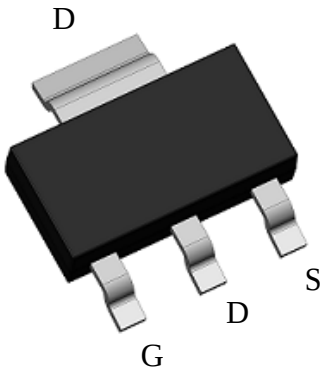
N-Channel Enhancement Mode MOSFET

Features:

- Low Gate Charge
- Simple Drive Requirement
- ESD protected gate, HBM 6kV, typically
- Pb-free lead plating & Halogen-free package

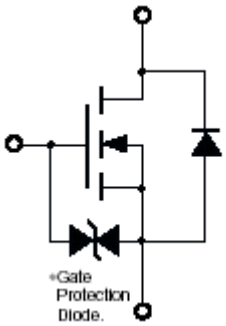
Outline

SOT-223



Equivalent Circuit

KWM1K0N20KL3



G：Gate D：Drain
S：Source

BV_{DSS}	**200V**
I_D @ V_{GS}=10V, T_A=25°C	**1A**
R_{DSON}@V_{GS}=10V, I_D=2A	**830mΩ (typ.)**
R_{DSON}@V_{GS}=4.5V, I_D=1A	**777mΩ (typ.)**

Ordering Information

Device	Package	Shipping
KWM1K0N20KL3	SOT-223 (Pb-free lead plating & Halogen-free package)	2500 pcs / Tape & Reel

Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V	I_D	1	A
Continuous Drain Current @ T_A=70°C, V_{GS}=10V		0.8	
Pulsed Drain Current *1	I_{DM}	4	
Avalanche Current @ L=0.1mH	I_{AS}	2	
Avalanche Energy @ L=1mH, I_D=2A, V_{DD}=50V *2	E_{AS}	2	mJ
Repetitive Avalanche Energy @ L=0.05mH	E_{AR}	0.625	
ESD susceptibility *3	V_{ESD}	6000	V
Total Power Dissipation @T_A=25℃	P_D	2.4	W
Total Power Dissipation @T_A=70℃		1.5	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Note : *1. Pulse width limited by maximum junction temperature
*2. Guaranteed by design, not by 100% test.
*3. Human body model, 1.5kΩ in series with 100pF

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	10	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	52 (Note)	

Note : When mounted on a 1 in^2 pad of 2 oz. copper.

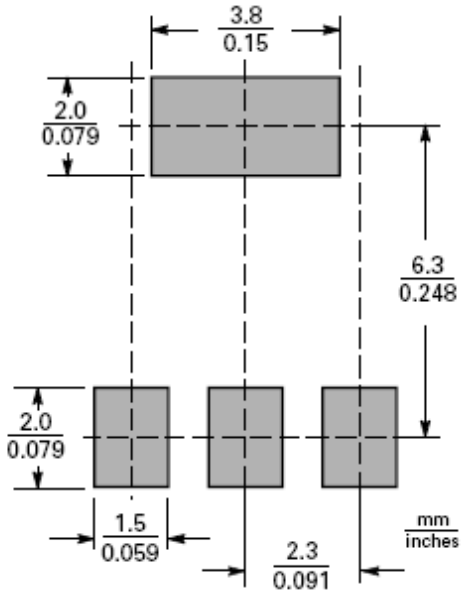
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	200	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	3		V_{DS} =V_{GS}, I_D=250μA
G_{FS} *1	-	3.1	-	S	V_{DS} =10V, I_D=1A
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS} =160V, V_{GS} =0V
	-	-	25		V_{DS} =160V, V_{GS} =0V, Tj=125°C
$R_{DS(ON)}$ *1	-	0.83	1.08	Ω	V_{GS} =10V, I_D=2A
	-	0.78	1.6		V_{GS} =4.5V, I_D=1A
Dynamic					
Qg *1, 2	-	5.2	7.8	nC	V_{DS}=150V, V_{GS}=5V, I_D=3.6A
Qgs *1, 2	-	1	1.5		
Qgd *1, 2	-	2.8	4.2		
$t_{d(ON)}$ *1, 2	-	39	58.5	ns	V_{DS}=100V, I_D=3.6A, V_{GS}=5V, R_G=25Ω
tr *1, 2	-	80.4	120.6		
$t_{d(OFF)}$ *1, 2	-	94.2	141.3		
t_f *1, 2	-	59.2	88.8		

Ciss	-	273	409.5	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	21	31.5		
Crss	-	23	34.5		
Source-Drain Diode					
I_S *1	-	-	1	A	
I_{SM} *3	-	-	4		
V_{SD} *1	-	0.8	1	V	I_S=1A, V_{GS}=0V
trr	-	46.8	-	ns	I_F=3.6A, dI_F/dt=100A/μs
Qrr	-	72.2	-	nC	

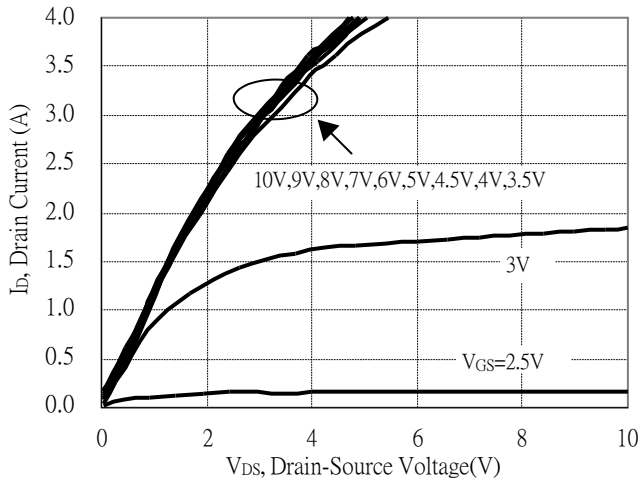
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Recommended soldering footprint

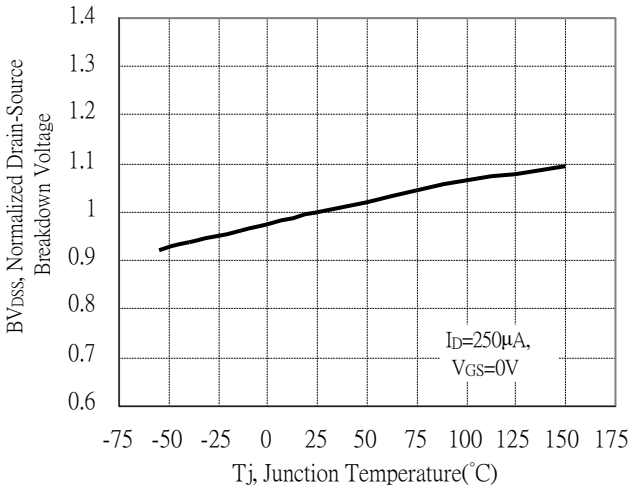


Typical Characteristics

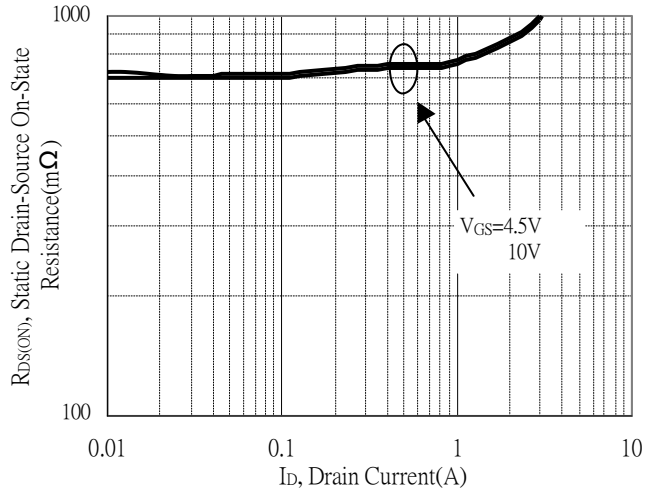
Typical Output Characteristics



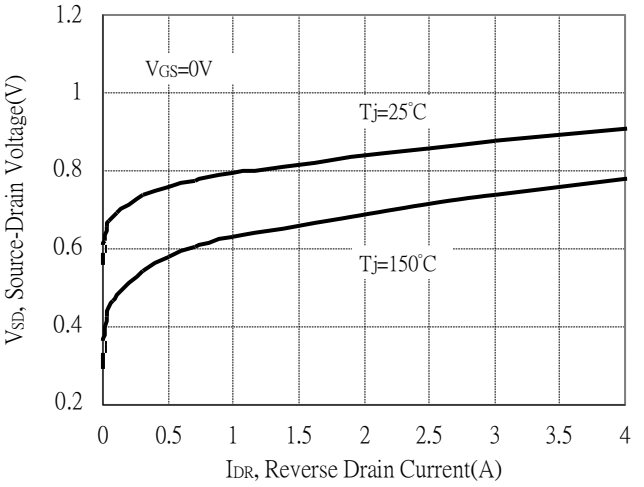
Brekdown Voltage vs Junction Temperature



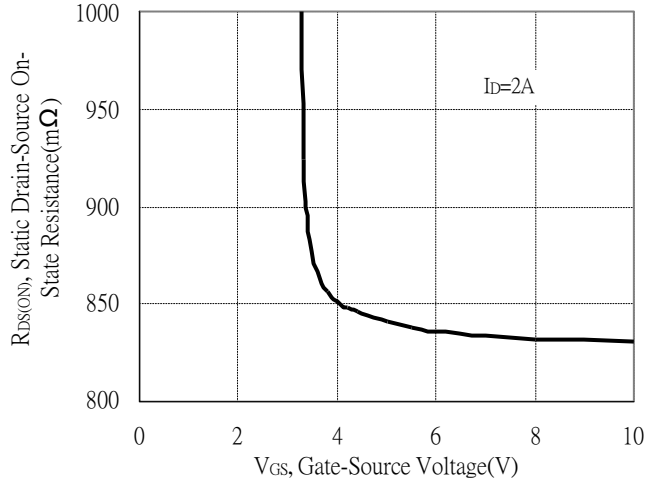
Static Drain-Source On-State resistance vs Drain Current



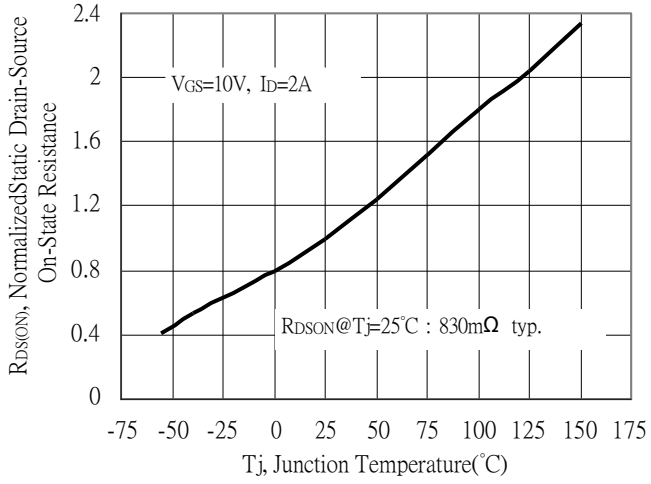
Reverse Drain Current vs Source-Drain Voltage



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

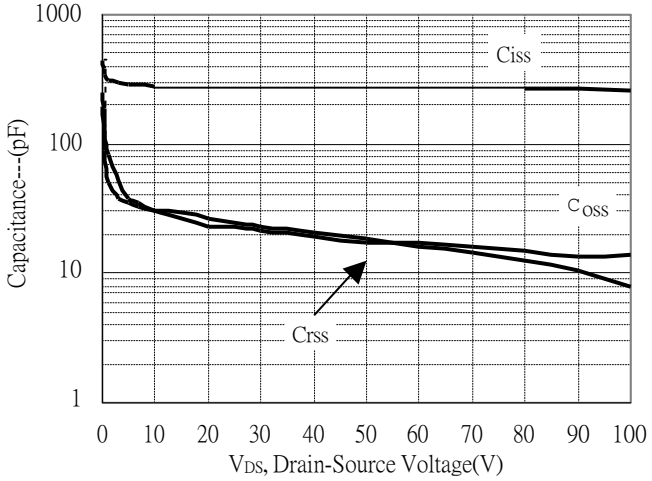


Drain-Source On-State Resistance vs Junction Tempearture

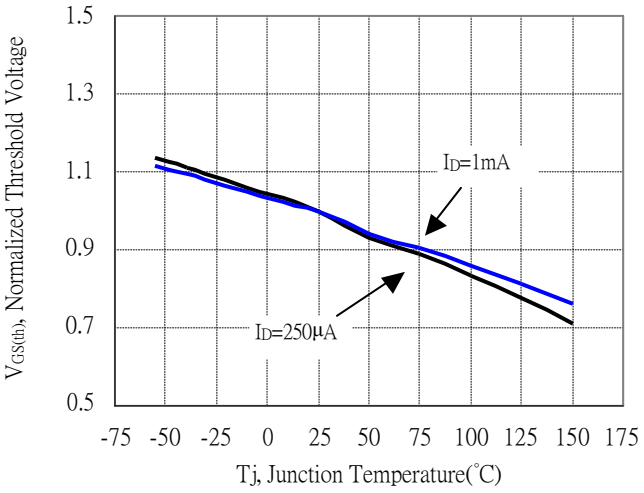


Typical Characteristics(Cont.)

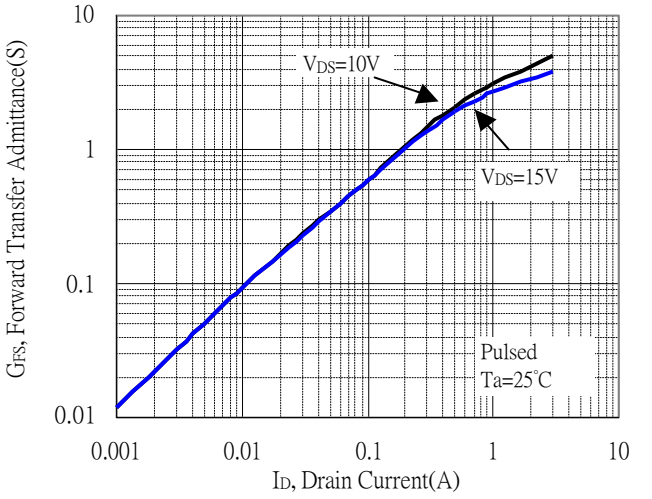
Capacitance vs Drain-to-Source Voltage



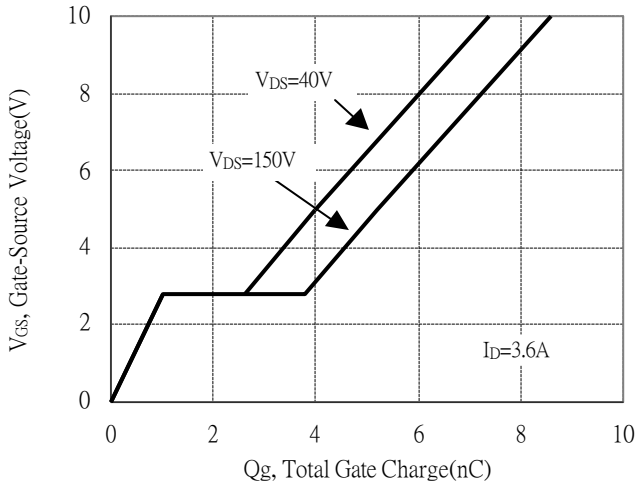
Threshold Voltage vs Junction Tempearture



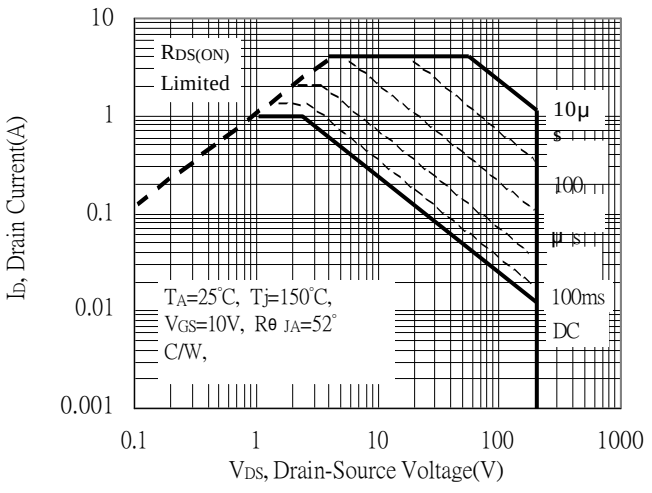
Forward Transfer Admittance vs Drain Current



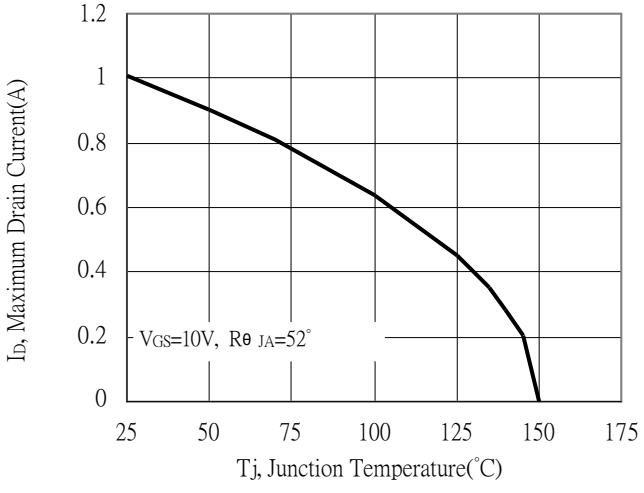
Gate Charge Characteristics



Maximum Safe Operating Area

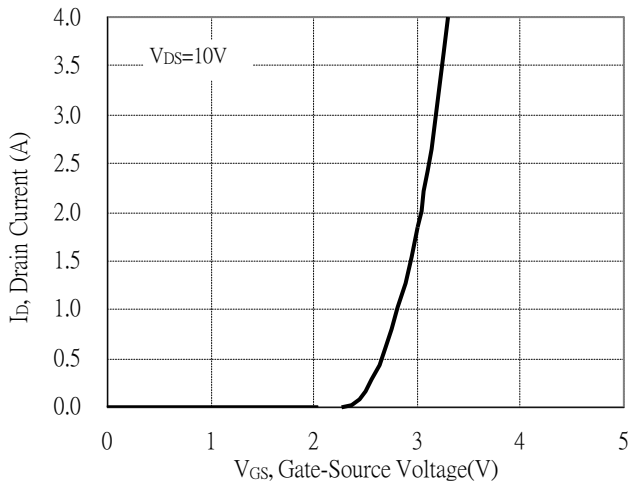


Maximum Drain Current vs Junction Temperature

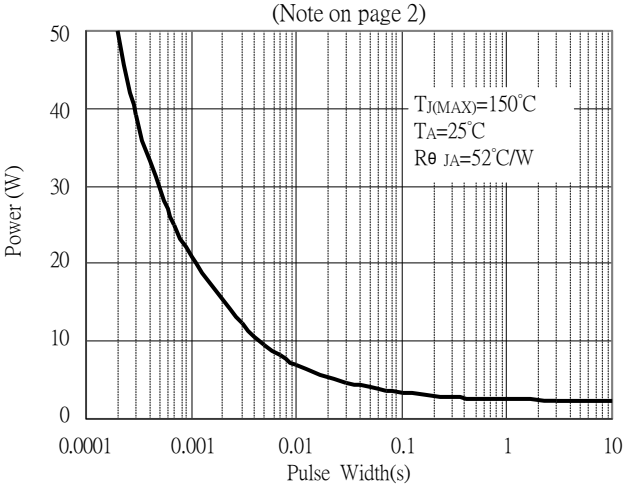


Typical Characteristics(Cont.)

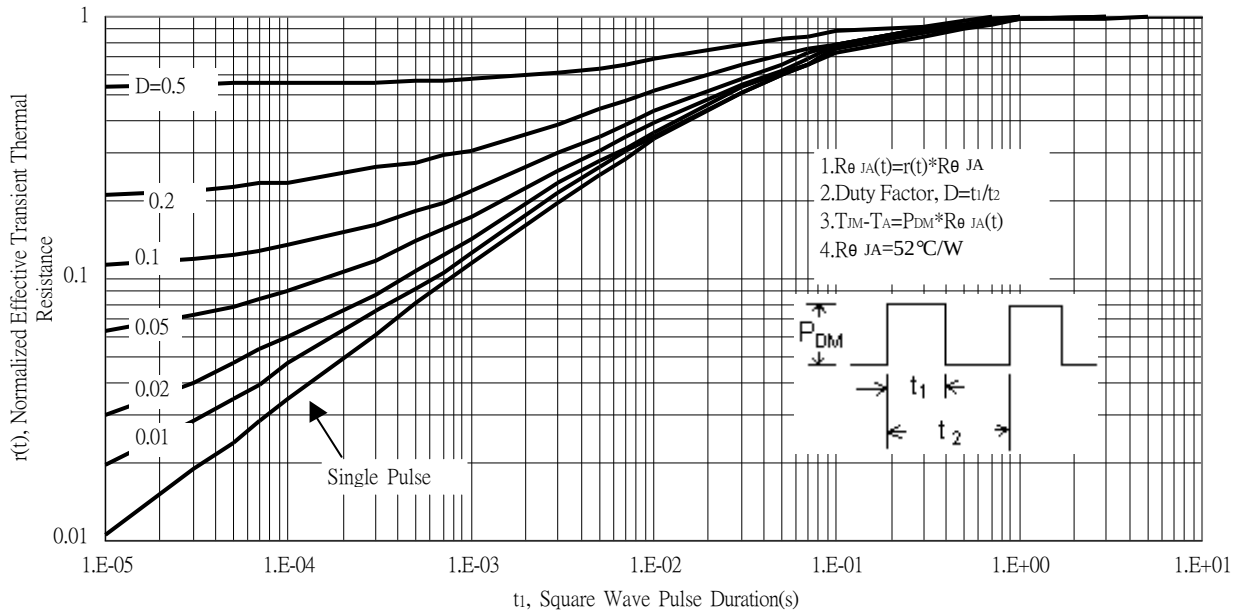
Typical Transfer Characteristics



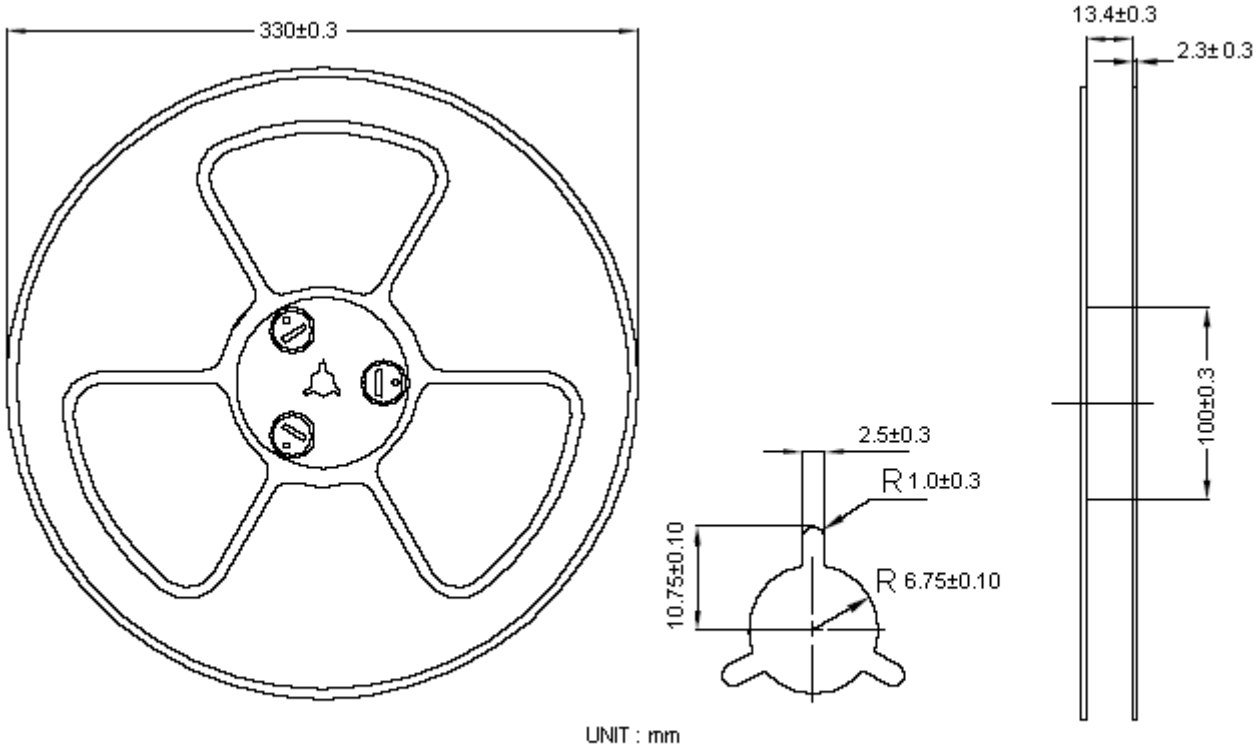
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



Transient Thermal Response Curves



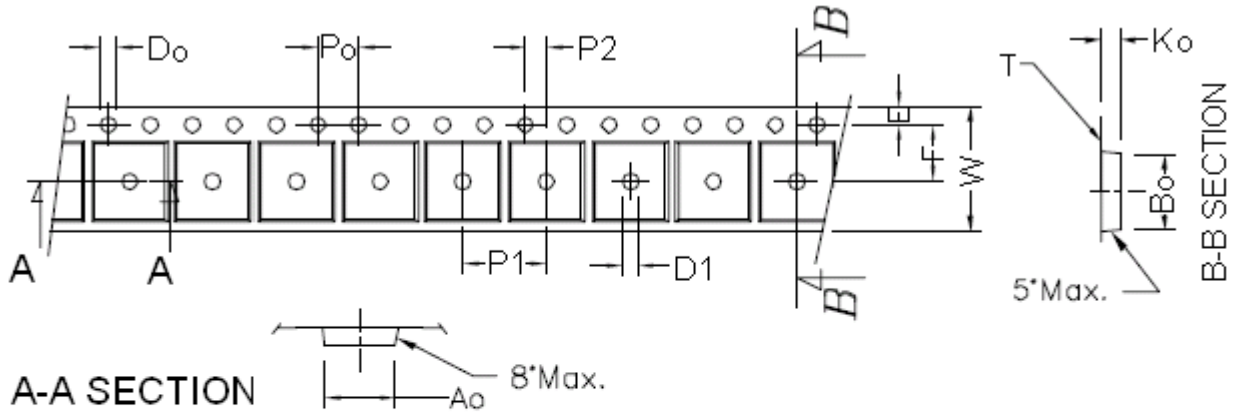
Reel Dimension



UNIT : mm

NOTE : 1. Material : Anti-static polystyrene
2. Surface resistivity 10^9 Ω/sq

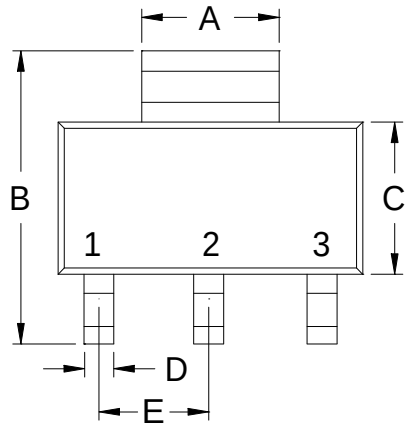
Carrier Tape Dimension

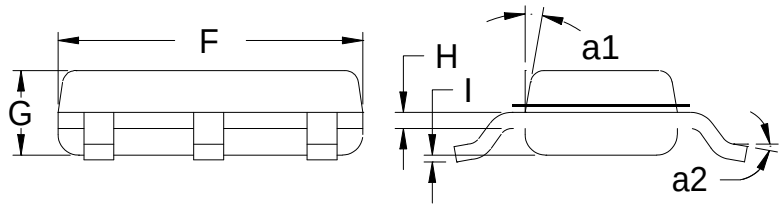


Symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.83±0.1	7.42±0.1	1.88±0.1	4.0±0.1	8.0±0.10	2.0±0.05	0.292±0.02
Symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.60±0.1	1.5±0.25	$12^{+0.3}_{-0.1}$	40.0±0.2	

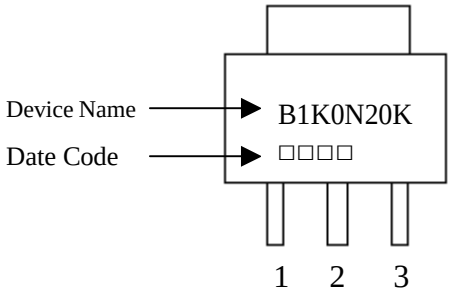
Unit : mm

SOT-223 Dimension





Marking:



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

3-Lead SOT-223 Plastic
Surface Mounted Package
Package Code: L3

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1142	0.1220	2.90	3.10	G	0.0551	0.0709	1.40	1.80
B	0.2638	0.2874	6.70	7.30	H	0.0098	0.0138	0.25	0.35
C	0.1299	0.1457	3.30	3.70	I	0.0008	0.0039	0.02	0.10
D	0.0236	0.0315	0.60	0.80	a1	*13°	-	*13°	-
E	*0.0906	-	*2.30	-	a2	0°	10°	0°	10°
F	0.2480	0.2638	6.30	6.70					