



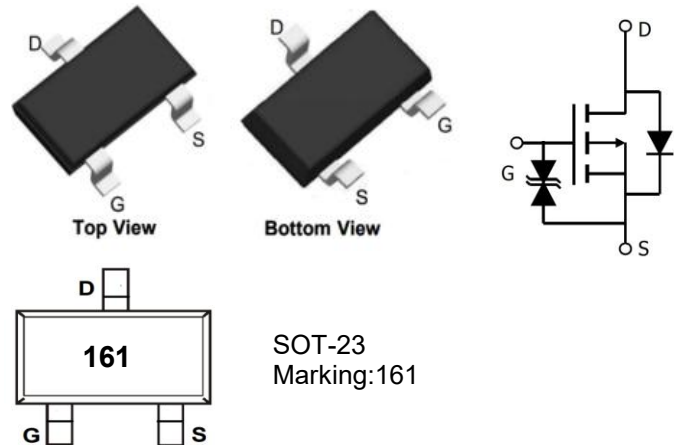
P-Channel Enhancement Mode MOSFET

Features

- Advanced Trench Process Technology
- Low Threshold Voltage
- Fast Switching Speed
- Halogen-Free & Lead-Free
- ESD Protected up to 2KV (HBM)

Application

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



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	-30	V
Gate-Source Voltage	V _{GS}	±12	V
Continuous Drain Current	I _D	-1.2	A
Peak Drain Current, Pulsed ¹⁾	I _{DM}	-10	A
Power Dissipation ²⁾	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 Ambient ²⁾	R _{θJA}	100	°C/W

Note:

1) Pulse width ≤100us, duty cycle ≤1%, limited by T_{Jmax}

2) Device mounted on FR-4 substrate PC board, 2ozcopper, with 1-inch square copper plate in still air.

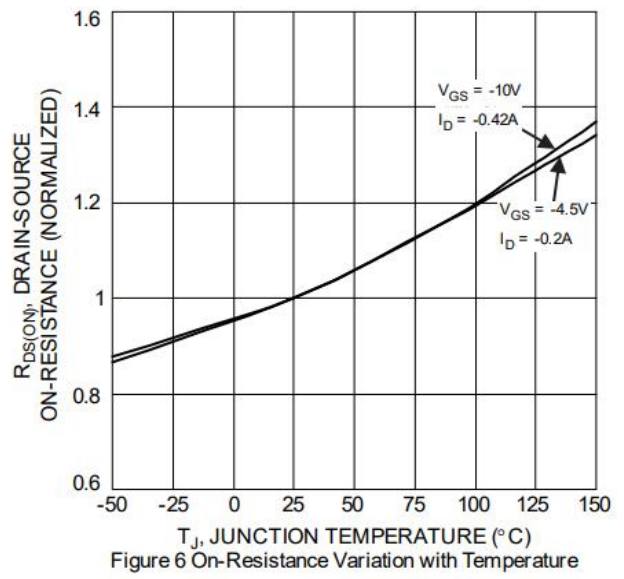
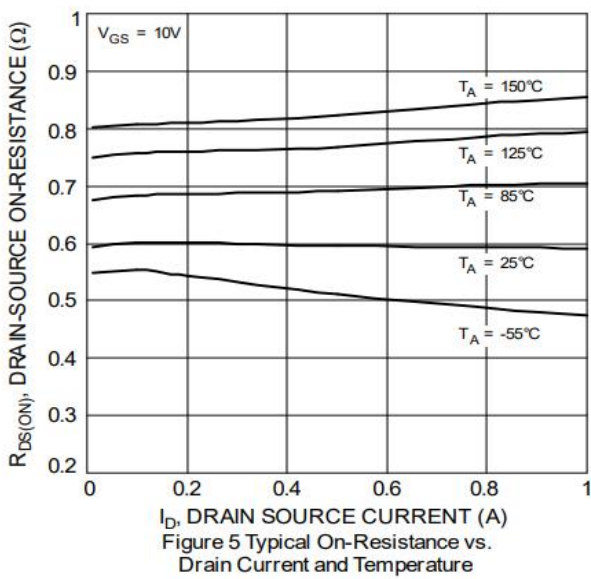
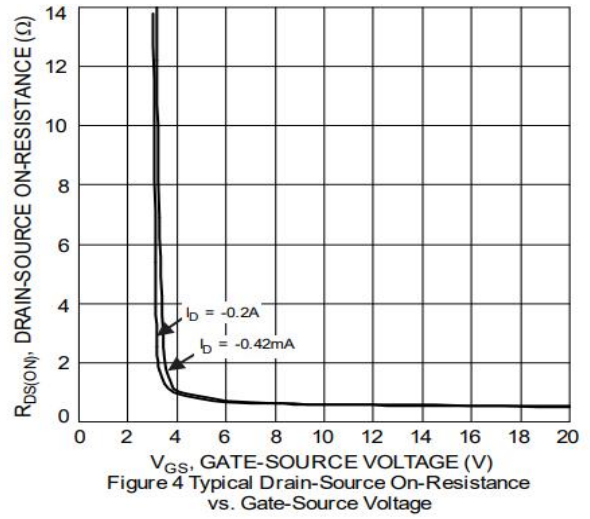
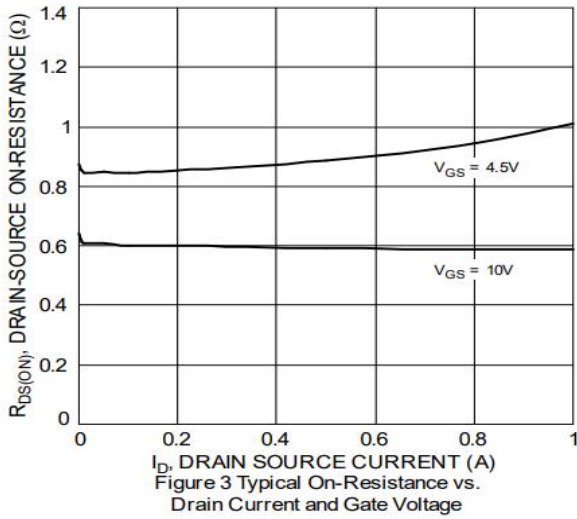
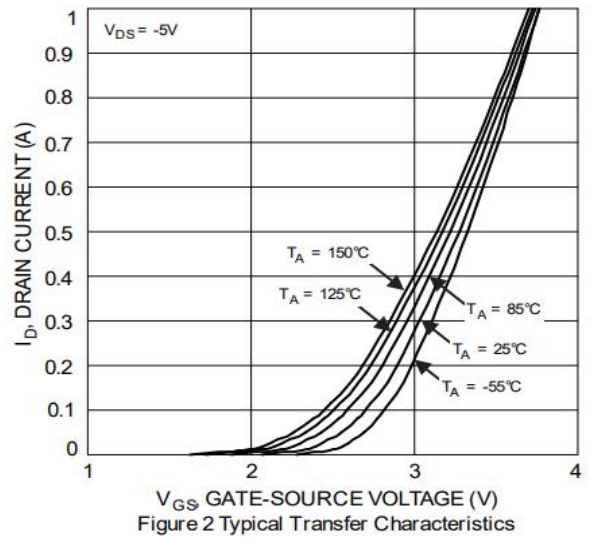
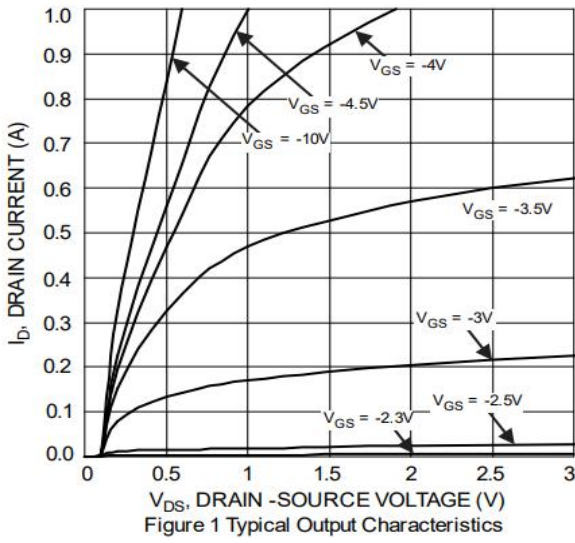


Characteristics at Ta = 25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = -250 \mu A$	BV_{DSS}	-30			V
Drain-Source Leakage Current at $V_{DS} = -24 V$	I_{DSS}			-1	μA
Gate Leakage Current at $V_{GS} = \pm 10 V$	I_{GSS}			± 5	μA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}, I_D = -250 \mu A$	$V_{GS(th)}$	-0.5		-1.5	V
Drain-Source On-State Resistance at $V_{GS} = -10 V, I_D = -0.5 A$ at $V_{GS} = -4.5 V, I_D = -0.3 A$	$R_{DS(on)}$		450 600	620 900	m Ω
DYNAMIC PARAMETERS					
Gate Resistance at $V_{DS} = 0 V, f = 1 MHz$	R_g		729		Ω
Forward Transconductance at $V_{DS} = -10 V, I_D = -0.54 A$	g_{fs}		1.2		S
Input Capacitance at $V_{GS} = 0 V, V_{DS} = -15V, f = 1 MHz$	C_{iss}		19		pF
Output Capacitance at $V_{GS} = 0 V, V_{DS} = -15 V, f = 1 MHz$	C_{oss}		16		pF
Reverse Transfer Capacitance at $V_{GS} = 0 V, V_{DS} = -15V, f = 1 MHz$	C_{rss}		3		pF
Gate charge total at $V_{DS} = -10 V, I_D = -0.25 A, V_{GS} = -4.5 V$	Q_g		0.36		nC
Gate to Source Charge at $V_{DS} = -10 V, I_D = -0.25 A, V_{GS} = -4.5 V$	Q_{gs}		0.1		nC
Gate to Drain Charge at $V_{DS} = -10 V, I_D = -0.25 A, V_{GS} = -4.5 V$	Q_{gd}		0.1		nC
Turn-On Delay Time at $V_{GS} = -4.5 V, V_{DS} = -10V, I_D = -0.2A, R_G=10\Omega, R_L= 47\Omega$	$t_{d(on)}$		30		ns
Turn-On Rise Time at $V_{GS} = -4.5 V, V_{DS} = -10V, I_D = -0.2A, R_G=10\Omega, R_L= 47\Omega$	t_r		74		ns
Turn-Off Delay Time at $V_{GS} = -4.5 V, V_{DS} = -10V, I_D = -0.2A, R_G=10\Omega, R_L= 47\Omega$	$t_{d(off)}$		28		ns
Turn-Off Fall Time at $V_{GS} = -4.5 V, V_{DS} = -10V, I_D = -0.2A, R_G=10\Omega, R_L= 47\Omega$	t_f		31		ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S = -0.23 A, V_{GS} = 0 V$	V_{SD}			-1.2	V



Electrical Characteristics Curves





Electrical Characteristics Curves

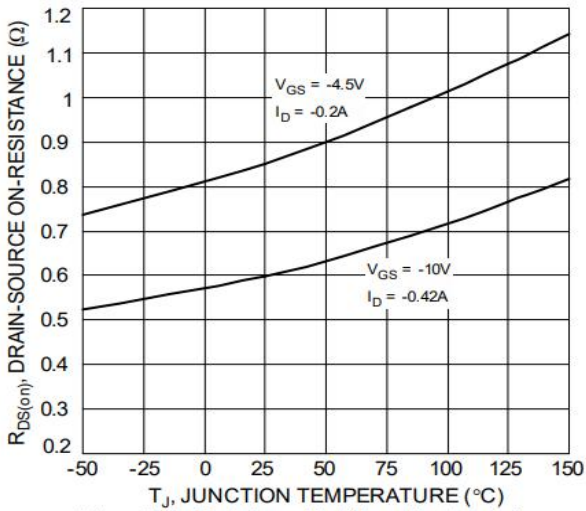


Figure 7 On-Resistance Variation with Temperature

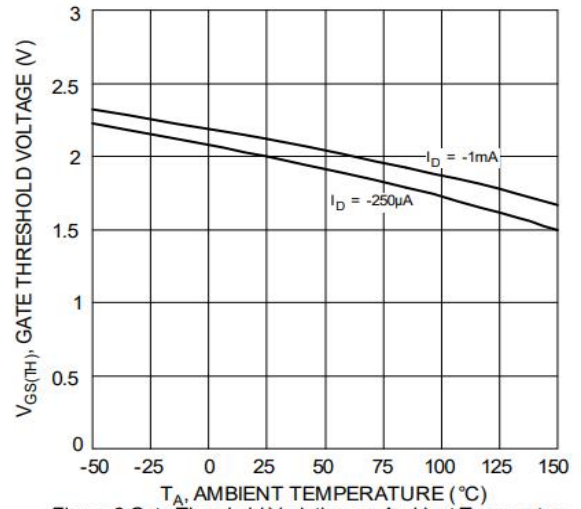


Figure 8 Gate Threshold Variation vs. Ambient Temperature

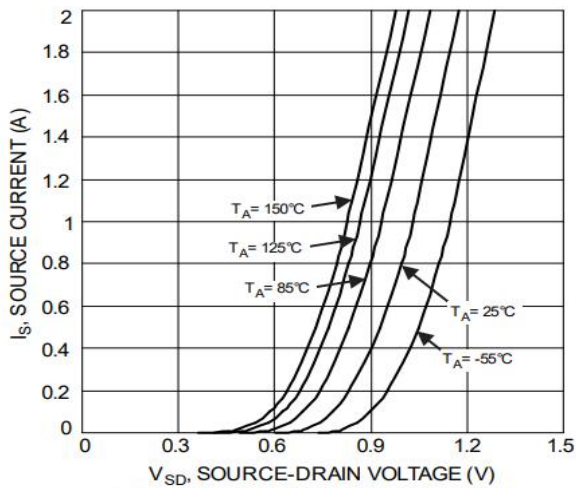


Figure 9 Diode Forward Voltage vs. Current

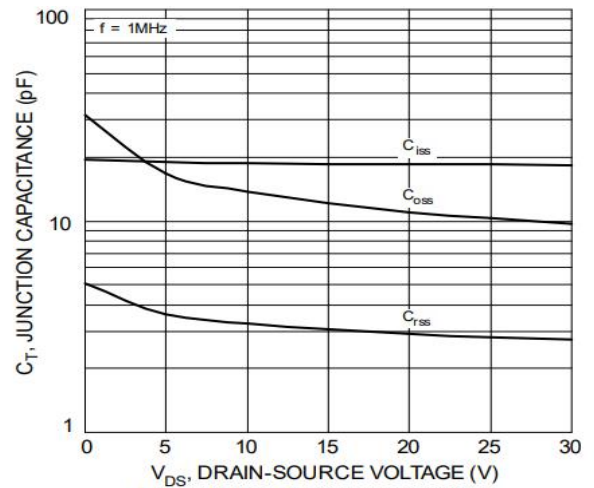


Figure 10 Typical Junction Capacitance

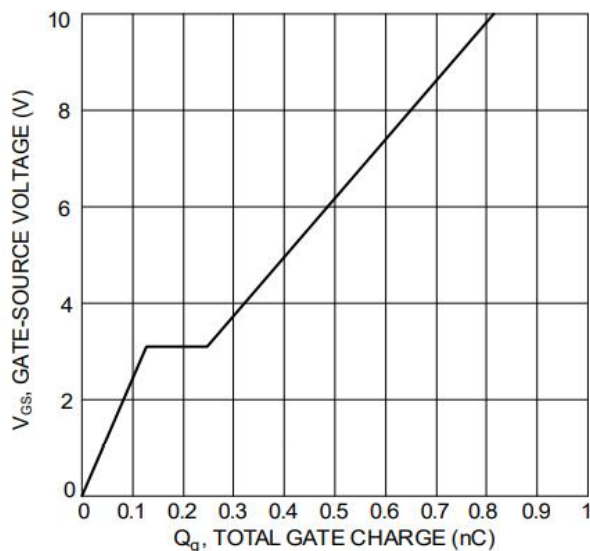


Figure 11 Gate Charge

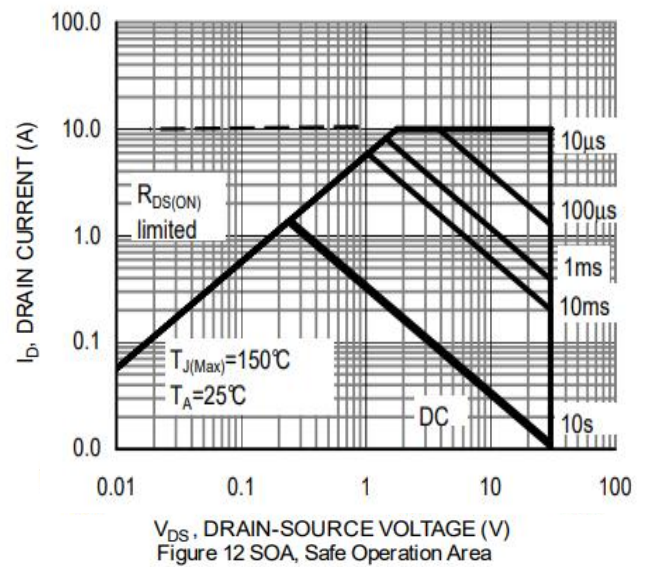


Figure 12 SOA, Safe Operation Area



Test Circuits

Fig.1-1 Switching times test circuit

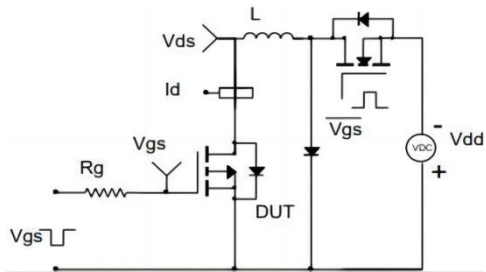


Fig.1-2 Switching Waveform

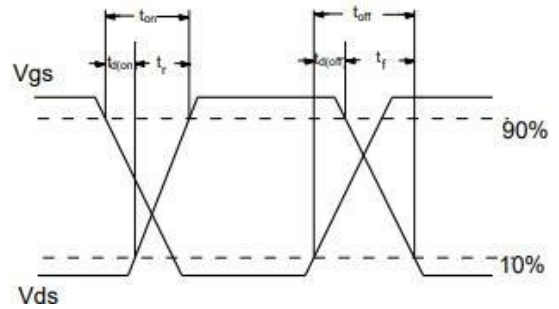


Fig.2-1 Gate charge test circuit

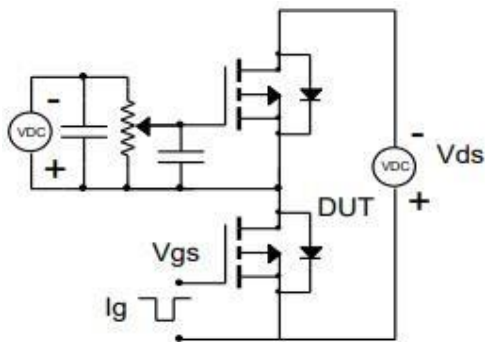


Fig.2-2 Gate charge waveform

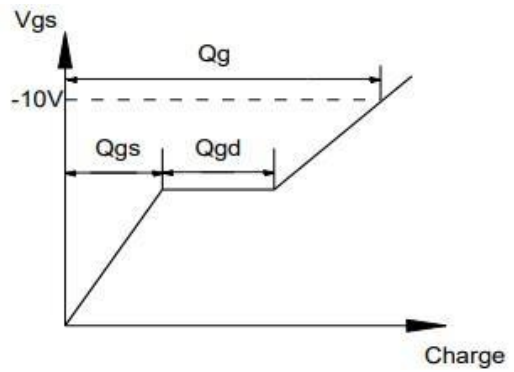


Fig.3-1 Avalanche test circuit

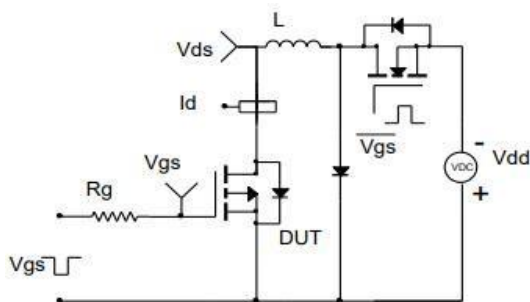
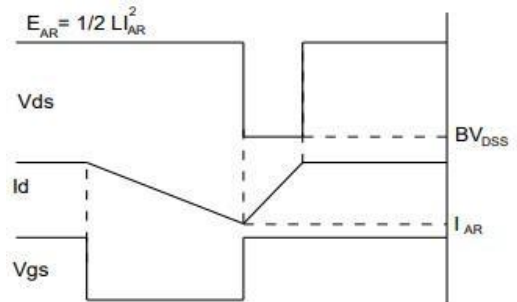


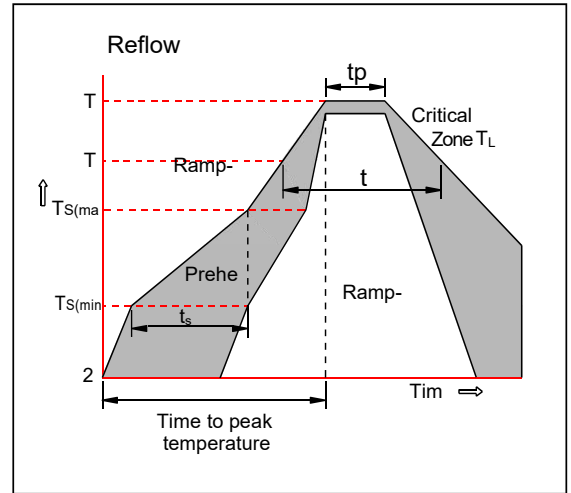
Fig.3-2 Avalanche waveform





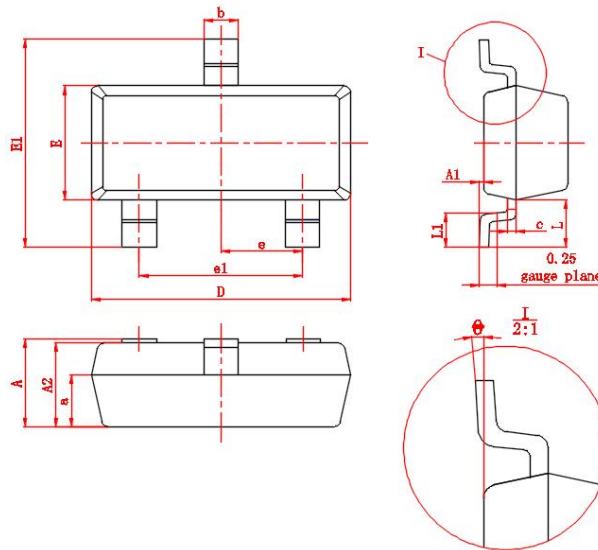
Soldering parameters

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)

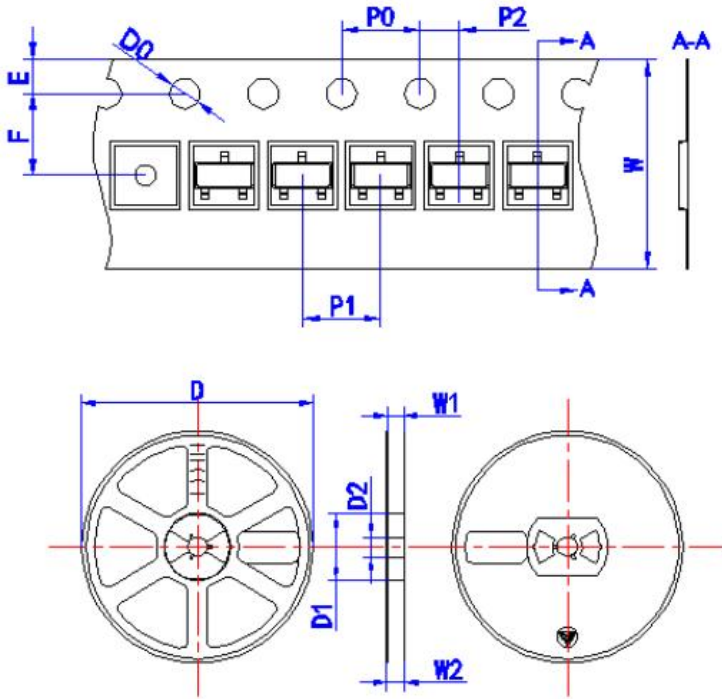
SOT-23



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