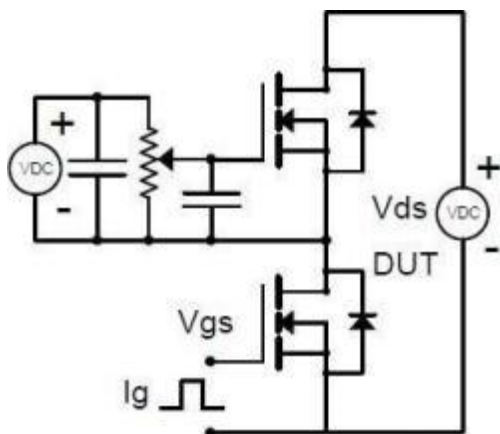


Fig.2-2 Gate charge waveform

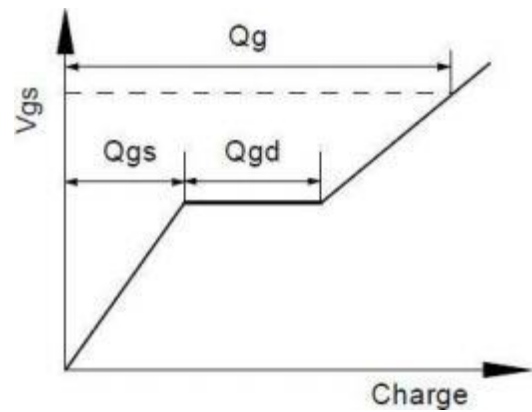


Fig.3- 1 Avalanche test circuit

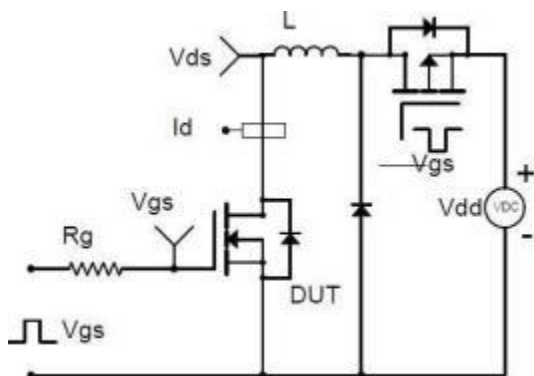
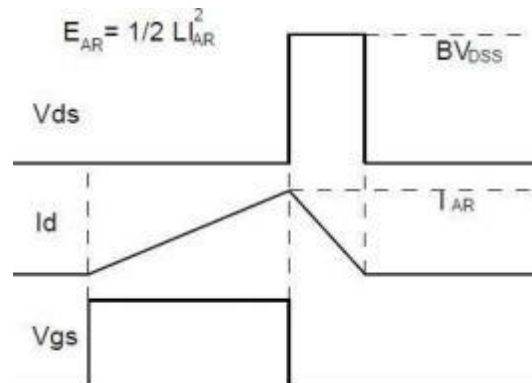
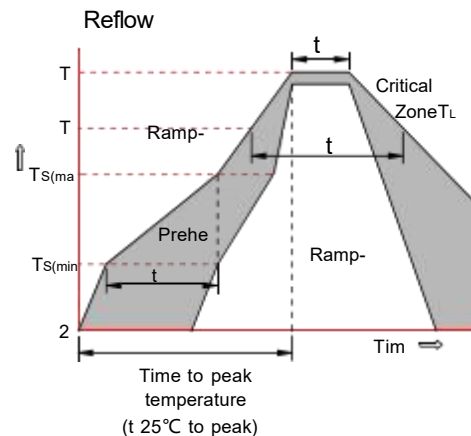
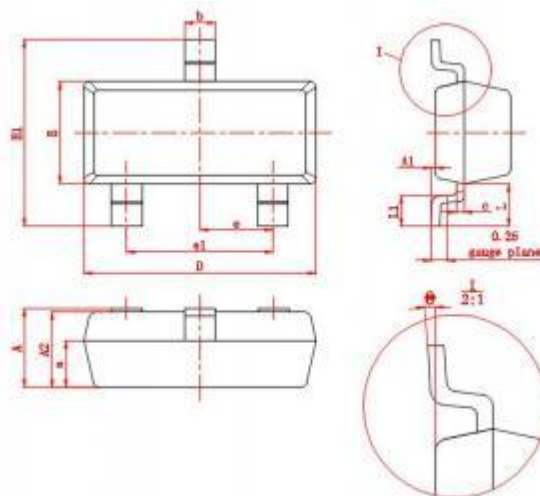


Fig.3-2 Avalanche waveform

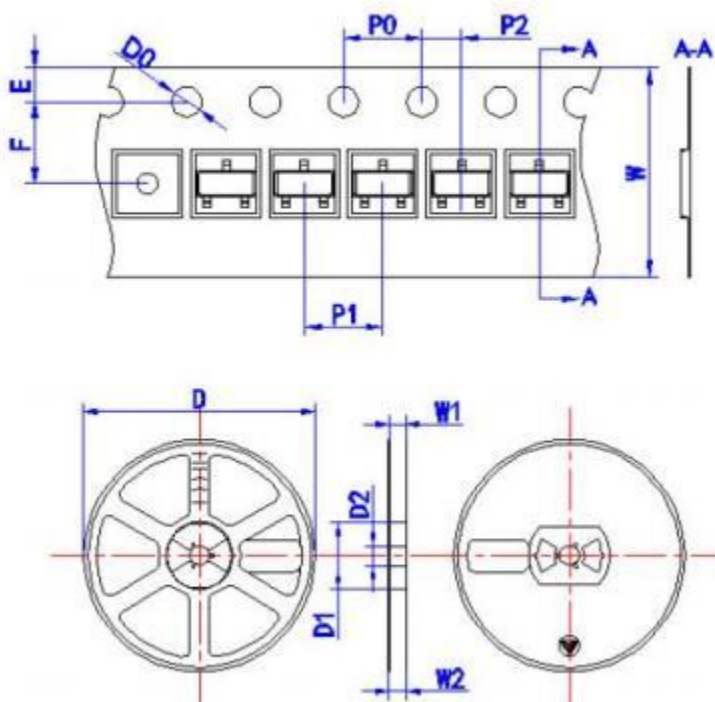


Soldering parameters

Reflow Condition		Pb-Free assembly (see as bellow)
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 Outline Dimensions (Units: mm)
SOT-23


符号	尺寸		符号	尺寸		符号	尺寸	
	Min	Max		Min	Max		Min	Max
A	0.9	1.15	E	1.2	1.4	c	0.08	0.15
A1	0	0.1	E1	2.25	2.55	L	(0.55)	
A2	0.9	1.05	e	(0.95)		L1	0.3	0.5
a	(0.6)		e1	1.8	2.0	θ	0°	8°
D	2.8	3.0	b	0.3	0.5			

Emboss Carrier Tape&Reel


Symbol	Dimension in Millimeters
Tape	
D0	1.50+0.10/-0.00
E	1.75±0.10
F	3.50±0.10
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
W	8.00+0.3/-0.1
Reel	
D	178.0±2.00
D1	54.40±1.00
D2	13.00±1.00
W1	9.50±1.00
W2	12.30±1.00