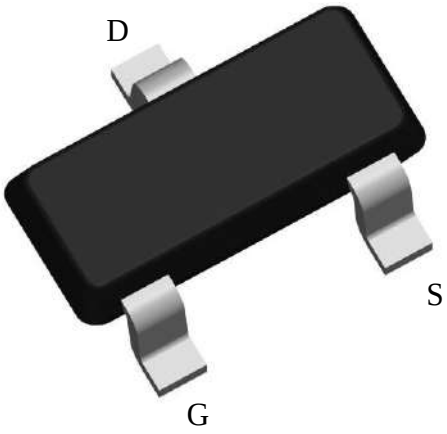
250V N-Channel Enhancement Mode MOSFET

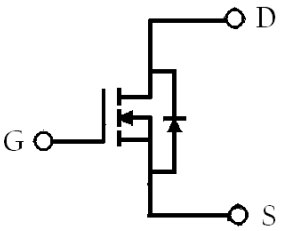
Features:

- Simple drive requirement
- Small package outline
- Pb-free lead plating and halogen-free package

SOT-23



BV_{DSS}	250V
I_D@ T_A=25°C, V_{GS}=10V	0.5A
R_{DSON}@V_{GS}=10V, I_D=0.3A	1.53Ω (typ)
R_{DSON}@V_{GS}=4.5V, I_D=0.2A	1.55Ω (typ)
R_{DSON}@V_{GS}=3V, I_D=0.1A	1.78Ω (typ)



G：Gate S：Source D：Drain

Ordering Information

Device	Package	Shipping
KNB1K8N25	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	250	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V (Note 3)	I_D	0.5	A
Continuous Drain Current @ T_A=70°C, V_{GS}=10V (Note 3)		0.4	
Pulsed Drain Current (Notes 1, 2)	I_{DM}	2	
Maximum Power Dissipation@ T_A=25℃ (Note 3)	P_D	1.25	W
Maximum Power Dissipation@ T_A=70℃ (Note 3)		0.8	
Operating Junction and Storage Temperature Range	Tj ; Tstg	-55~+150	°C

Note : 1. Pulse width limited by maximum junction temperature.
2. Pulse width≤ 300μs, duty cycle≤2%.
3. Surface mounted on 1 in² copper pad of FR-4 board; 270°C/W when mounted on minimum copper pad

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, max	$R_{\theta JA}$	100	°C/W
Thermal Resistance, Junction-to-Case, max	$R_{\theta JC}$	55	

Note : Surface mounted on 1 in² copper pad of FR-4 board; 270°C/W when mounted on minimum copper pad

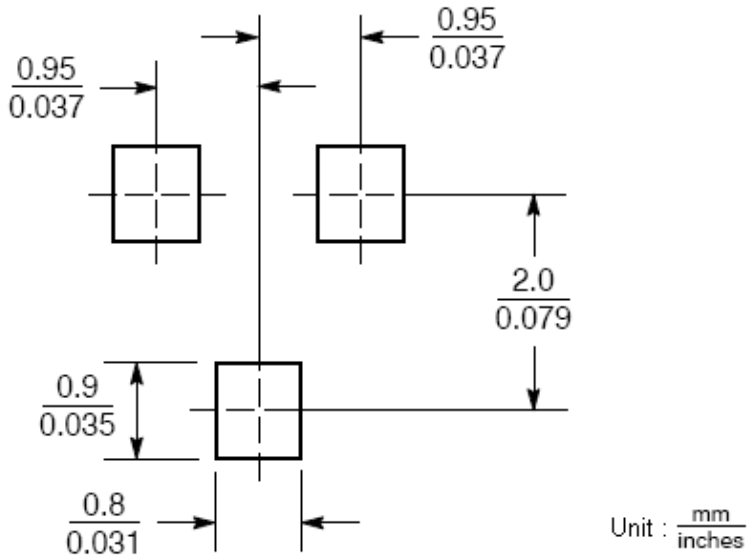
Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	250	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1.0	-	2.3		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=200V, V_{GS}=0V
	-	-	10		V_{DS}=200V, V_{GS}=0V (Tj=85°C)
*$R_{DS(ON)}$	-	1.53	4	Ω	V_{GS}=10V, I_D=300mA
	-	1.55	4		V_{GS}=4.5V, I_D=200mA
	-	1.78	6		V_{GS}=3V, I_D=100mA
*G_{FS}	-	1.5	-	S	V_{DS}=10V, I_D=0.3A
Dynamic					
Ciss	-	153	-	pF	V_{DS}=100V, V_{GS}=0V, f=1MHz
Coss	-	11	-		
Crss	-	8	-		
$t_{d(ON)}$	-	3.6	8	ns	V_{DS}=60V, I_D=0.3A, V_{GS}=10V, R_G=25Ω
t_r	-	7	14		
$t_{d(OFF)}$	-	15.4	32		
t_f	-	12.4	25		

Qg	-	5.3	8.5	nC	V_{DS}=192V, I_D=0.5A, V_{GS}=10V
Qgs	-	1	-		
Qgd	-	1.2	-		
Source-Drain Diode					
*I_S	-	-	0.5	A	
*I_{SM}	-	-	2		
*V_{SD}	-	0.74	1.2	V	V_{GS}=0V, I_S=0.3A
*Qrr	-	49	-	nC	I_F=0.5A, dI_F/dt=100A/μs
*trr	-	36	-	ns	

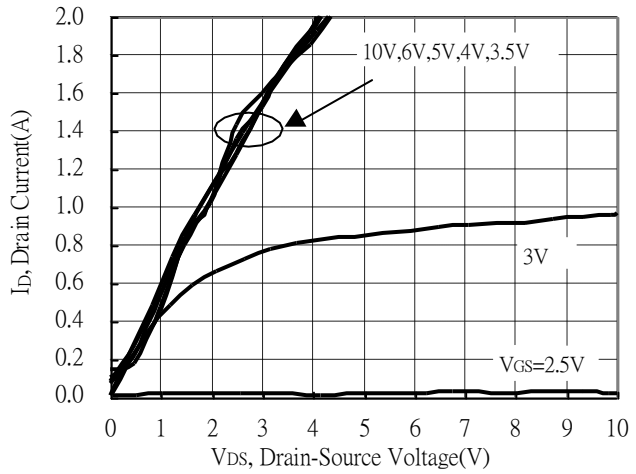
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Recommended Soldering Footprint

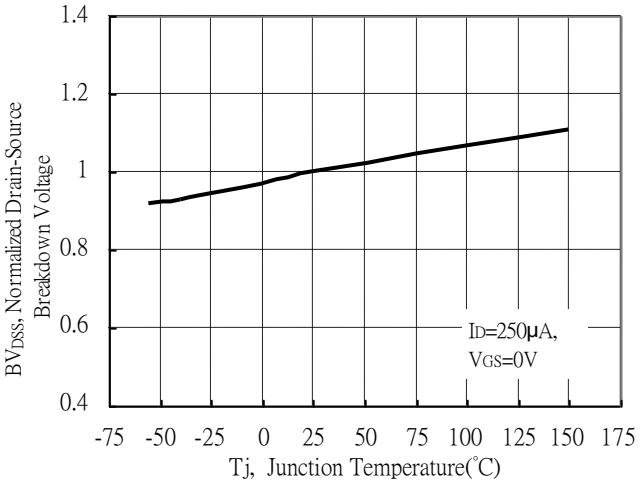


Typical Characteristics

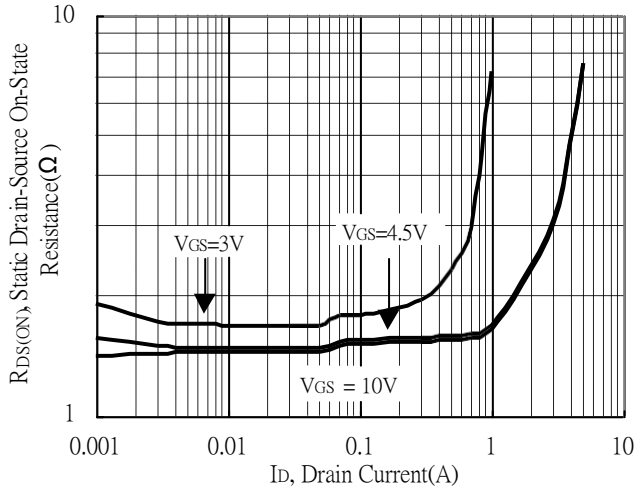
Typical Output Characteristics



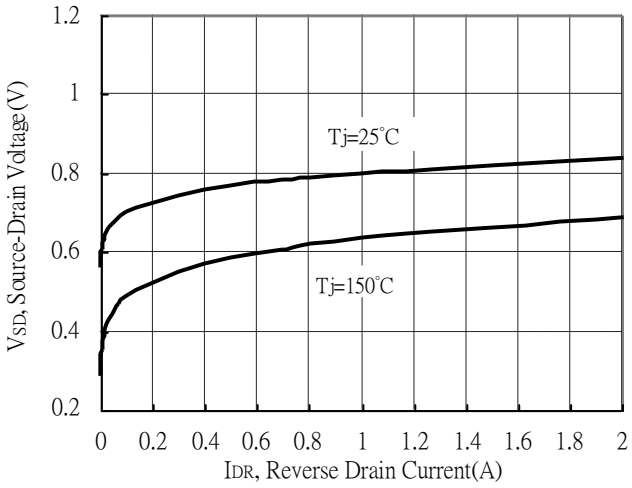
Brekdown Voltage vs Ambient Temperature



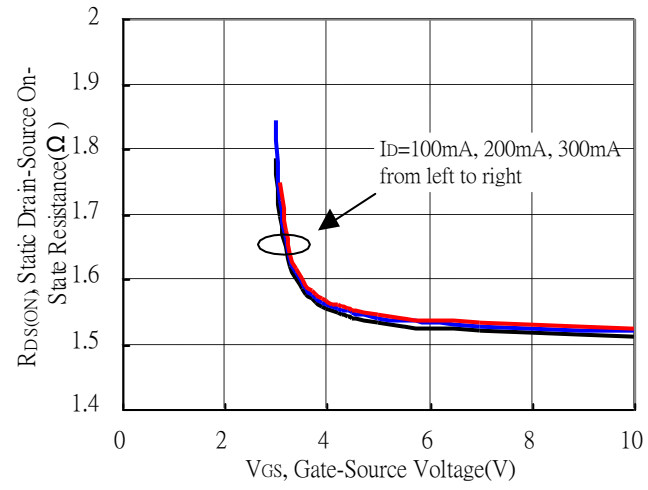
Static Drain-Source On-State resistance vs Drain Current



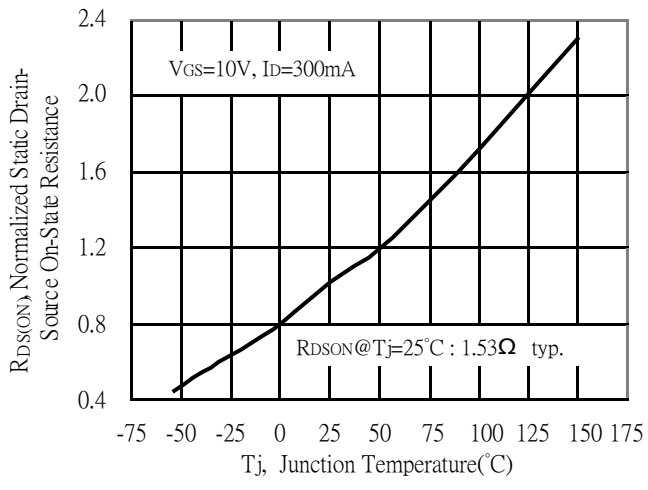
Reverse Drain Current vs Source-Drain Voltage



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

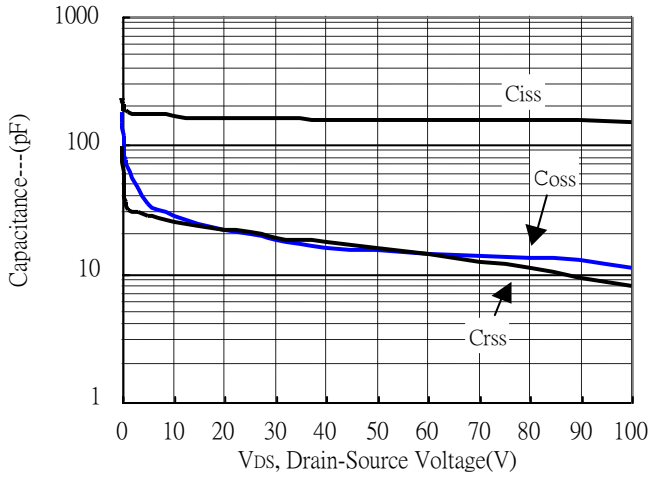


Drain-Source On-State Resistance vs Junction Tempearture

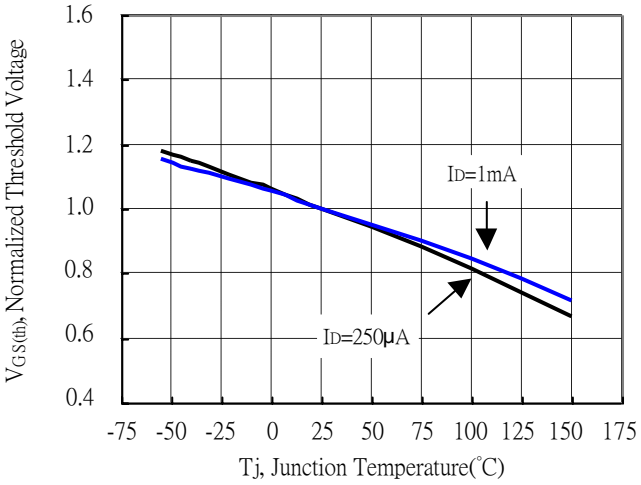


Typical Characteristics(Cont.)

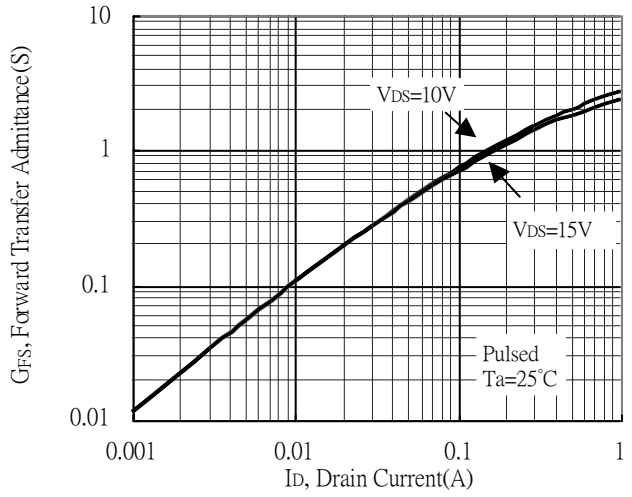
Capacitance vs Drain-to-Source Voltage



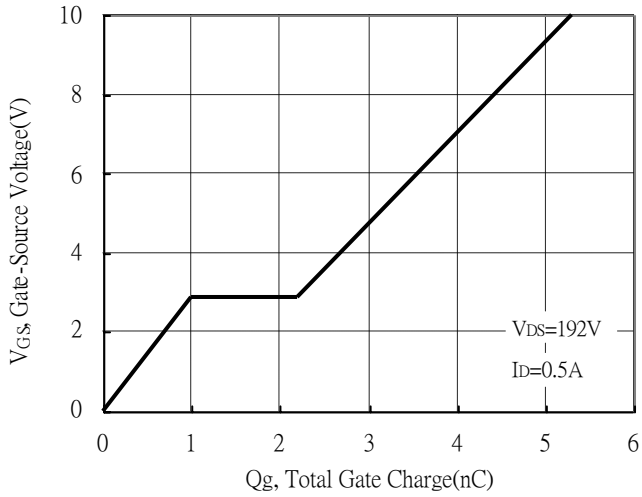
Threshold Voltage vs Junction Tempearture



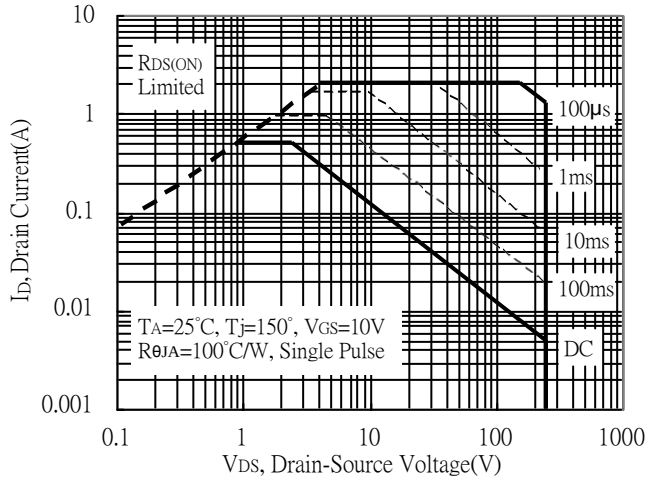
Forward Transfer Admittance vs Drain Current



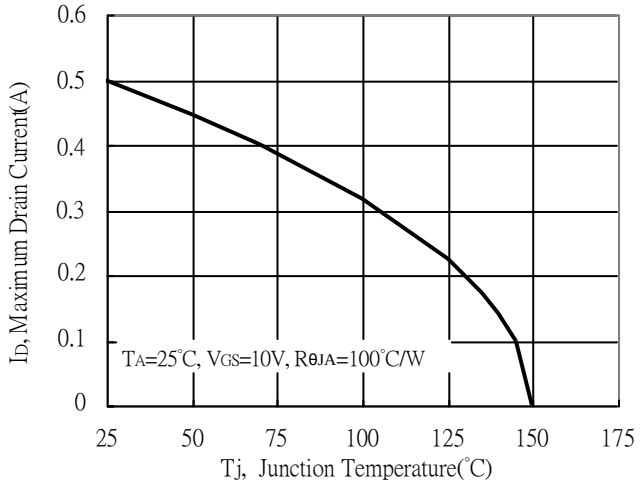
Gate Charge Characteristics



Maximum Safe Operating Area

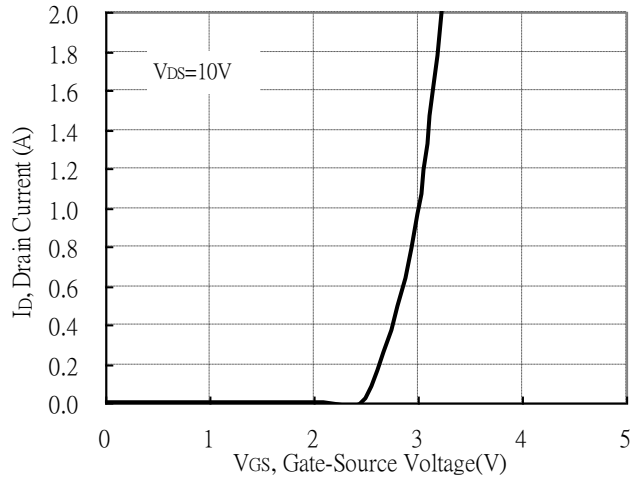


Maximum Drain Current vs Junction Temperature

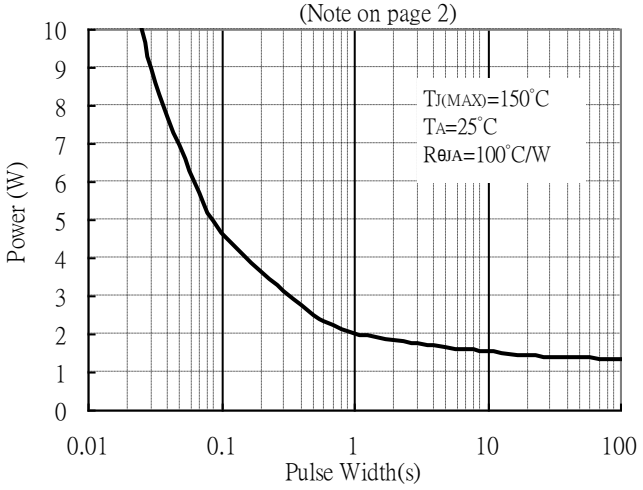


Typical Characteristics(Cont.)

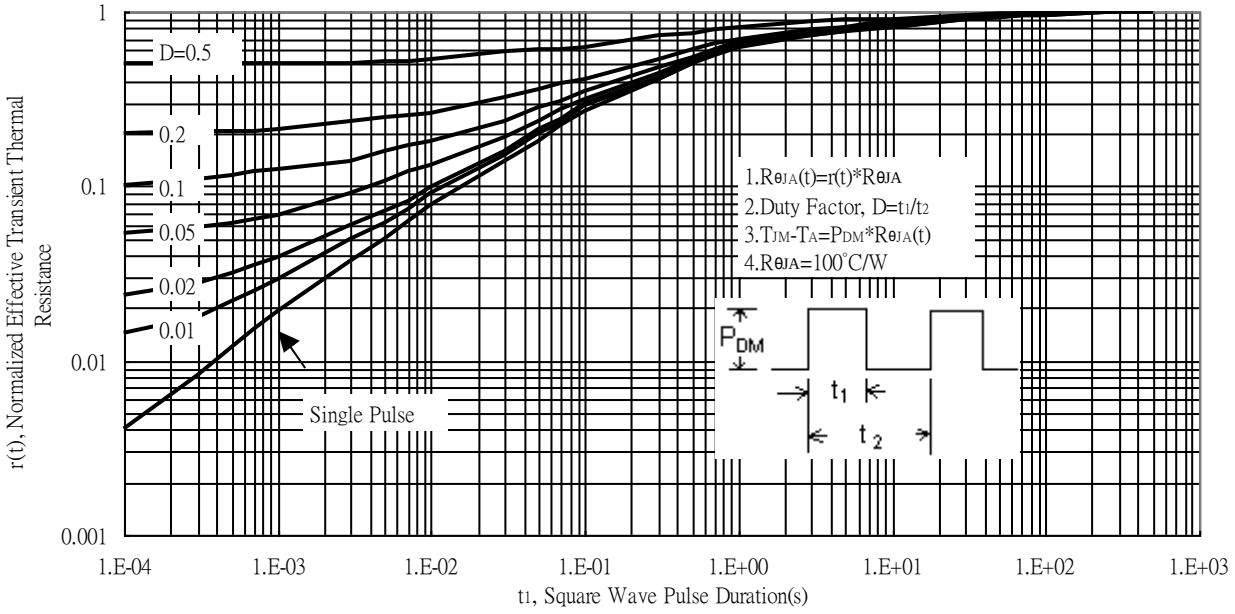
Typical Transfer Characteristics



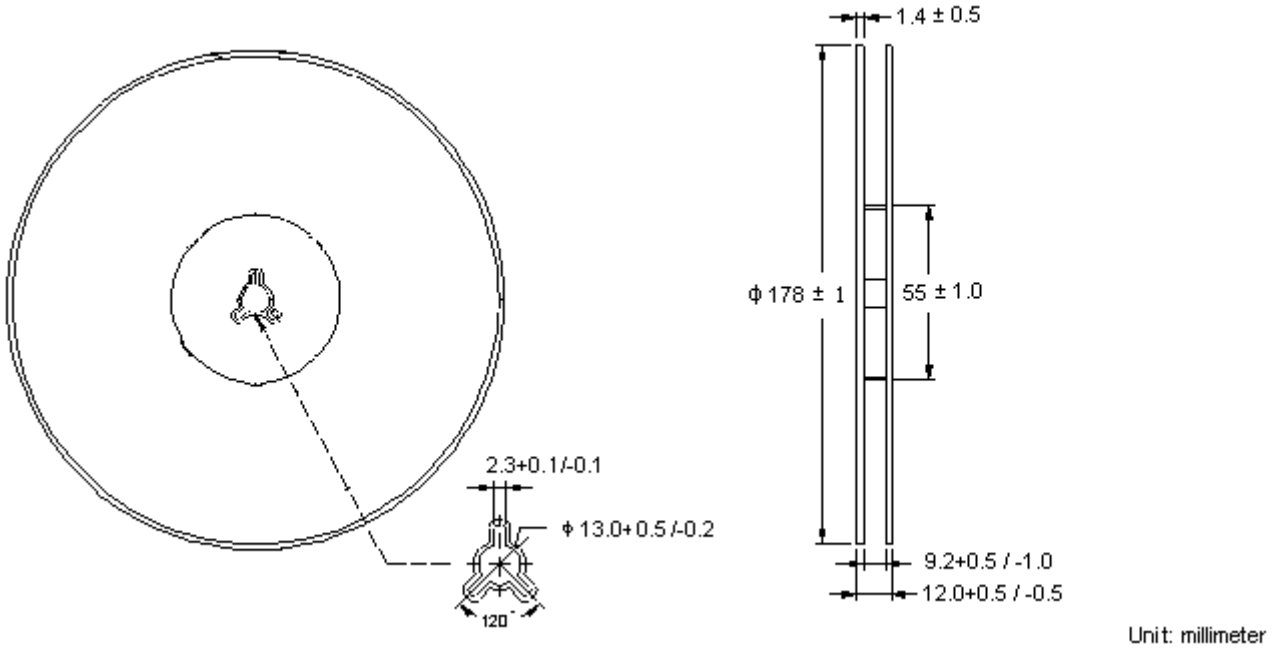
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



Transient Thermal Response Curves

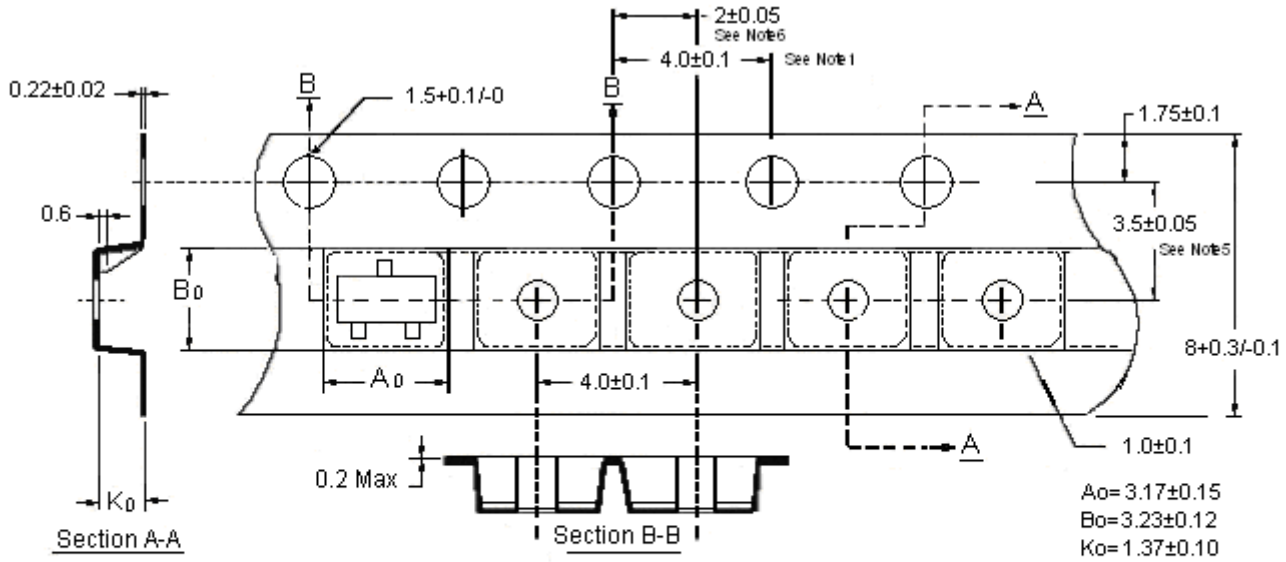


Reel Dimension



Unit: millimeter

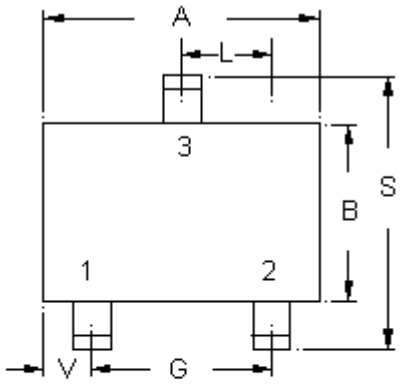
Carrier Tape Dimension

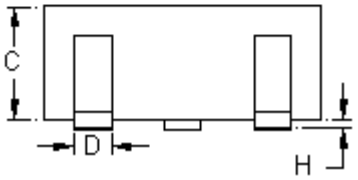


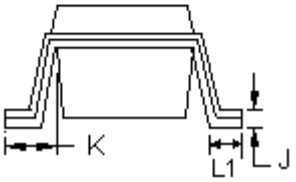
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

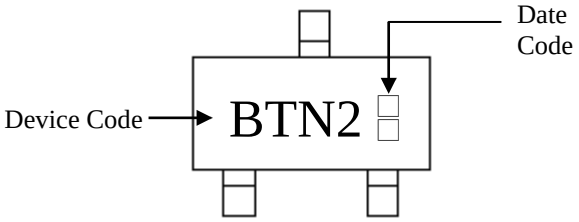
SOT-23 Dimension







Marking:



3-Lead SOT-23 Plastic
Surface Mounted Package

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

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50