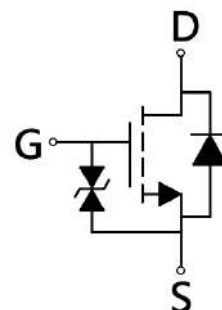
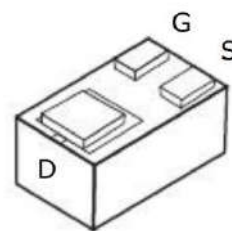


N-Channel Enhancement Mode MOSFET

Features:

- ESD protected gate, typical 3kV (HBM)
- High speed switching
- Easily designed drive circuits
- Low-voltage drive
- Easy to use in parallel
- RoHS compliant package

WBFBP-03E



G : Gate S : Source D : Drain

BV_{DSS}	20V
$I_D @ V_{GS}=4.5V, T_C=25^\circ C$	1.4A
$I_D @ V_{GS}=4.5V, T_A=25^\circ C$	1.1A
$R_{DS(ON)} \text{ typ.} @ V_{GS}=4.5V, I_D=0.5A$	0.3 Ω
$R_{DS(ON)} \text{ typ.} @ V_{GS}=2.5V, I_D=0.3A$	0.4 Ω
$R_{DS(ON)} \text{ typ.} @ V_{GS}=1.8V, I_D=0.3A$	0.8 Ω

Ordering Information

Device	Package	Shipping
KWAK9	WBFBP-03E (Pb-free lead plating and halogen-free package)	10000 pcs / Tape & Reel

Absolute Maximum Ratings (T_A=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V _{DS}	20	V
Gate-Source Voltage		V _{GS}	±8	
Continuous Drain Current @ V _{GS} =4.5V, T _C =25°C		I _D	1.4	A
Continuous Drain Current @ V _{GS} =4.5V, T _C =100°C			0.9	
Continuous Drain Current @ V _{GS} =4.5V, T _A =25°C			1.1	
Continuous Drain Current @ V _{GS} =4.5V, T _A =70°C			0.9	
Pulsed Drain Current *a		I _{DM}	5.6	
Continuous Body Diode Forward Current @ T _A =25°C		I _S	1	
ESD susceptibility *b		V _{ESD}	3000	V
Total Power Dissipation	T _C =25°C	P _D	1.4	W
	T _C =100°C		0.6	
	T _A =25°C		0.9	
	T _A =70°C		0.6	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55~+150	°C

Thermal Data

Parameter	Symbol	Steady State	Unit
Thermal Resistance, Junction-to-case	R _{θJC}	90	°C/W
Thermal Resistance, Junction-to-ambient	R _{θJA}	136	

Note:

- *a. The power dissipation P_D is based on T_{J(MAX)}=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- *b. 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.
- *c. 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}	20	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	0.3	-	1.2		V _{DS} =V _{GS} , I _D =250μA
G _{FS}	-	1.2	-	S	V _{DS} =5V, I _D =0.3A
I _{GSS}	-	-	±10	μA	V _{GS} =±8V, V _{DS} =0V
I _{DSS}	-	-	1		V _{DS} =16V, V _{GS} =0V
R _{DS(ON)}	-	0.3	0.4	Ω	V _{GS} =4.5V, I _D =0.5A
	-	0.4	0.6		V _{GS} =2.5V, I _D =0.3A
	-	0.8	1.2		V _{GS} =1.8V, I _D =0.3A
Dynamic					
C _{iss}	-	32	-	pF	V _{DS} =10V, V _{GS} =0V, f=1MHz
C _{oss}	-	19	-		
C _{rss}	-	17	-		
Q _g *1, 2	-	0.8	-	nC	V _{DS} =10V, I _D =0.3A, V _{GS} =4.5V
Q _{gs} *1, 2	-	0.2	-		
Q _{gd} *1, 2	-	0.15	-		
t _{d(ON)} *1, 2	-	4.8	-	ns	V _{DS} =10V, I _D =0.3A, V _{GS} =4.5V, R _{GS} =10Ω
t _r *1, 2	-	16	-		
t _{d(OFF)} *1, 2	-	20	-		
t _f *1, 2	-	15.6	-		
Source-Drain Diode					
V _{SD} *1	-	0.83	1.2	V	I _S =0.3A, V _{GS} =0V
t _{rr}	-	7	-	ns	I _F =0.3A, dI _F /dt=100A/μs
Q _{rr}	-	1	-	nC	

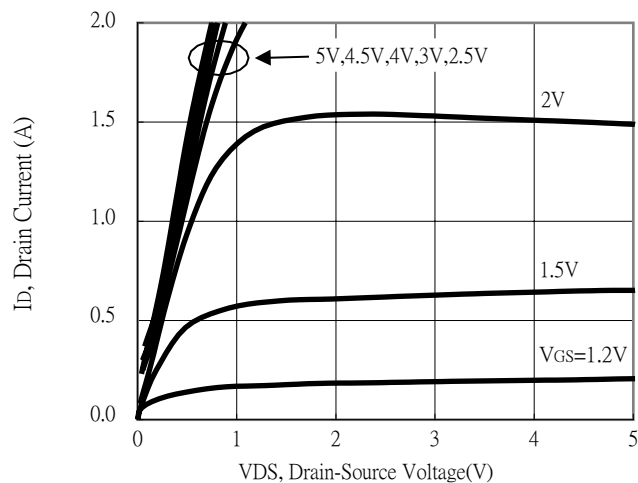
Note:

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

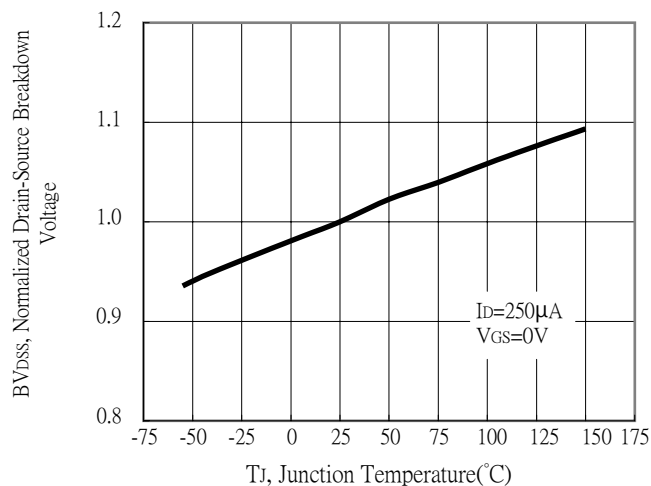
*2. Independent of operating temperature

Typical Characteristics

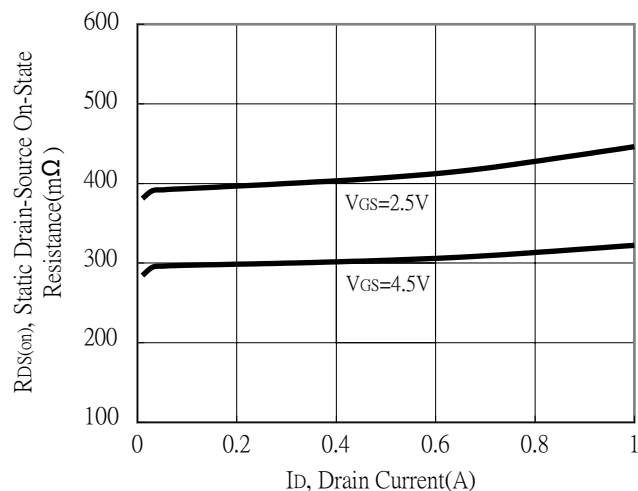
Typical Output Characteristics



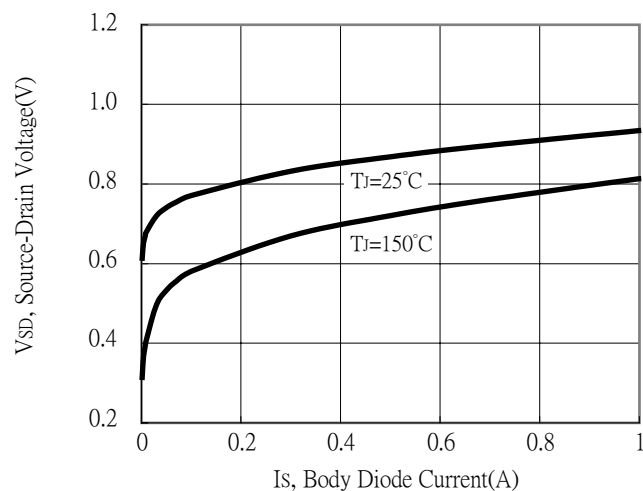
Breakdown Voltage vs Junction Temperature



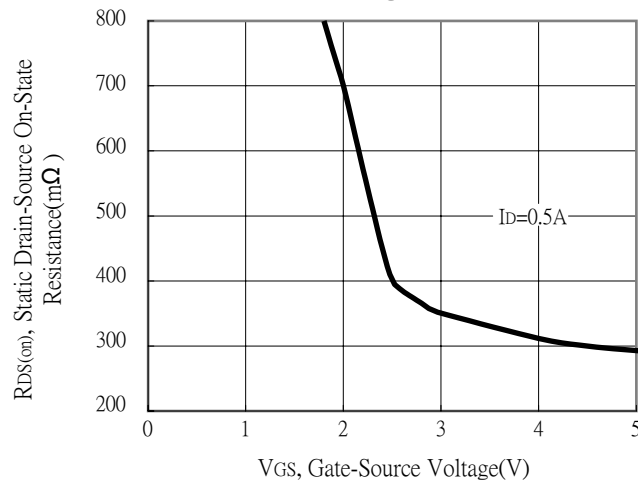
Static Drain-Source On-State resistance vs Drain Current



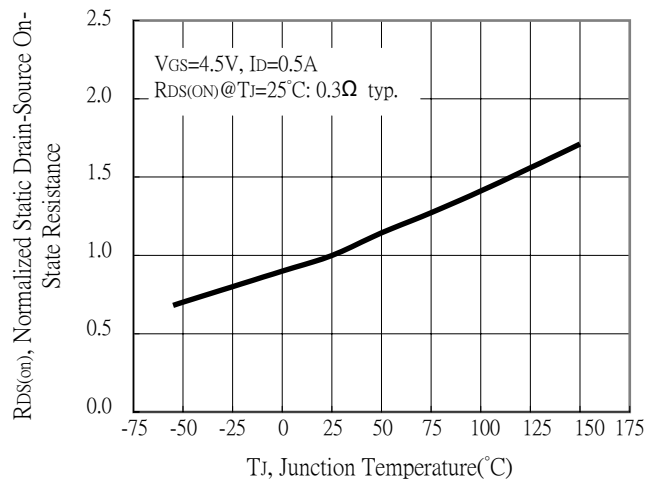
Body Diode Current vs Source-Drain Voltage



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

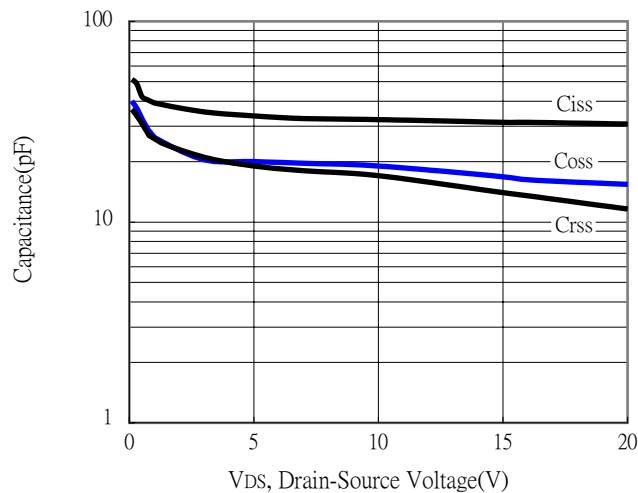


Drain-Source On-State Resistance vs Junction Temperature

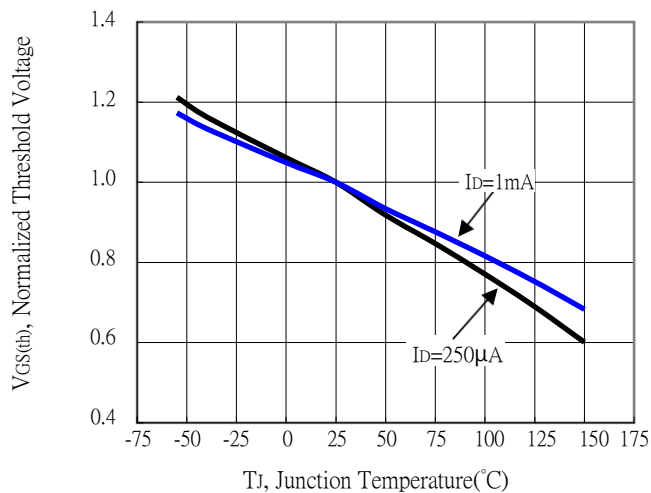


Typical Characteristics (Cont.)

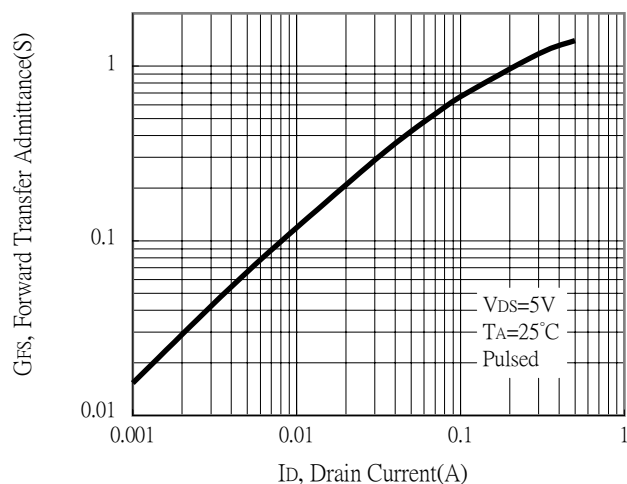
Capacitance vs Drain-to-Source Voltage



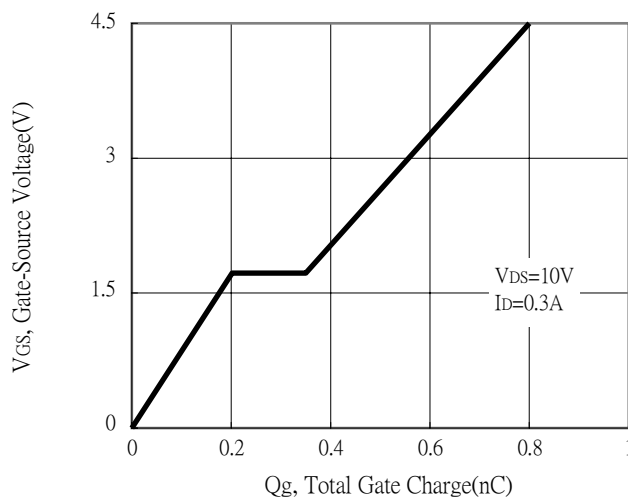
Threshold Voltage vs Junction Temperature



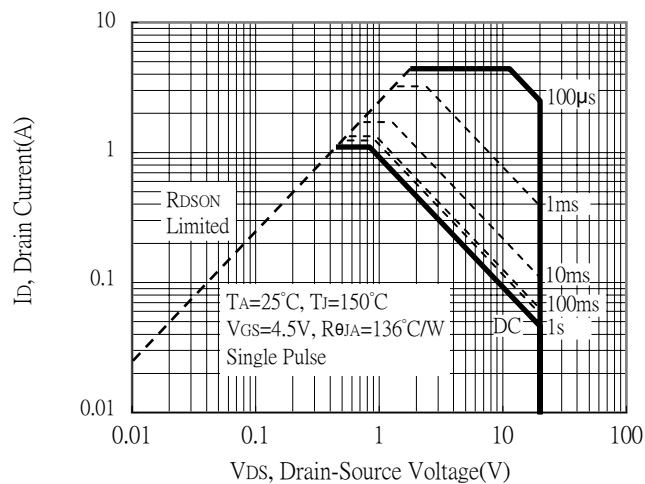
Forward Transfer Admittance vs Drain Current



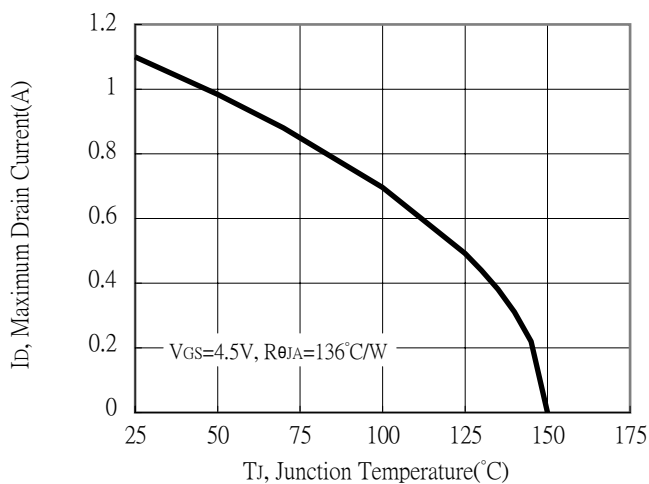
Gate Charge Characteristics



Maximum Safe Operating Area

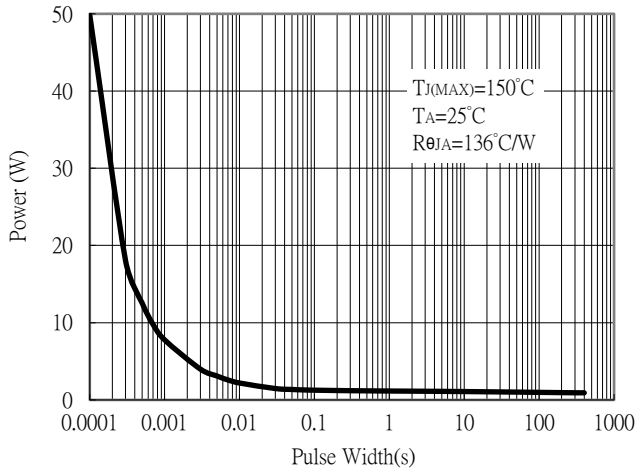


Maximum Drain Current vs Junction Temperature

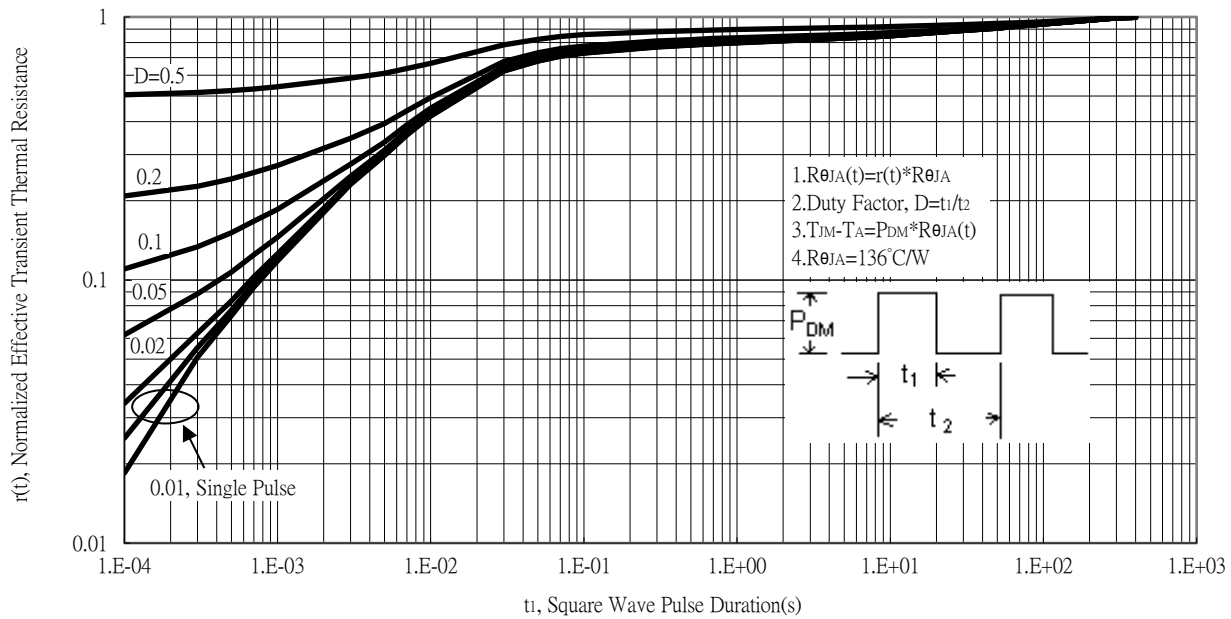


Typical Characteristics (Cont.)

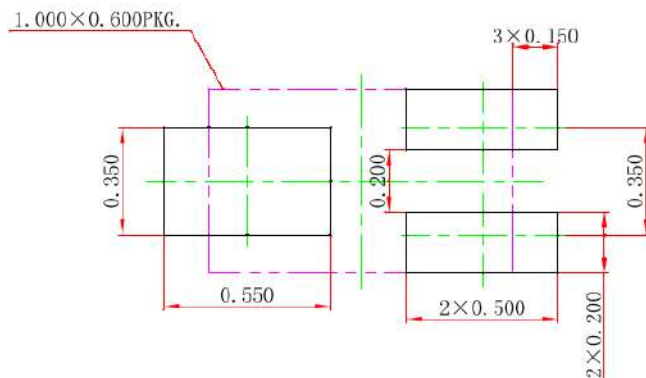
Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves



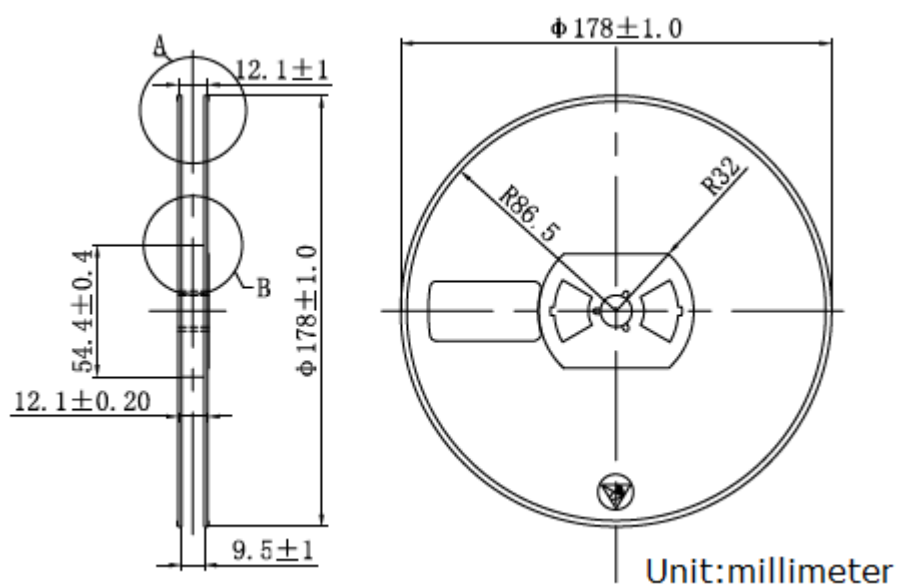
Recommended Soldering Footprint



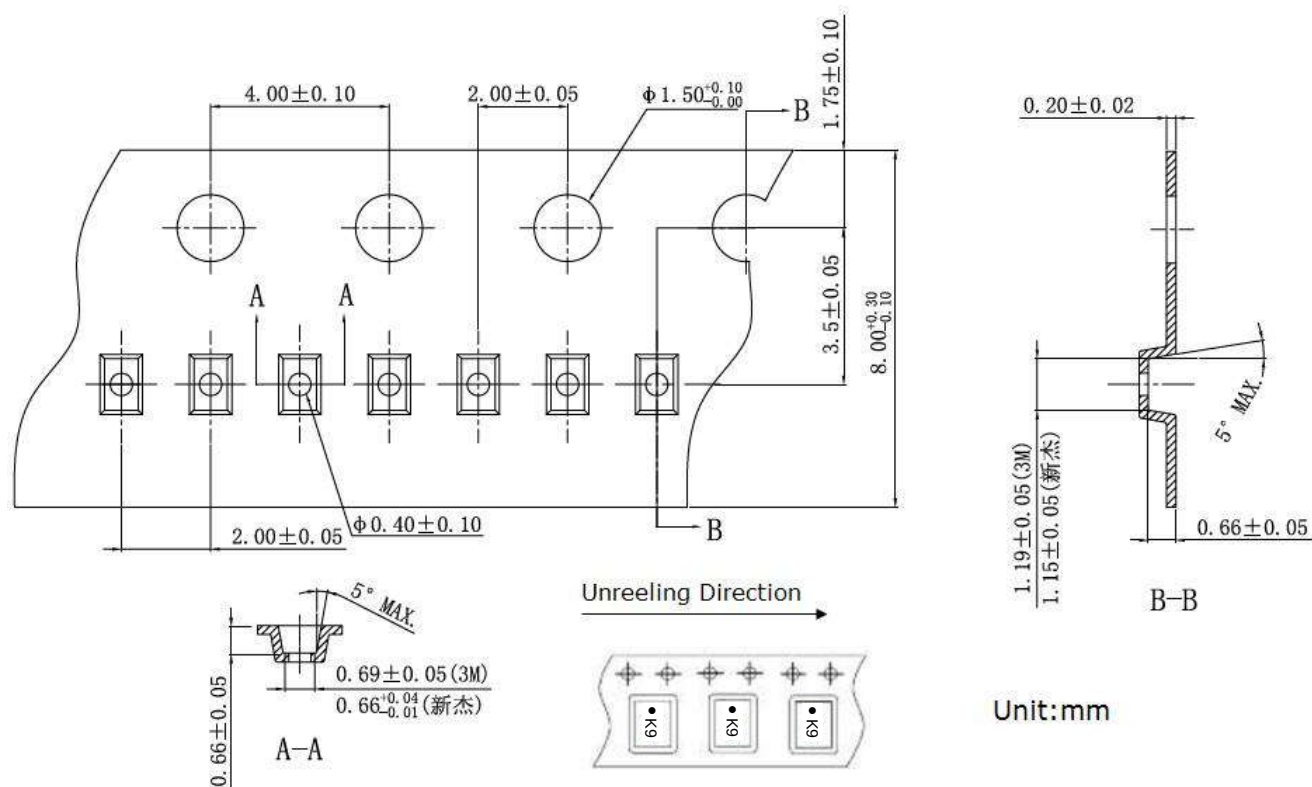
Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.050\text{mm}$.
3. The pad layout is for reference purposes only.

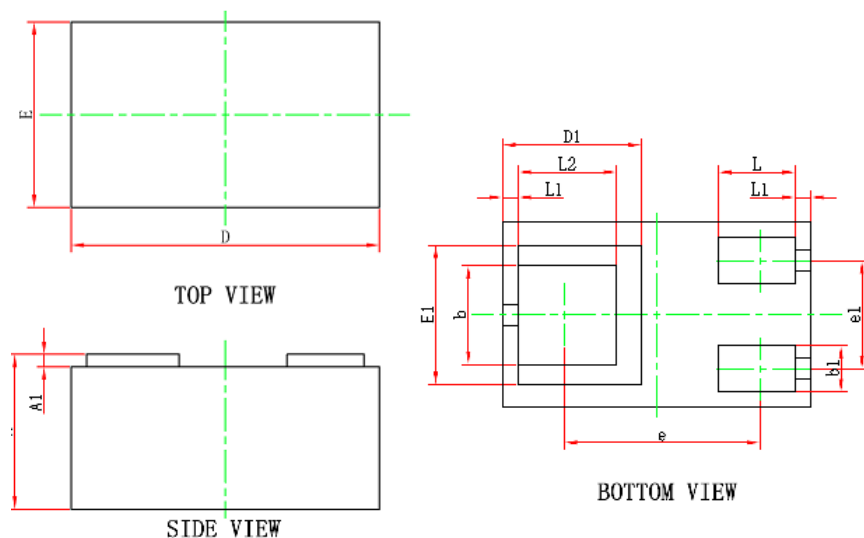
Reel Dimension



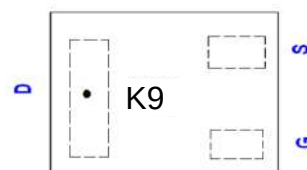
Carrier Tape Dimension



WBFBP-03E Dimension



Marking:



3-Lead WBFBP-03E Plastic
 Surface Mounted Package

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

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.018	0.022	0.450	0.550	b1	0.004	0.008	0.100	0.200
A1	0.000	0.004	0.010	0.100	e	0.025 REF		0.635 REF	
D	0.037	0.041	0.950	1.050	e1	0.012	0.016	0.300	0.400
E	0.022	0.026	0.550	0.650	L	0.008	0.012	0.200	0.300
D1	0.018 REF		0.450 REF		L1	0.002 REF		0.050 REF	
E1	0.018 REF		0.450 REF		L2	0.011	0.015	0.270	0.370
b	0.011	0.015	0.270	0.370					