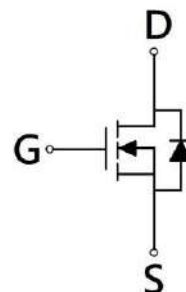
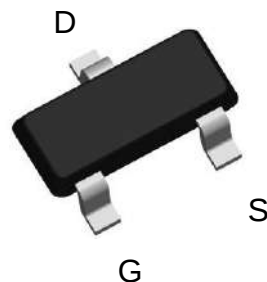


N-Channel Enhancement Mode Power MOSFET

Features:

- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic

SOT-23



G : Gate S : Source D : Drain

BV_{DSS}	40V
$I_D @ V_{GS}=10V, T_A=25^\circ C$	5A
$R_{DS(ON) typ. @ V_{GS}=10V, I_D=5A}$	20m Ω
$R_{DS(ON) typ. @ V_{GS}=4.5V, I_D=5A}$	27m Ω

Ordering Information

Device	Package	Shipping
KWB020N04R	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (T_A=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V _{DS}	40	V
Gate-Source Voltage		V _{GS}	±20	
Continuous Drain Current @ V _{GS} =10V, T _A =25°C		I _D	5	A
Continuous Drain Current @ V _{GS} =10V, T _A =70°C			4	
Pulsed Drain Current		I _{DM}	20	
Continuous Body Diode Forward Current @ T _A =25°C		I _S	1	
Pulsed Body Diode Forward Current @ T _A =25°C		I _{SM}	4	
Avalanche Current @ L=0.1mH		I _{AS}	5	
Avalanche Energy @ L=0.5mH		E _{AS}	4	mJ
Total Power Dissipation	T _A =25°C	P _D	1.3	W
	T _A =70°C		0.8	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55~+150	°C

Thermal Data

Parameter	Symbol	Steady State	Unit
Thermal Resistance, Junction-to-ambient	R _{θJA}	100	°C/W

Note:

*a. The value of R_{θJA} is measured with the device mounted on 1 in² FR -4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_D is based on R_{θJA} and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

*b. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	40	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	1	-	2.5		V _{DS} =V _{GS} , I _D =250μA
G _{FS}	-	7.5	-	S	V _{DS} =5V, I _D =5A
I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
I _{DSS}	-	-	1	μA	V _{DS} =32V, V _{GS} =0V
R _{DS(ON)}	-	20	26	mΩ	V _{GS} =10V, I _D =5A
	-	27	38		V _{GS} =4.5V, I _D =5A
Dynamic					
C _{iss}	-	275	-	pF	V _{DS} =20V, V _{GS} =0V, f=1MHz
C _{oss}	-	135	-		
C _{rss}	-	23	-		
R _g	-	0.4	-	Ω	f=1MHz
Q _g *1, 2	-	2.7	-	nC	V _{DS} =20V, I _D =5A, V _{GS} =4.5V
Q _g *1, 2	-	5.5	-		V _{DS} =20V, I _D =5A, V _{GS} =10V
Q _{gs} *1, 2	-	1	-		
Q _{gd} *1, 2	-	1	-		
t _{d(ON)} *1, 2	-	4.5	-	ns	V _{DS} =20V, I _D =5A, V _{GS} =10V, R _{GS} =1Ω
t _r *1, 2	-	14	-		
t _{d(OFF)} *1, 2	-	13	-		
t _f *1, 2	-	5	-		
Source-Drain Diode					
V _{SD} *1	-	0.85	1.2	V	I _S =5A, V _{GS} =0V
t _{rr}	-	9.3	-	ns	I _F =5A, dI _F /dt=100A/μs
Q _{rr}	-	2.6	-	nC	

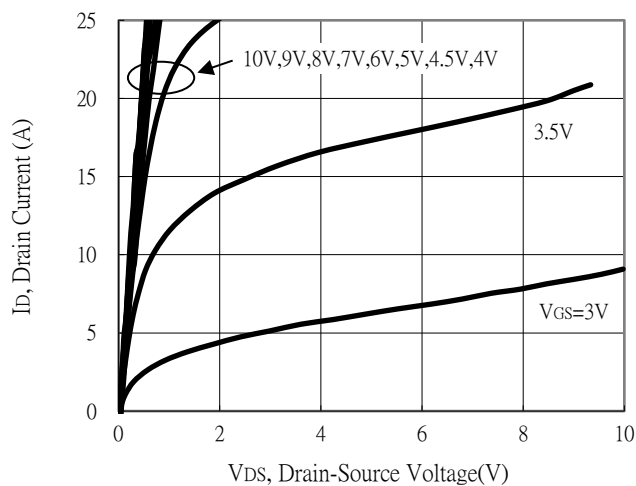
Note:

*1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

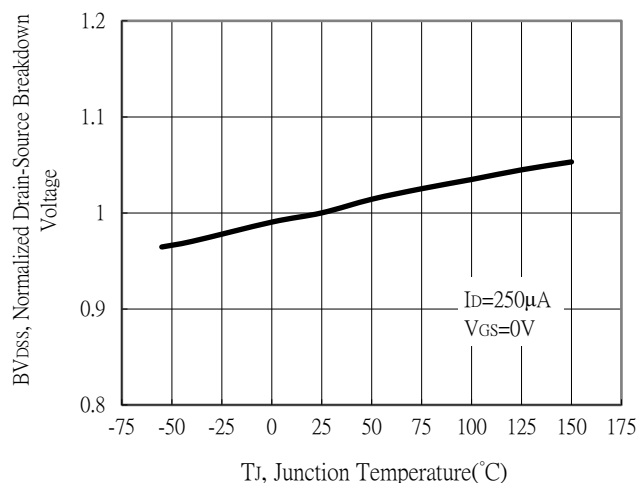
*2. Independent of operating temperature

Typical Characteristics

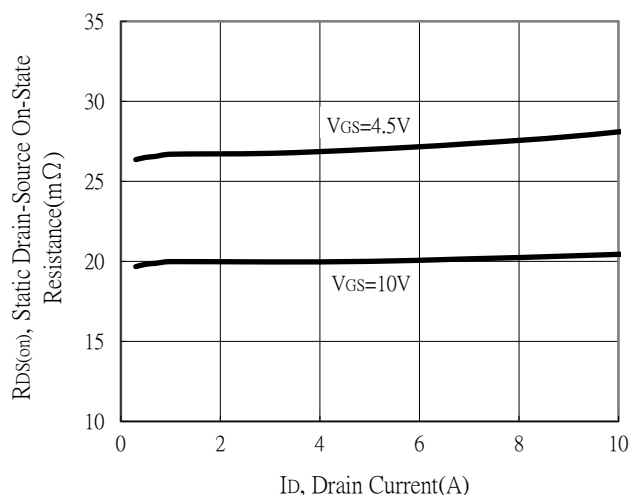
Typical Output Characteristics



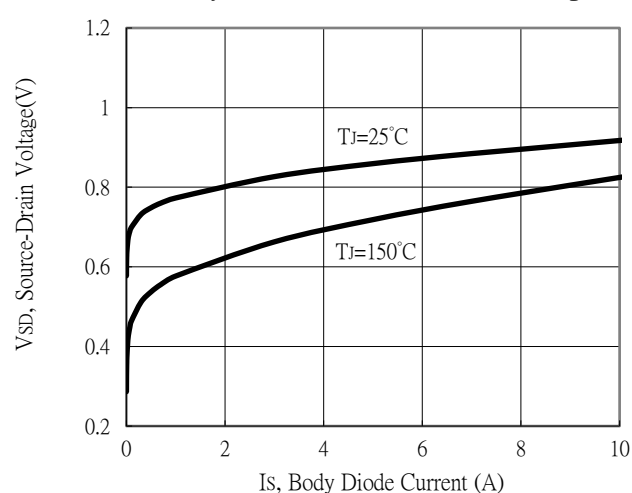
Breakdown Voltage vs Ambient Temperature



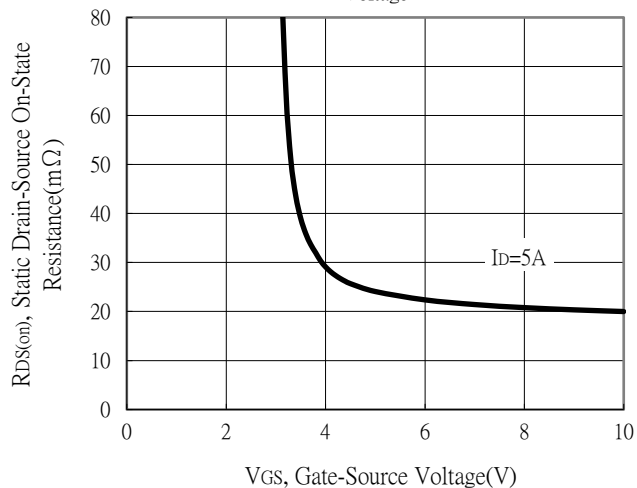
Static Drain-Source On-State resistance vs Drain Current



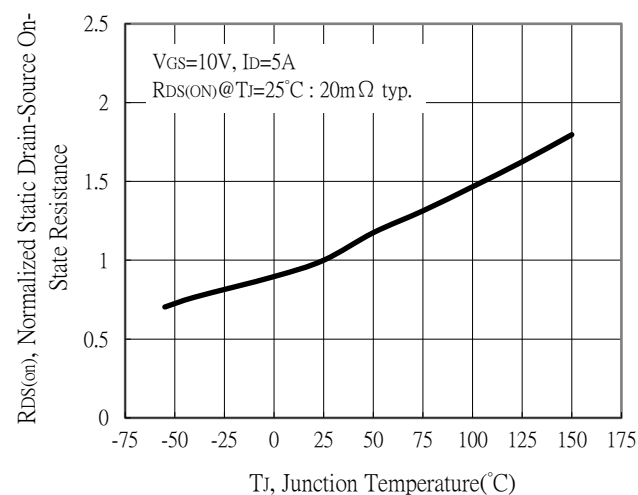
Body Diode Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

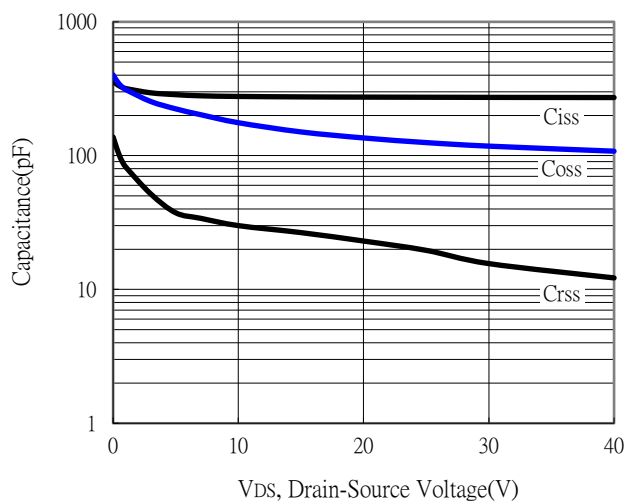


Drain-Source On-State Resistance vs Junction Temperature

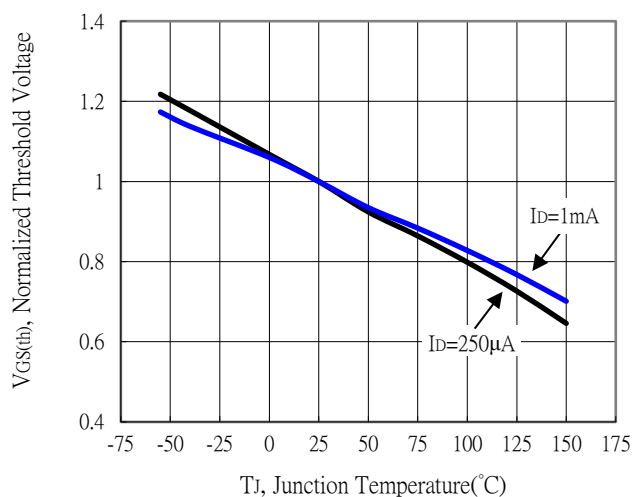


Typical Characteristics (Cont.)

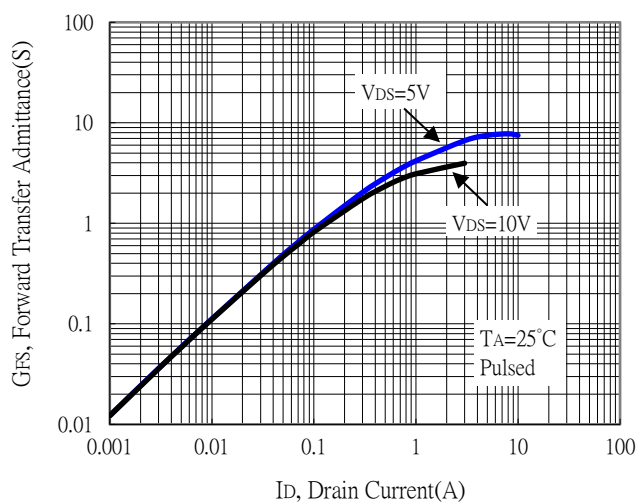
Capacitance vs Drain-to-Source Voltage



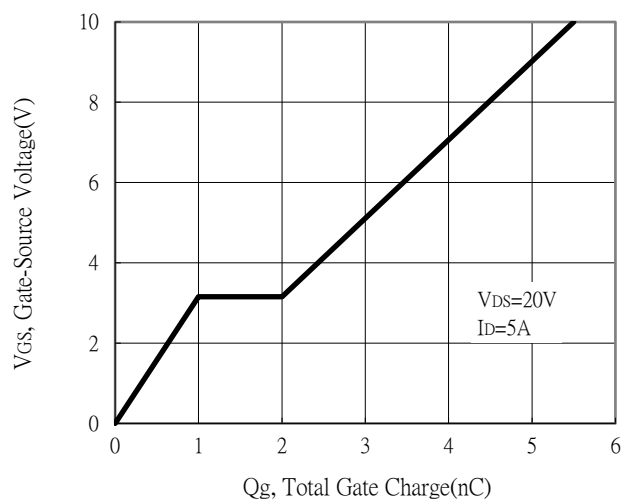
Threshold Voltage vs Junction Temperature



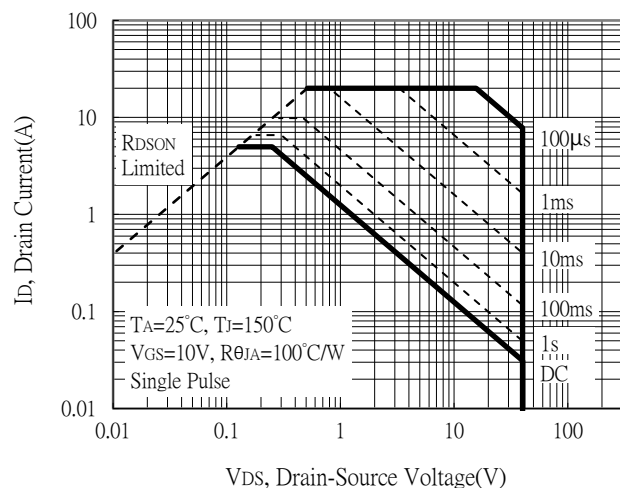
Forward Transfer Admittance vs Drain Current



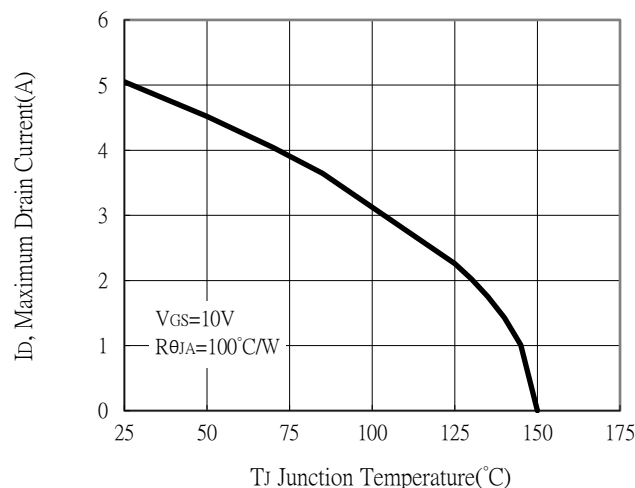
Gate Charge Characteristics



Maximum Safe Operating Area

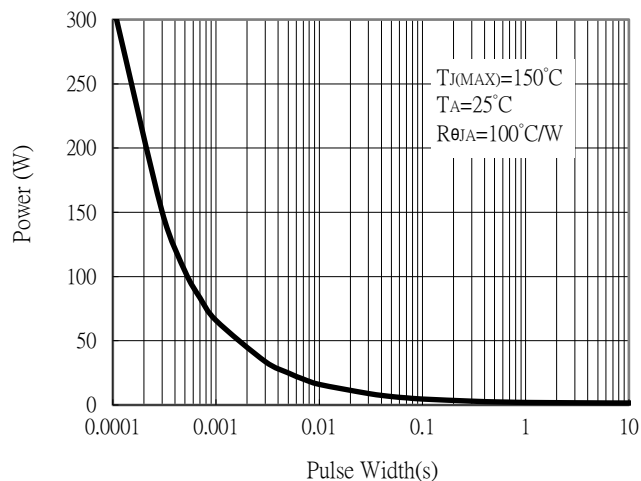


Maximum Drain Current vs Junction Temperature

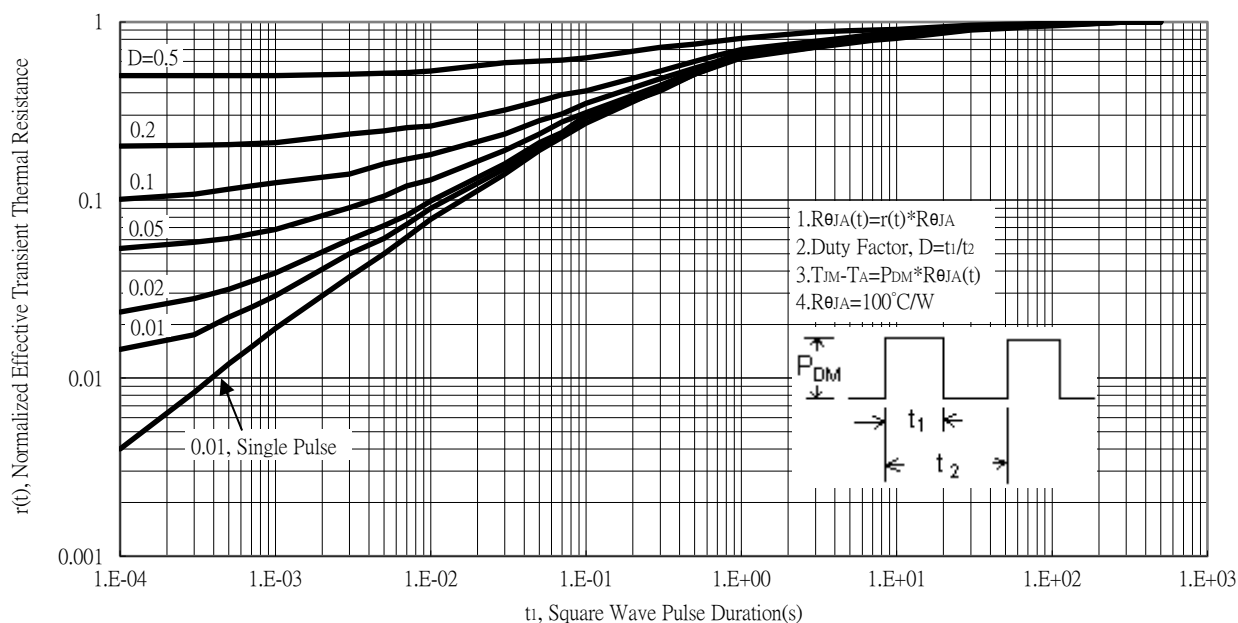


Typical Characteristics (Cont.)

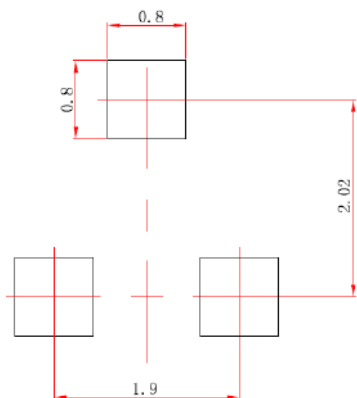
Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves

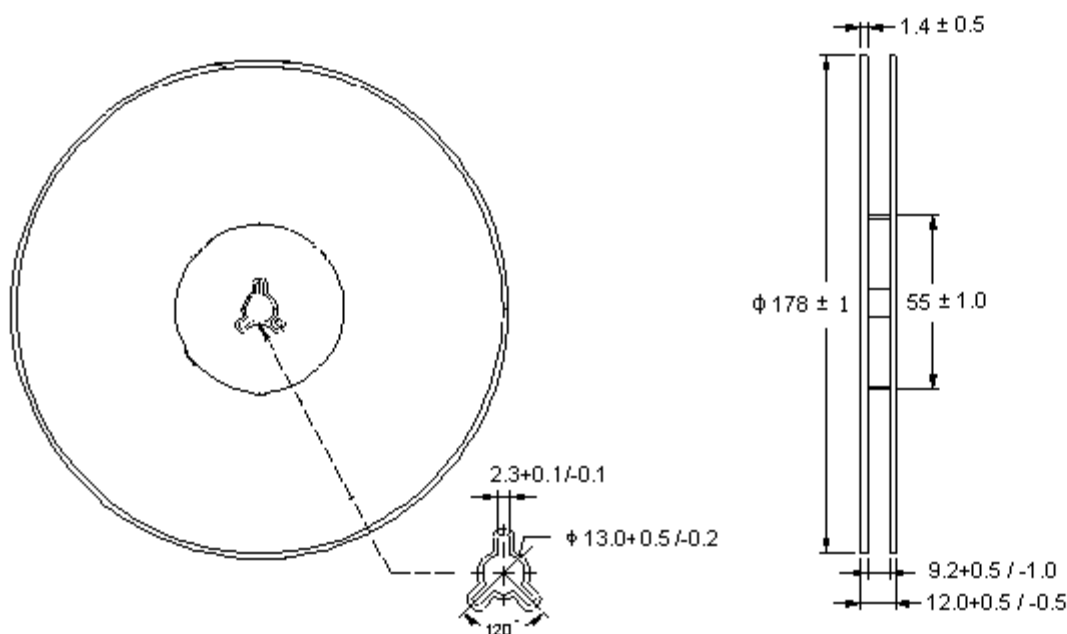


Recommended Soldering Footprint



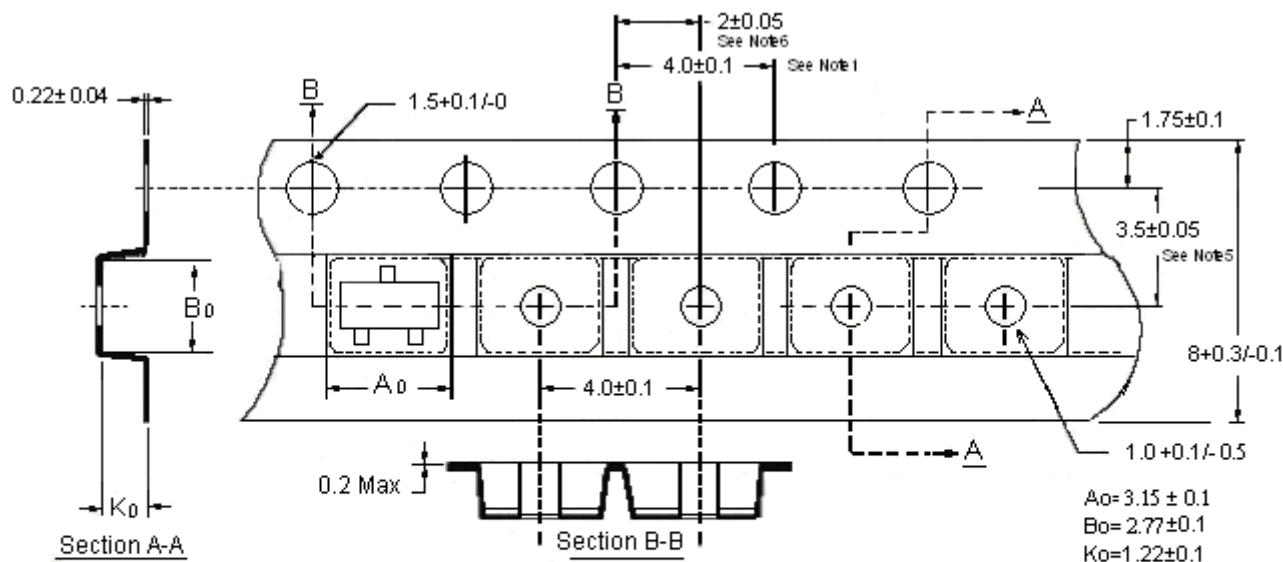
Unit : mm

Reel Dimension



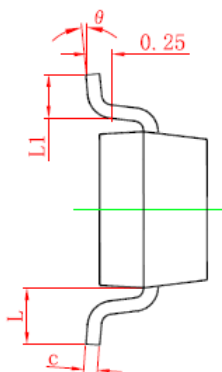
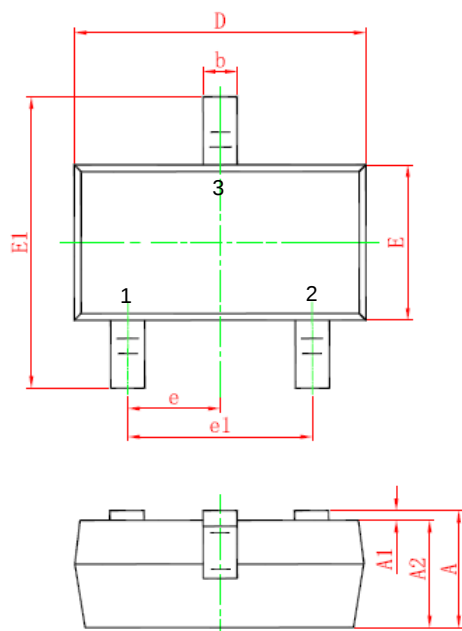
Unit: millimeter

Carrier Tape Dimension



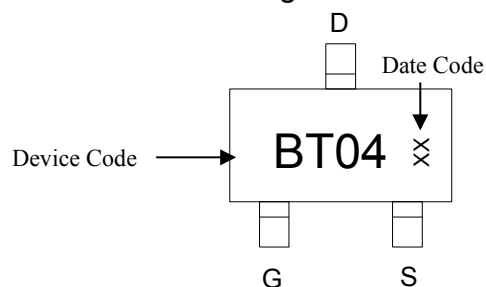
Unit : millimeter

SOT-23 Dimension



Date Code: Year+Month
 Year: 3→2003, 4→2004
 Month: 1→1, 2→2, . . .
 9→9, A→10, B→11, C→12

Marking:



Style: Pin 1.Gate 2.Source 3.Drain

3-Lead SOT-23 Plastic
 Surface Mounted Package

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.035	0.045	0.900	1.150	E1	0.089	0.100	2.250	2.550
A1	0.000	0.004	0.000	0.100	e	0.037 TYP.		0.950 TYP.	
A2	0.035	0.041	0.900	1.050	e1	0.071	0.079	1.800	2.000
b	0.012	0.020	0.300	0.500	L	0.022 REF.		0.550 REF.	
c	0.003	0.006	0.080	0.150	L1	0.012	0.020	0.300	0.500
D	0.110	0.118	2.800	3.000	θ	0°	8°	0°	8°
E	0.047	0.055	1.200	1.400					