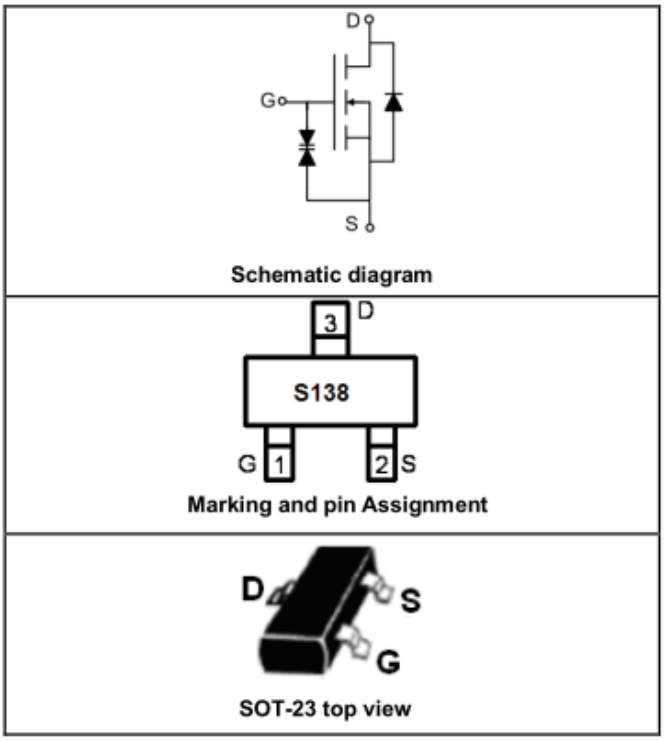
GENERAL FEATURES

- V_{DS} = 50V,I_D = 0.22A
- $R_{DS(ON)}$ < 6Ω @ V_{GS}=4.5V
- $R_{DS(ON)}$ < 3.5Ω @ V_{GS}=10V
- ESD Rating：1000V HBM
- High Power and current handing capability
- Halogen Free product is acquired
- Surface Mount Package

Applications

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays



PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
S138	BSS138-HF	SOT-23	Ø180mm	8 mm	3000 units

ABSOLUTE MAXIMUM RATINGS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	50	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D	0.22	A
	I_D(70℃)	0.18	
	I_{DM}	0.88	A
Maximum Power Dissipation	P_D	0.43	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

THERMAL CHARACTERISTICS

Parameter	Symbol	Limit	Unit
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	350	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	50			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=50V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			10	uA
Gate-Source Breakdown Voltage	BV_{GSO}	V_{DS}=0V, I_G=±250uA	±20			V
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	0.8		1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=0.22A			3.5	Ω
		V_{GS}=4.5V, I_D=0.22A			6	
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=0.22A		0.1		S
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz		30		PF
Output Capacitance	C_{oss}			15		
Reverse Transfer Capacitance	C_{rss}			6		
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V,V_{GS}=10V, R_{GEN}=6Ω，I_D=0.22A		2.6		nS
Turn–On Rise Time	t_r			9		
Turn-Off Delay Time	$t_{d(off)}$			20		
Turn–Off Fall Time	t_f			6		
Total Gate Charge	Q_g	V_{DS}=25V,I_D=0.22A,V_{GS}=10V		1.7	2.4	nC
Gate–Source Charge	Q_{gs}			0.1		
Gate–Drain Charge	Q_{gd}			0.4		
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=0.44A			1.4	V

NOTES:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

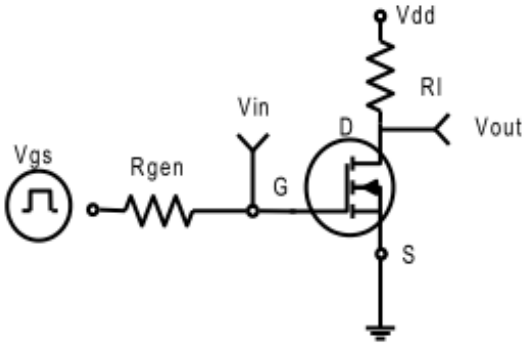


Figure 1:Switching Test Circuit

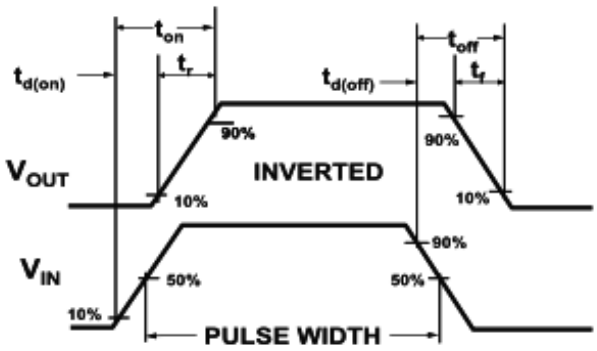


Figure 2:Switching Waveforms

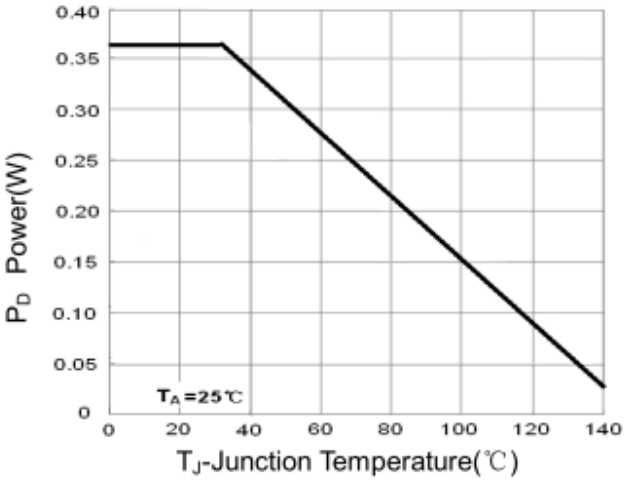


Figure 3 Power Dissipation

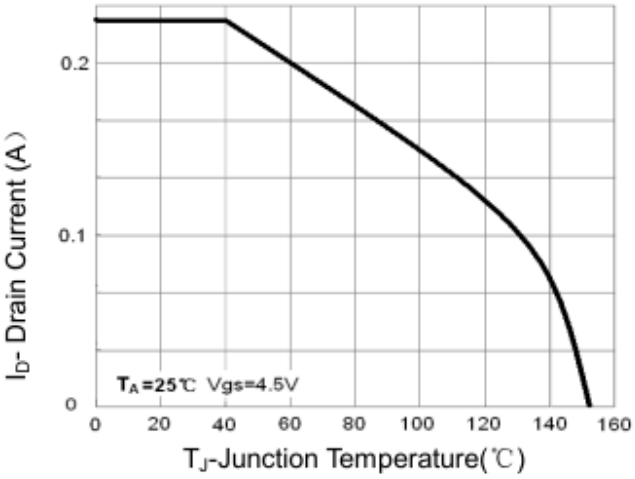


Figure 4 Drain Current

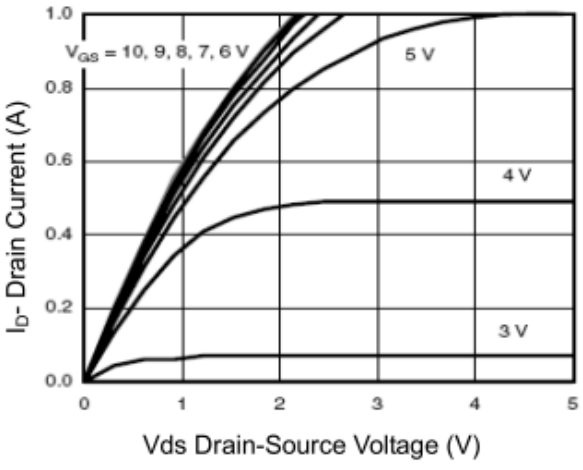


Figure 5 Output CHARACTERISTICS

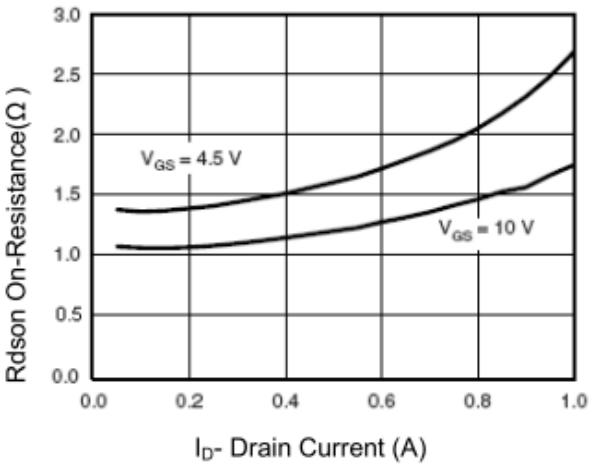


Figure 6 Drain-Source On-Resistance

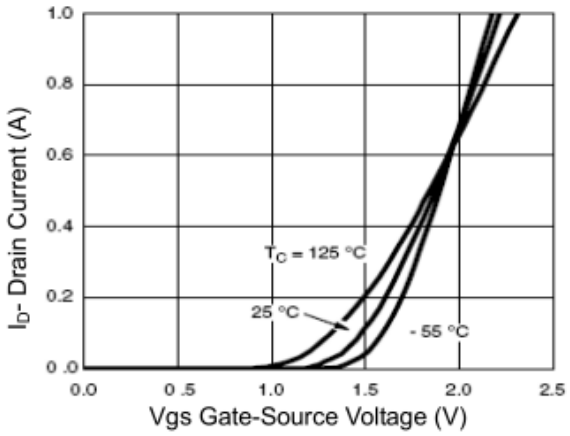


Figure 7 Transfer Characteristics

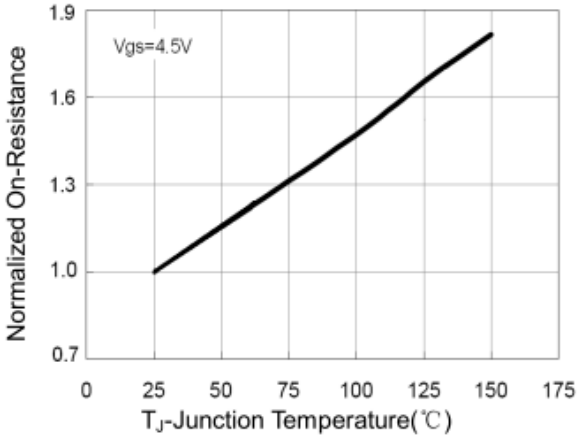


Figure 8 Drain-Source On-Resistance

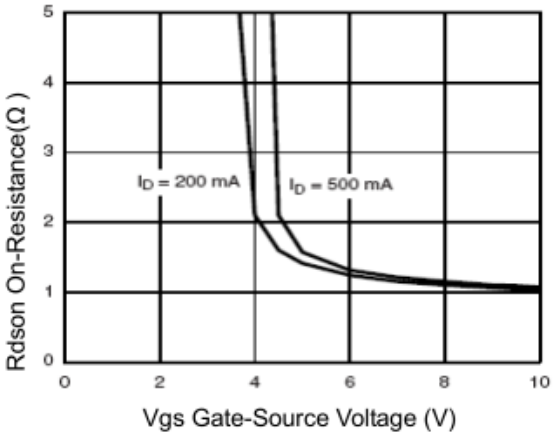


Figure 9 Rdson vs Vgs

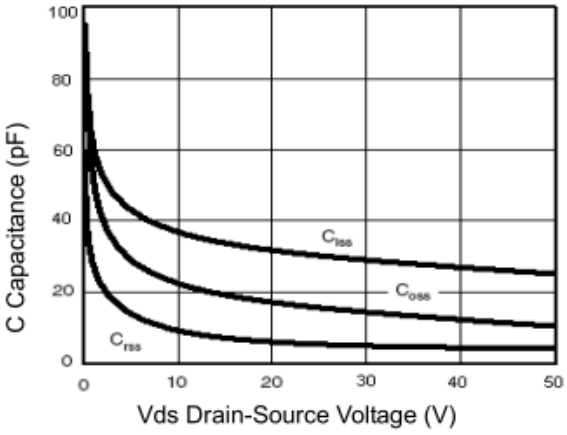


Figure 10 Capacitance vs Vds

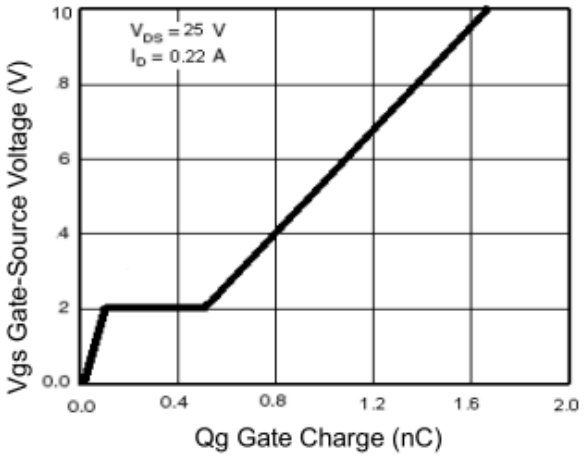


Figure 11 Gate Charge

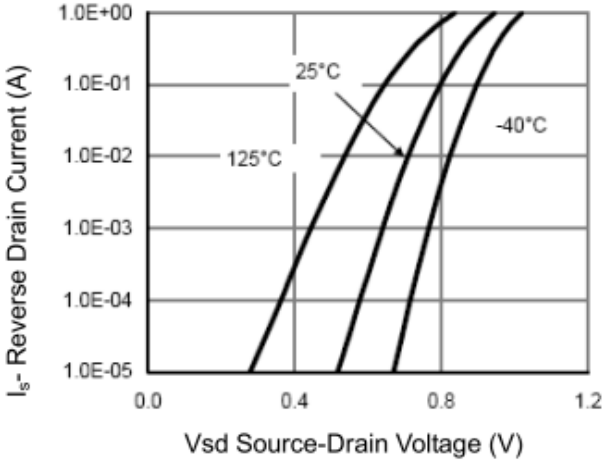


Figure 12 Source- Drain Diode Forward

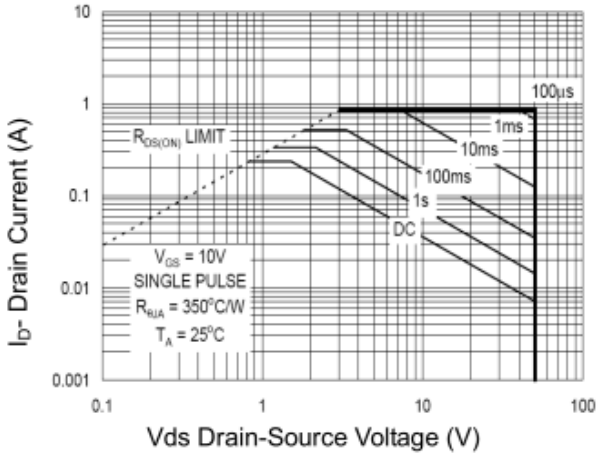


Figure 13 Safe Operation Area

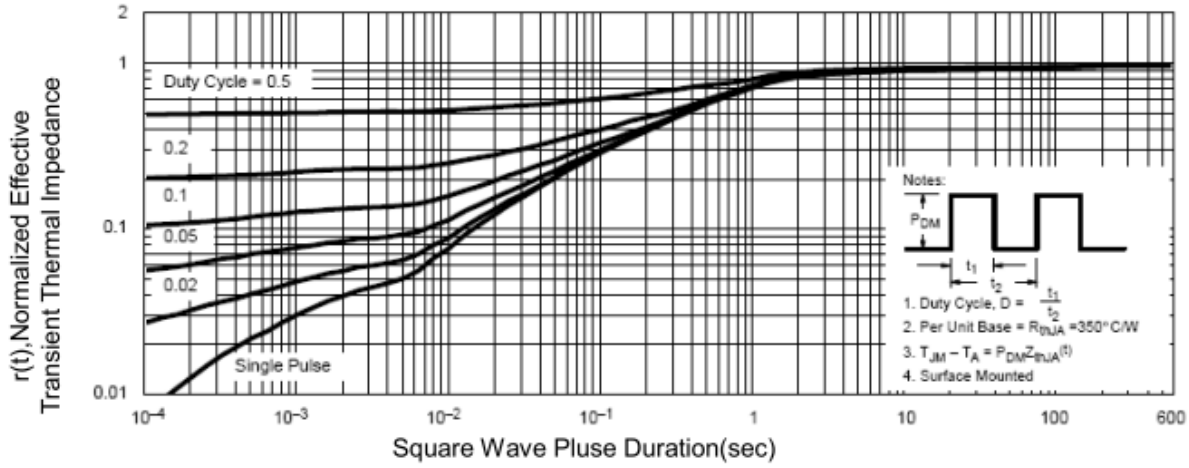
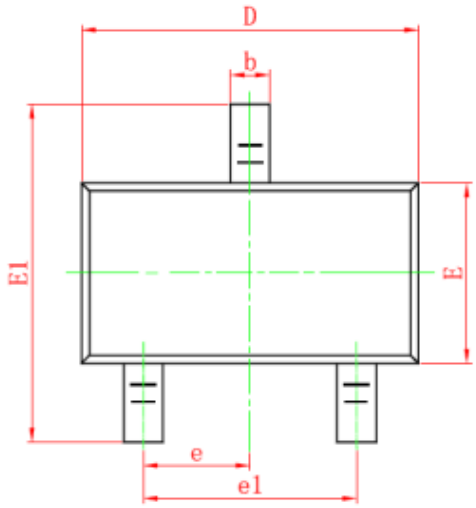
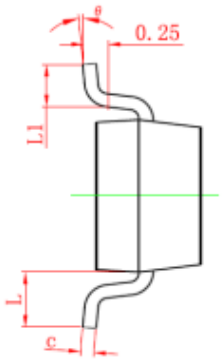
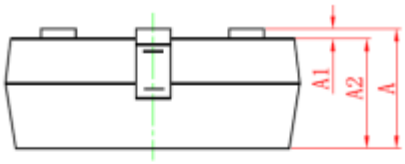


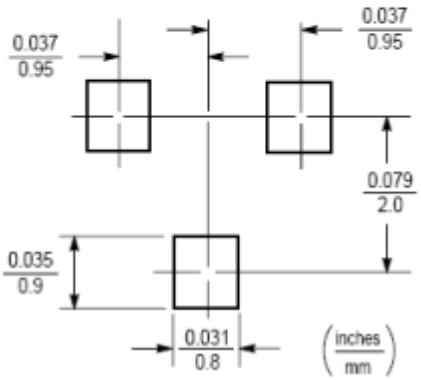
Figure 14 Normalized Maximum Transient Thermal Impedance

Package Information
SOT 23





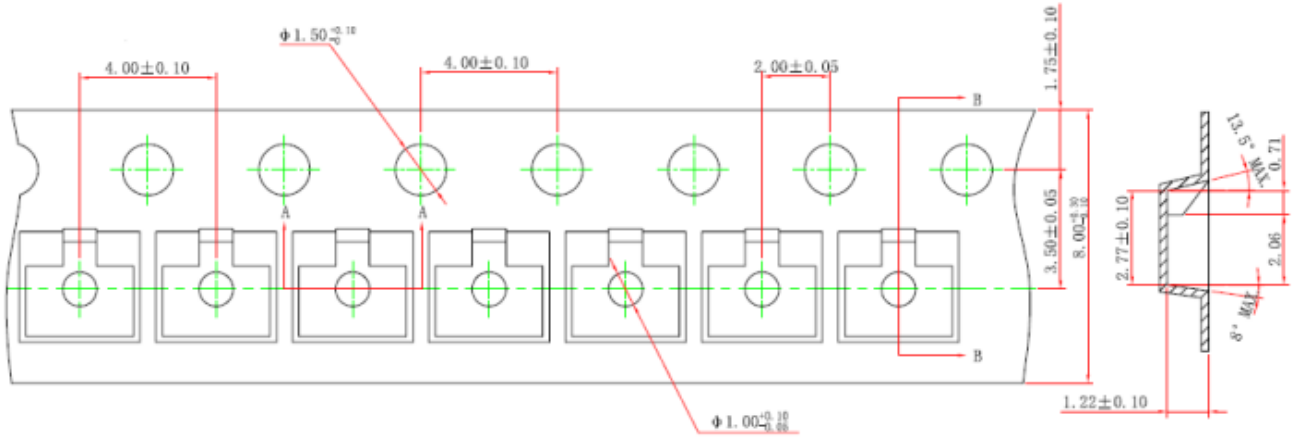


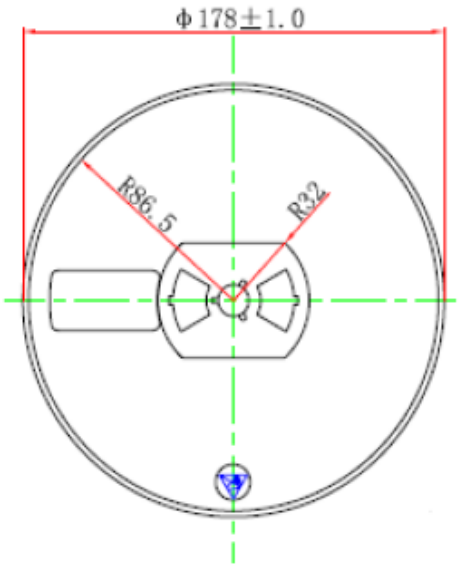


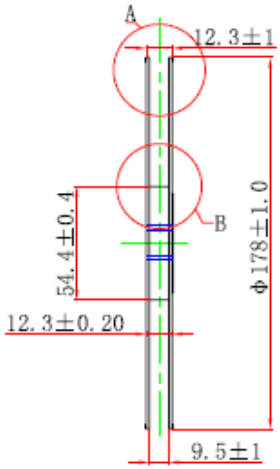
Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

NOTES
1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

SOT 23 Tape and Reel Information







NOTES：
1.All dimensions are in millimeters.
2.10 Sprocket hole pitch cumulative tolerance ±0.20MAX
3.General tolerance ±0.25