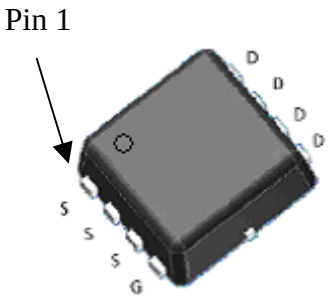
N -Channel Enhancement Mode Power MOSFET

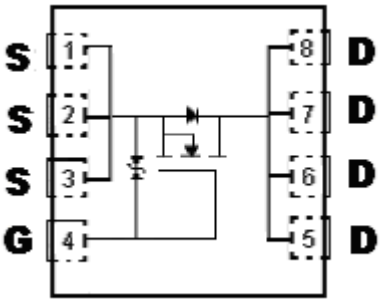
Features:

- Low Gate Charge
- Simple Drive Requirement
- ESD protected gate
- Pb-free lead plating package

DFN3x3



BV_{DSS}		30V
I_D@V_{GS}=10V, T_A=25°C		10A
I_D@V_{GS}=10V, T_C=25°C		18A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=10A	12.4mΩ
	V_{GS}=4.5V, I_D=8A	16.8mΩ



G：Gate D：Drain S：Source

Ordering Information

Device	Package	Shipping
KSPRB020N03K	DFN3x3 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel

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

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ V_{GS}=10V, T_C=25°C	I_D	18	A
Continuous Drain Current @ V_{GS}=10V, T_C=100°C		11.4	
Continuous Drain Current @ V_{GS}=10V, T_A=25°C		10	
Continuous Drain Current @ V_{GS}=10V, T_A=70°C		8	
Pulsed Drain Current *1	I_{DM}	72	
Single Pulse Avalanche Current	I_{AS}	18	
Single Pulse Avalanche Current @ L=0.1mH, V_{GS}=10V, V_{DD}=15V *2	E_{AS}	16.2	mJ
Total Power Dissipation @T_C=25℃	P_D	8	W
Total Power Dissipation @T_A=25℃		2.5	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Note : *1. Pulse width limited by maximum junction temperature
*2. 100% tested by conditions of L=0.1mH, I_{AS}=10A, V_{GS}=10V, V_{DD}=15V

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	16	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	50 *	

* Surface mounted on a 1 in² pad of 2oz copper.

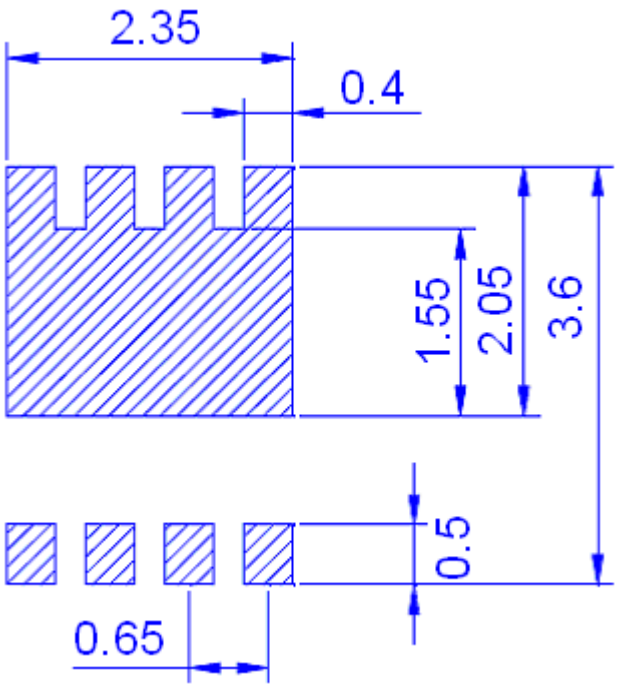
Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.02	-	V/℃	Reference to 25℃, I_D=1mA
$V_{GS(th)}$	1	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=30V, V_{GS}=0V
	-	-	25		V_{DS}=30V, V_{GS}=0V, Tj=125℃
*$R_{DS(ON)}$	-	12.4	16	mΩ	I_D=10A, V_{GS}=10V
	-	16.8	24		I_D=8A, V_{GS}=4.5V
*G_{FS}	-	10	-	S	V_{DS}=5V, I_D=10A
Dynamic					
Ciss	-	437	-	pF	V_{DS}=25V, V_{GS}=0V, f=1MHz
Coss	-	62	-		
Crss	-	49	-		
$t_{d(ON)}$	-	5.8	-	ns	V_{DS}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω
t_r	-	18.6	-		
$t_{d(OFF)}$	-	33.8	-		
t_f	-	11.8	-		

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Qg	-	11.4	-	nC	V_{DS}=15V, I_D=10A, V_{GS}=10V
Qgs	-	1.9	-		
Qgd	-	3.1	-		
Source Drain Diode					
*I_S	-	-	4	A	
*I_{SM}	-	-	16		
*V_{SD}	-	0.79	1.2	V	I_S=2.3A,V_{GS}=0V
*T_{rr}	-	9.4	-	ns	I_F=2.3A,V_{GS}=0V, dI_F/dt=100A/μs
Q_{rr}	-	4	-	nC	

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

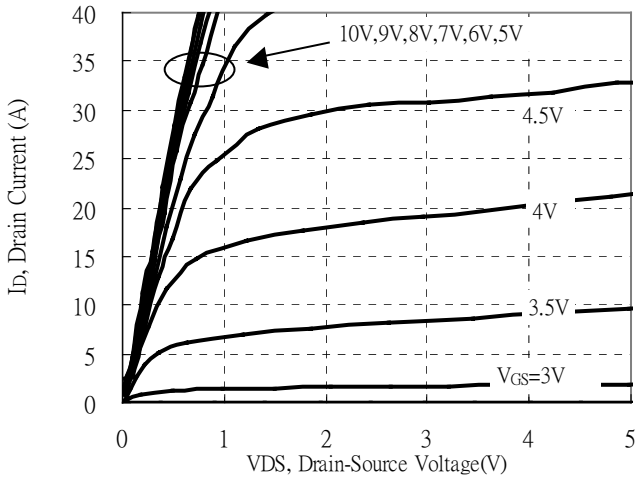
Recommended Soldering Footprint



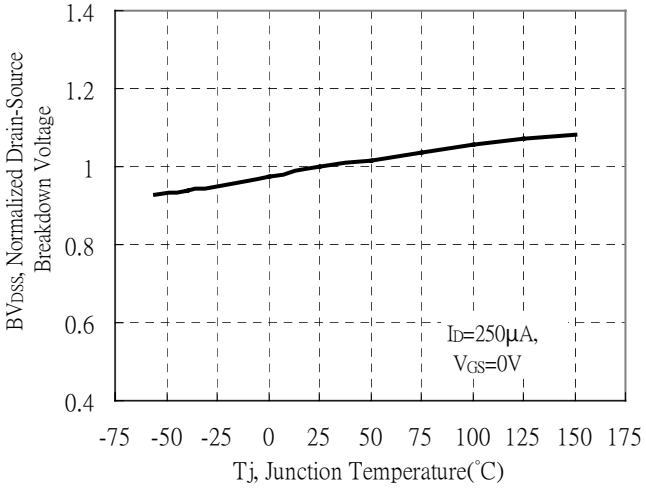
unit : mm

Typical Characteristics

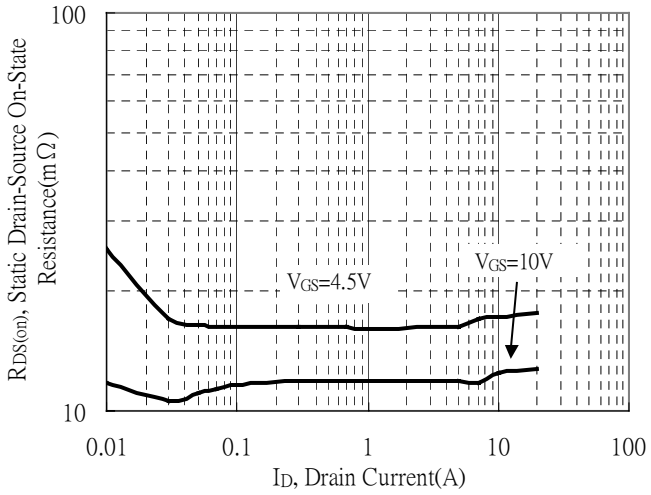
Typical Output Characteristics



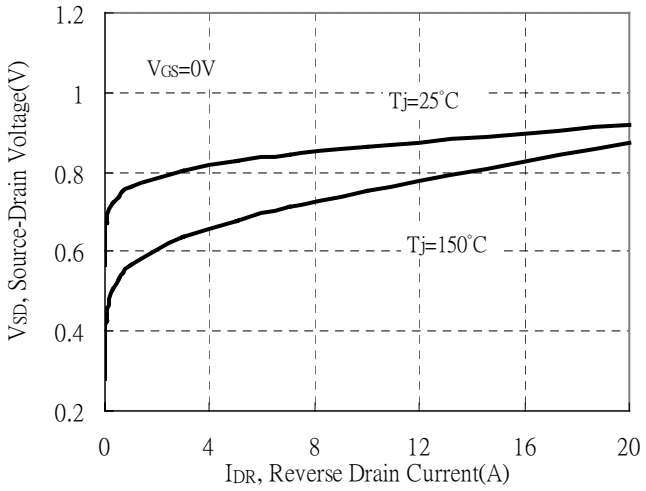
Brekdown Voltage vs Junction Temperature



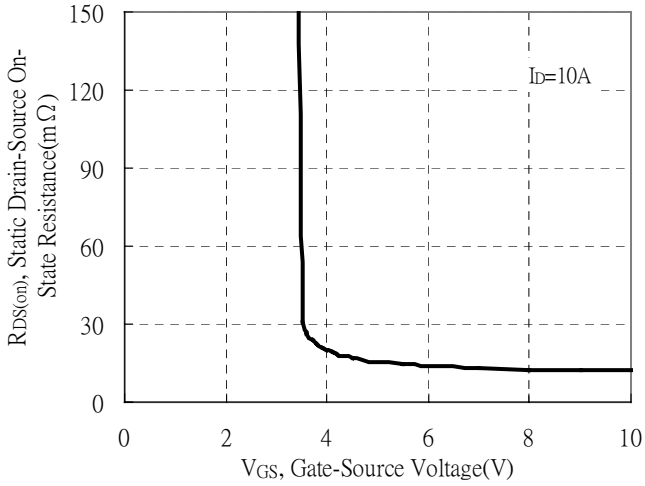
Static Drain-Source On-State resistance vs Drain Current



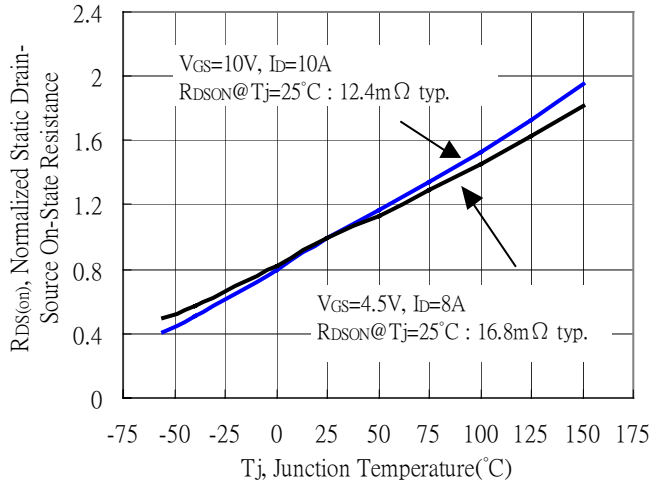
Reverse Drain Current vs Source-Drain Voltage



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

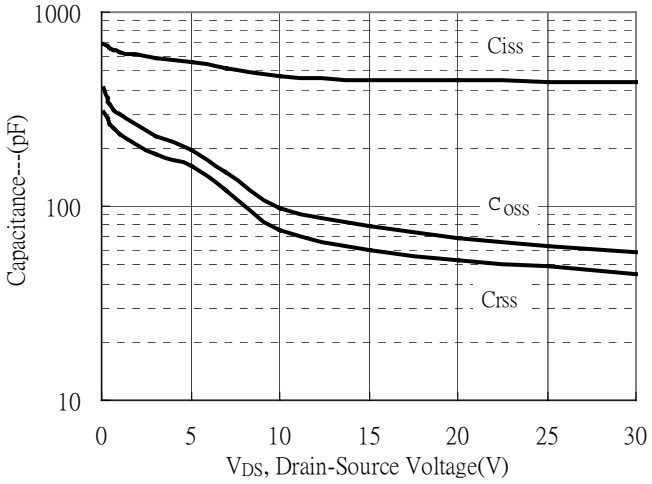


Drain-Source On-State Resistance vs Junction Tempearture

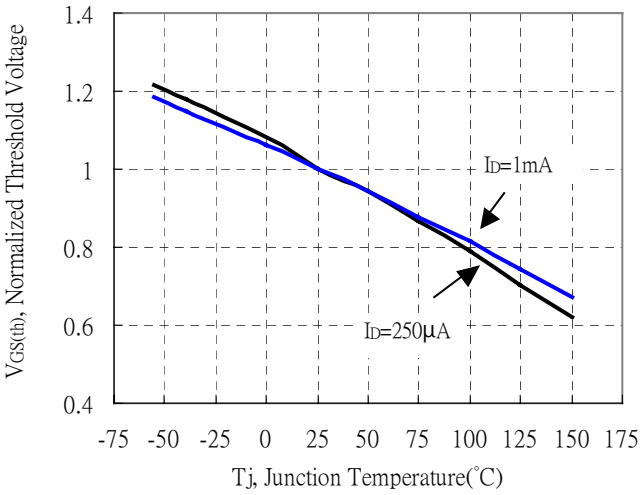


Typical Characteristics(Cont.)

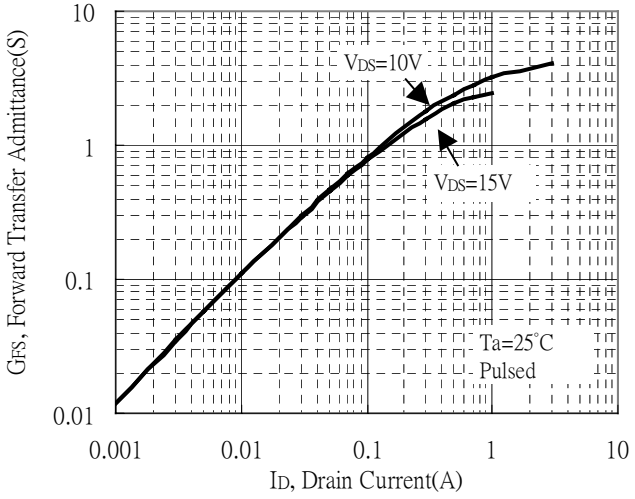
Capacitance vs Drain-to-Source Voltage



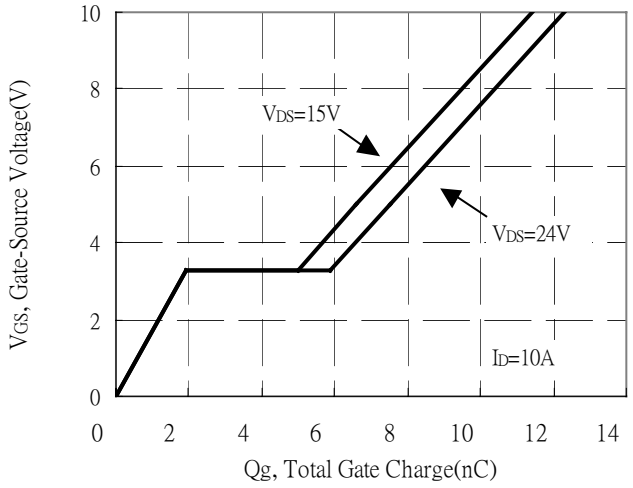
Threshold Voltage vs Junction Tempearture



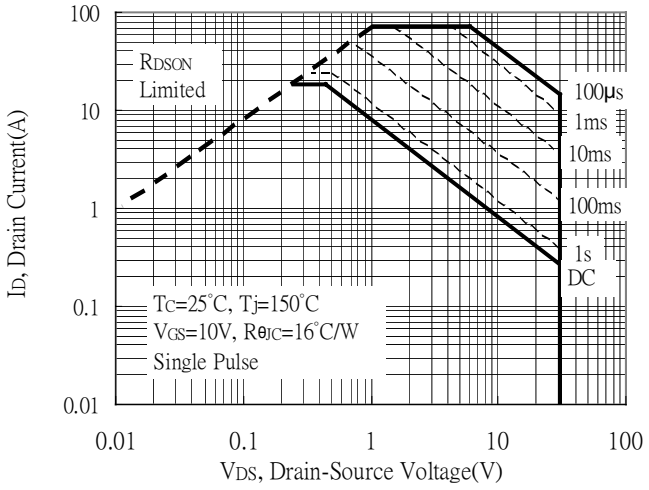
Forward Transfer Admittance vs Drain Current



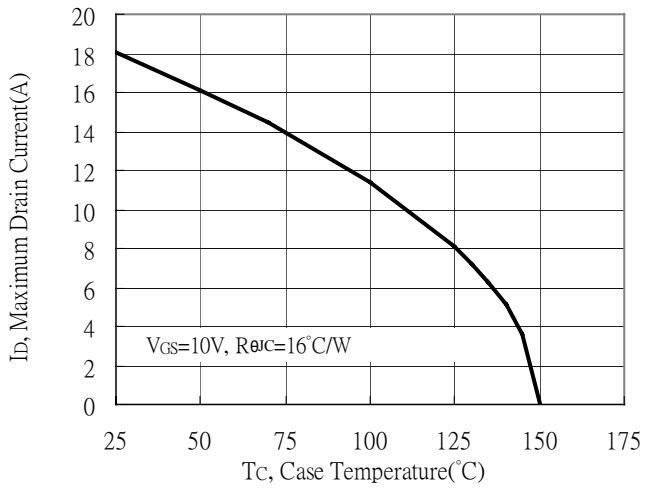
Gate Charge Characteristics



Maximum Safe Operating Area

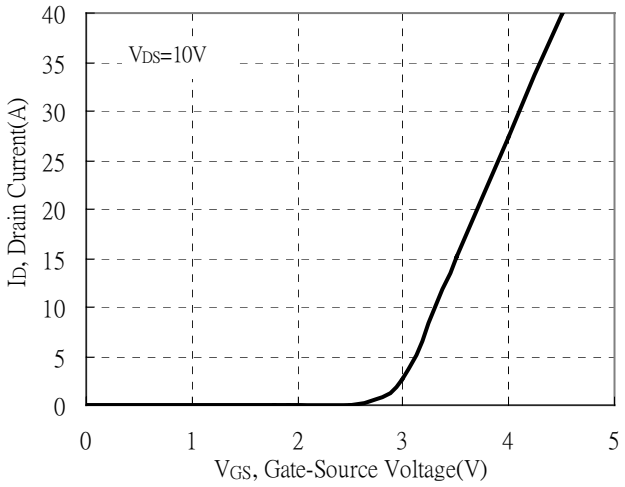


Maximum Drain Current vs Junction Temperature

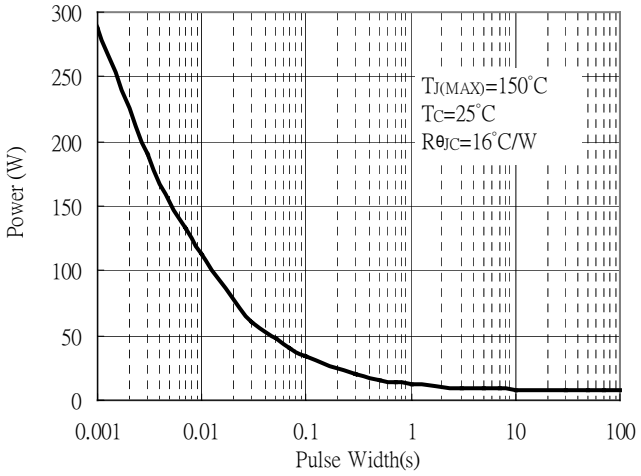


Typical Characteristics(Cont.)

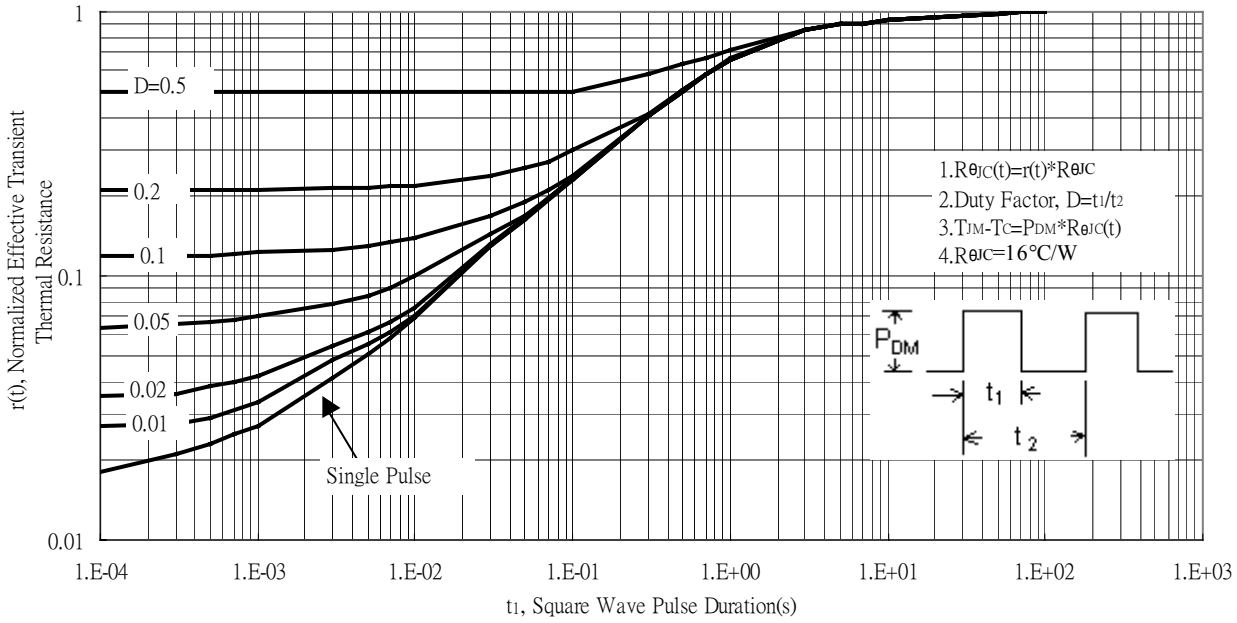
Typical Transfer Characteristics



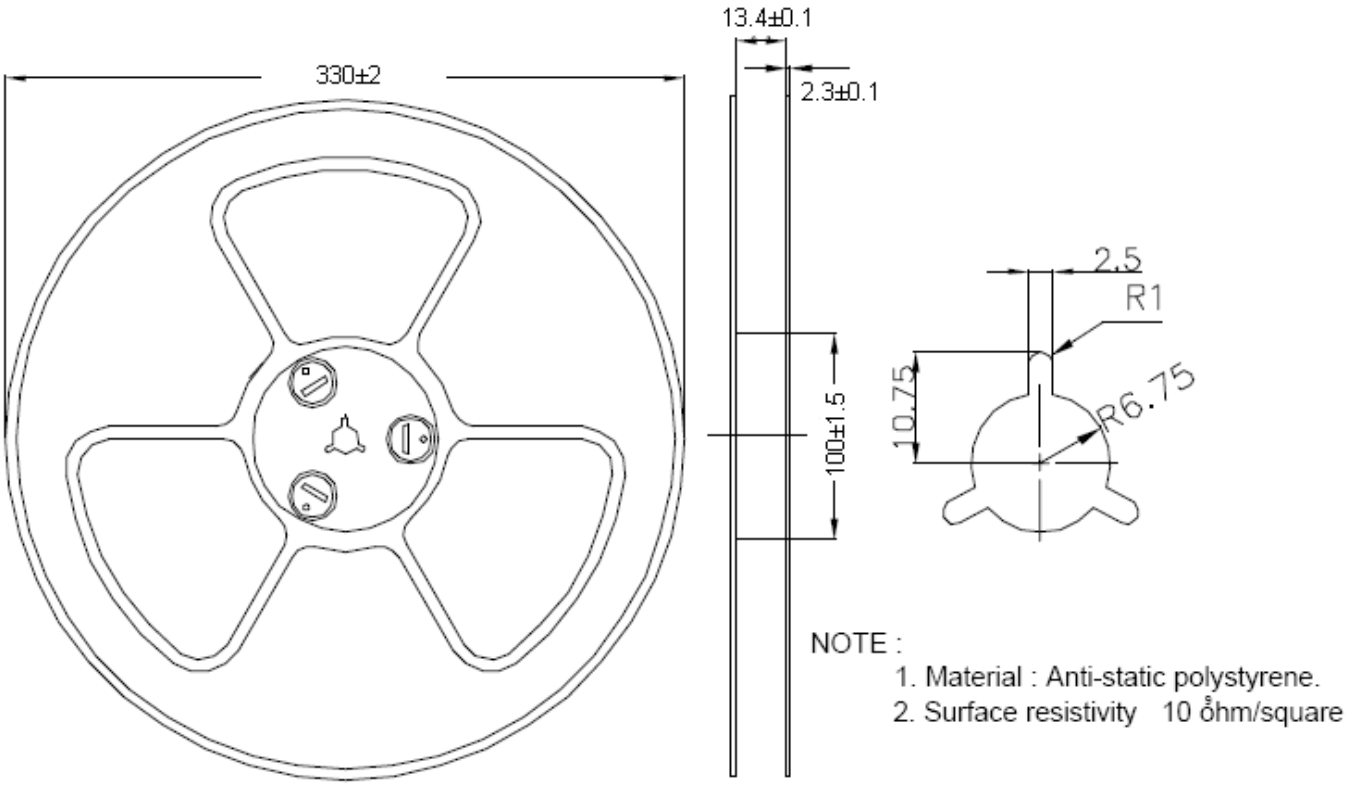
Single Pulse Power Rating, Junction to Case



Transient Thermal Response Curves

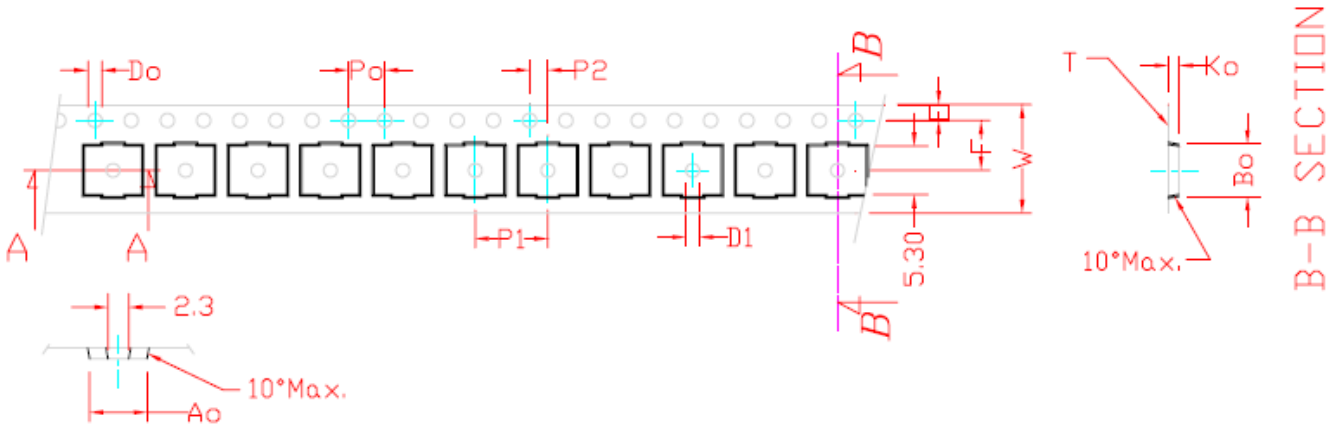


Reel Dimension



NOTE :
1. Material : Anti-static polystyrene.
2. Surface resistivity 10 ohm/square

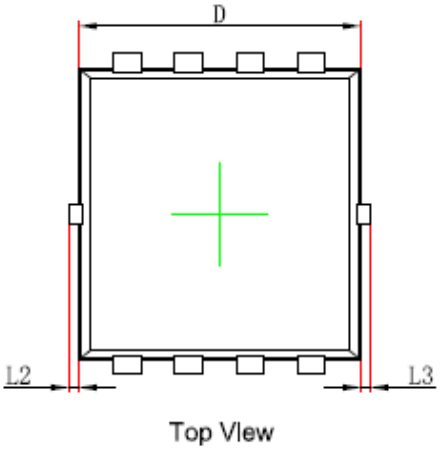
Carrier Tape Dimension



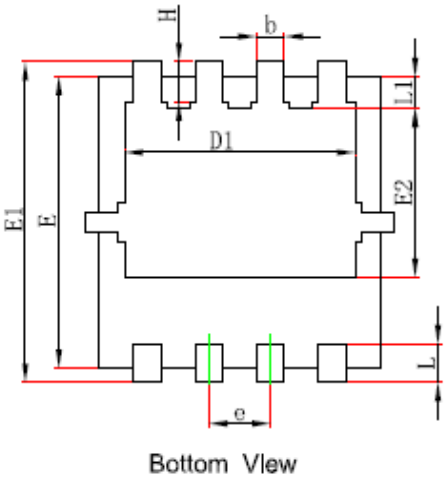
A-A SECTION

symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.33±0.1	5.78±0.1	1.18±0.1	4.00±0.1	8.0±0.10	2.0±0.05	0.29±0.02
symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.50±0.10	1.5±0.25	12.0 $^{+0.3}_{-0.1}$	40.0±0.2	

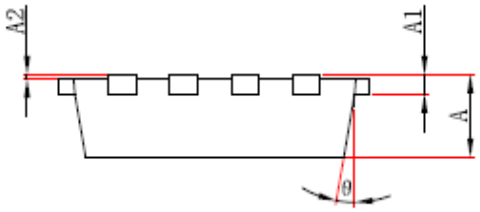
DFN3x3 Dimension



Top View

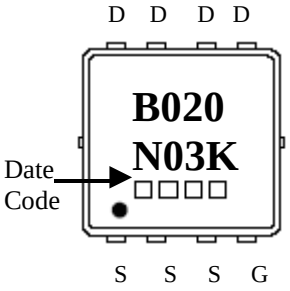


Bottom View



Side View

Marking:



8-Lead DFN3x3 Plastic Package

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.605	0.850	0.026	0.033	b	0.200	0.400	0.008	0.016
A1	0.152 REF		0.006 REF		e	0.550	0.750	0.022	0.030
A2	0.000	0.050	0.000	0.002	L	0.300	0.500	0.012	0.020
D	2.900	3.100	0.114	0.122	L1	0.180	0.480	0.007	0.019
D1	2.300	2.600	0.091	0.102	L2	0.000	0.100	0.000	0.004
E	2.900	3.100	0.114	0.122	L3	0.000	0.100	0.000	0.004
E1	3.150	3.450	0.124	0.136	H	0.315	0.515	0.012	0.020
E2	1.535	1.935	0.060	0.076	θ	9°	13°	9°	13°