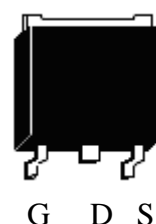


## N-Channel Enhancement Mode Power MOSFET

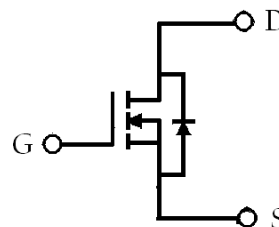
### Features:

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and halogen-free package

TO-252(DPAK)



<b>BV<sub>DSS</sub></b>	<b>60V</b>
<b>I<sub>D</sub>@V<sub>GS</sub>=10V, T<sub>C</sub>=25°C</b>	<b>50A</b>
<b>R<sub>DSON</sub>@V<sub>GS</sub>=10V, I<sub>D</sub>=20A</b>	<b>6.3 mΩ(typ)</b>
<b>R<sub>DSON</sub>@V<sub>GS</sub>=4.5V, I<sub>D</sub>=20A</b>	<b>9 mΩ(typ)</b>



G : Gate D : Drain S : Source

### Ordering Information

Device	Package	Shipping
KJB09N06	TO-252 (Pb-free lead plating and halogen-free package)	2500 pcs / tape& reel

### Absolute Maximum Ratings (T<sub>C</sub>=25°C)

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage (Note 1)	V <sub>DS</sub>	60	V	
Gate-Source Voltage	V <sub>GS</sub>	±20		
Continuous Drain Current @T <sub>C</sub> =25°C, V <sub>GS</sub> =10V(silicon limit) (Note 1)	I <sub>D</sub>	70	A	
Continuous Drain Current @T <sub>C</sub> =100°C, V <sub>GS</sub> =10V(silicon limit) (Note 1)		50		
Continuous Drain Current @T <sub>C</sub> =25°C, V <sub>GS</sub> =10V(package limit) (Note 1)		50		
Continuous Drain Current @T <sub>A</sub> =25°C, V <sub>GS</sub> =10V (Note 2)	I <sub>DSM</sub>	13		
Continuous Drain Current @T <sub>A</sub> =70°C, V <sub>GS</sub> =10V (Note 2)		10		
Pulsed Drain Current @ V <sub>GS</sub> =10V (Note 3)	I <sub>DM</sub>	180		
Avalanche Current (Note 3)	I <sub>AS</sub>	45		
Single Pulse Avalanche Energy @ L=0.1mH, I <sub>D</sub> =45A, V <sub>DD</sub> =25V (Note 2)	E <sub>AS</sub>	101	mJ	
Repetitive Avalanche Energy (Note 3)	E <sub>AR</sub>	10		
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C (Note 1)	75	W
		T <sub>C</sub> =100°C (Note 1)	37.5	
	P <sub>D</sub> SM	T <sub>A</sub> =25°C (Note 2)	2.5	
		T <sub>A</sub> =70°C (Note 2)	1.6	
Operating Junction and Storage Temperature	T <sub>j</sub> , T <sub>stg</sub>	-55~+175	°C	

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R <sub>θJC</sub>	2	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	R <sub>θJA</sub>	50	
Thermal Resistance, Junction-to-ambient, max (Note 4)		110	

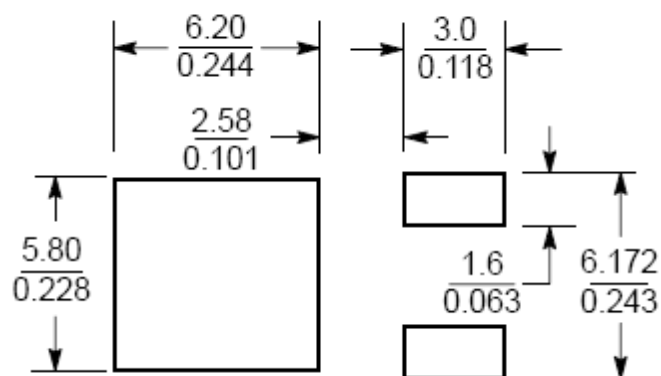
- Note : 1. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=175 °C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
2. The value of R<sub>θJA</sub> is measured with the device mounted on 1 in<sup>2</sup>FR-4 board with 2 oz. copper, in a still air environment with T<sub>A</sub>=25 °C. The power dissipation P<sub>D</sub>SM is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
3. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=175 °C. Ratings are based on low frequency and low duty cycles to keep initial T<sub>J</sub>=25°C.
4. When mounted on the minimum pad size recommended (PCB mount), t≤10s.

**Characteristics (Tj=25°C, unless otherwise specified)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	60	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	0.1	-	V/°C	Reference to 25°C, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	1.0	-	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA
*G <sub>FS</sub>	-	40	-	S	V <sub>DS</sub> = 5V, I <sub>D</sub> =20A
I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V
	-	-	10		V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V, T <sub>j</sub> =125°C
*R <sub>DS(ON)</sub>	-	6.3	8.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> =20A
	-	9.0	13.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =20A
<b>Dynamic</b>					
*Q <sub>g</sub> (V <sub>GS</sub> =10V)	-	46	-	nC	V <sub>DD</sub> =30V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V
*Q <sub>g</sub> (V <sub>GS</sub> =4.5V)	-	25	-		
*Q <sub>gs</sub>	-	6.9	-		
*Q <sub>gd</sub>	-	14	-		
*t <sub>d(ON)</sub>	-	10	-	ns	V <sub>DD</sub> =30V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω
*t <sub>r</sub>	-	8	-		
*t <sub>d(OFF)</sub>	-	43	-		
*t <sub>f</sub>	-	25	-		
C <sub>iss</sub>	-	1974	-	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =30V, f=1MHz
C <sub>oss</sub>	-	285	-		
C <sub>rss</sub>	-	197	-		
<b>Source-Drain Diode</b>					
*I <sub>S</sub>	-	-	50	A	
*V <sub>SD</sub>	-	0.67	1	V	I <sub>S</sub> =1A, V <sub>GS</sub> =0V
*t <sub>rr</sub>	-	26	-	ns	V <sub>GS</sub> =0V, I <sub>F</sub> =20A, dI <sub>F</sub> /dt=500A/μs
*Q <sub>rr</sub>	-	80	-	nC	

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

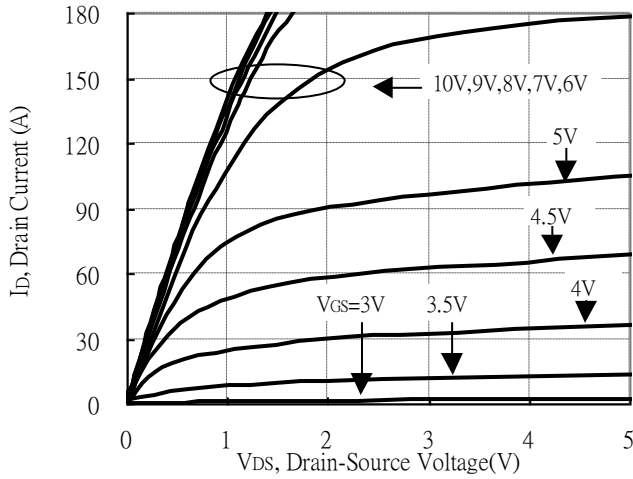
**Recommended soldering footprint**



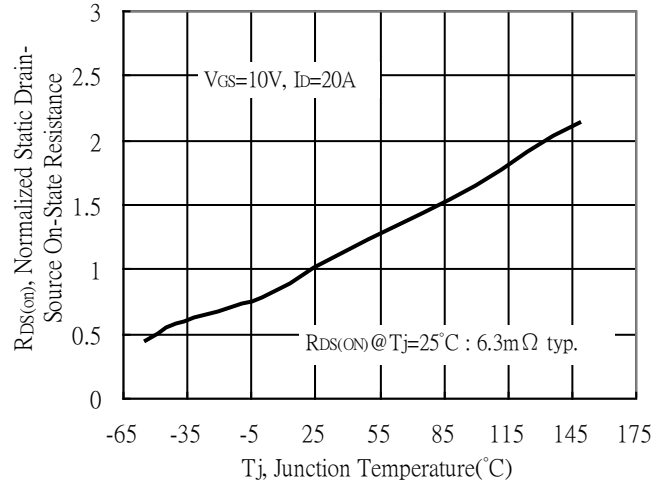
Unit (  $\frac{\text{mm}}{\text{inch}}$  )

**Typical Characteristics**

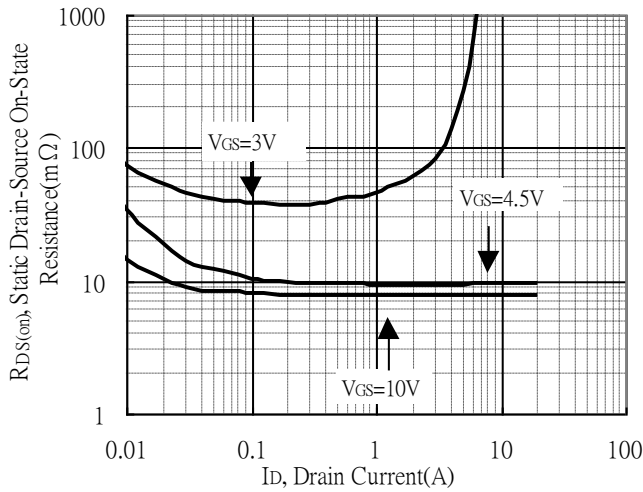
Typical Output Characteristics



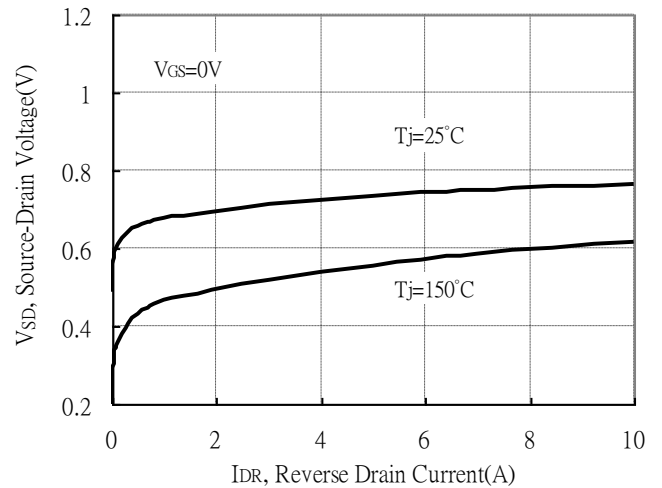
Drain-Source On-State Resistance vs Junction Temperature



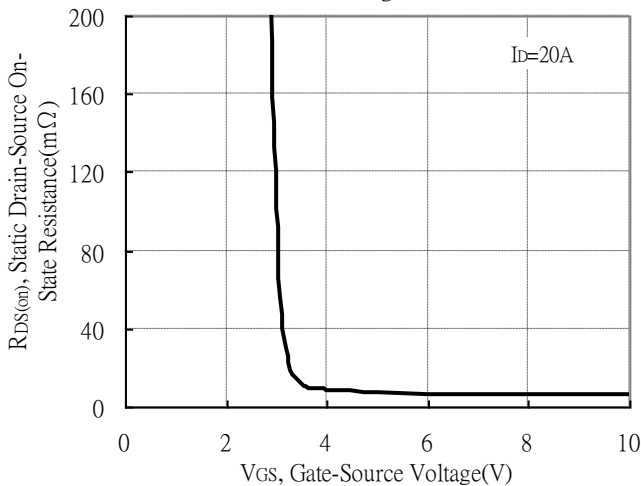
Static Drain-Source On-State resistance vs Drain Current



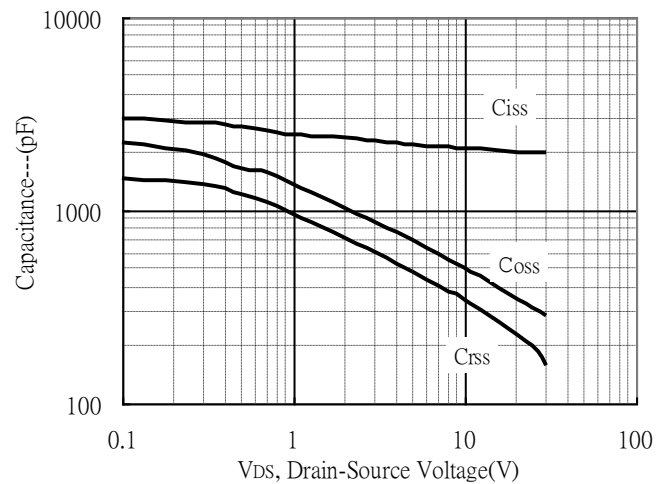
Reverse Drain Current vs Source-Drain Voltage



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

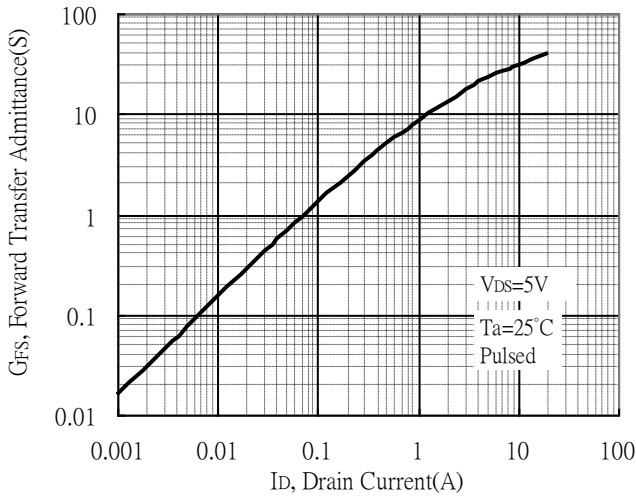


Capacitance vs Drain-to-Source Voltage

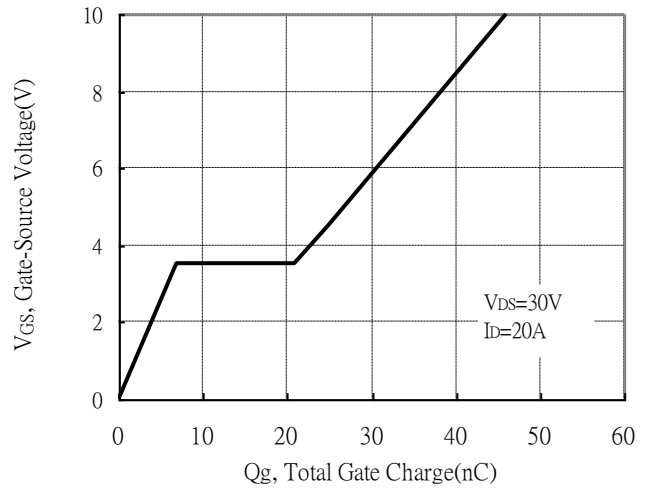


**Typical Characteristics(Cont.)**

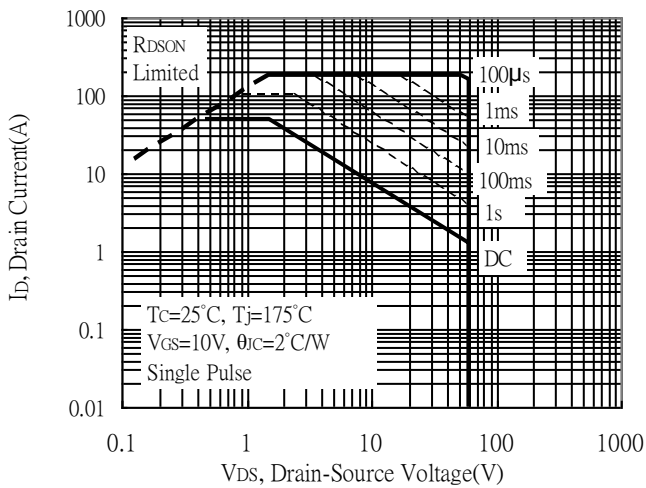
Forward Transfer Admittance vs Drain Current



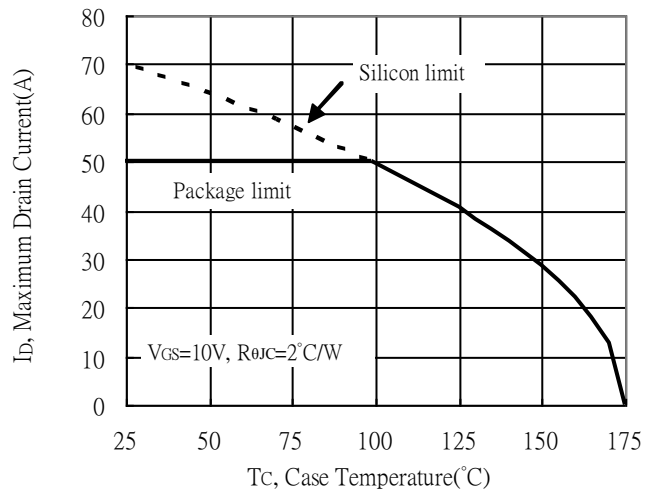
Gate Charge Characteristics



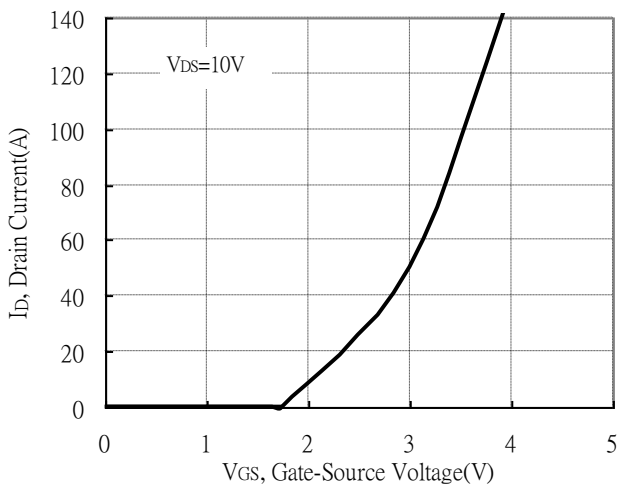
Maximum Safe Operating Area



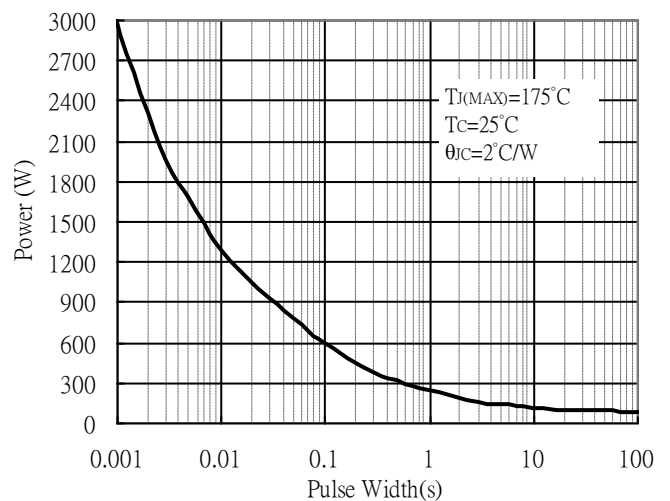
Maximum Drain Current vs Case Temperature



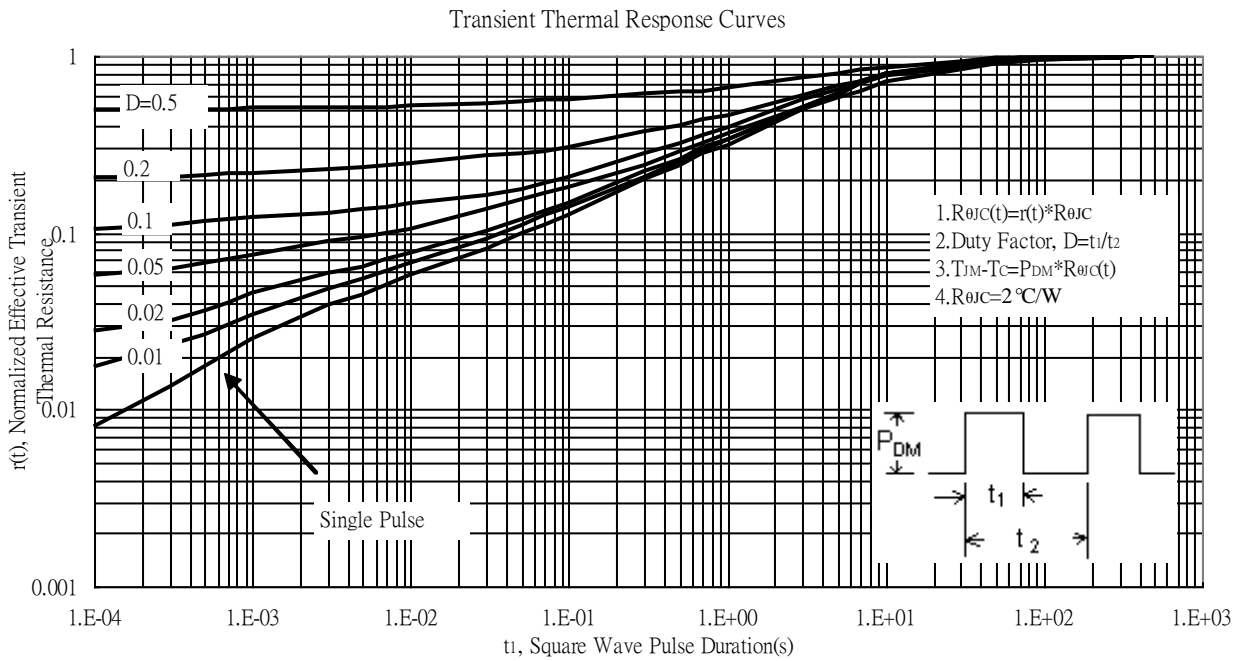
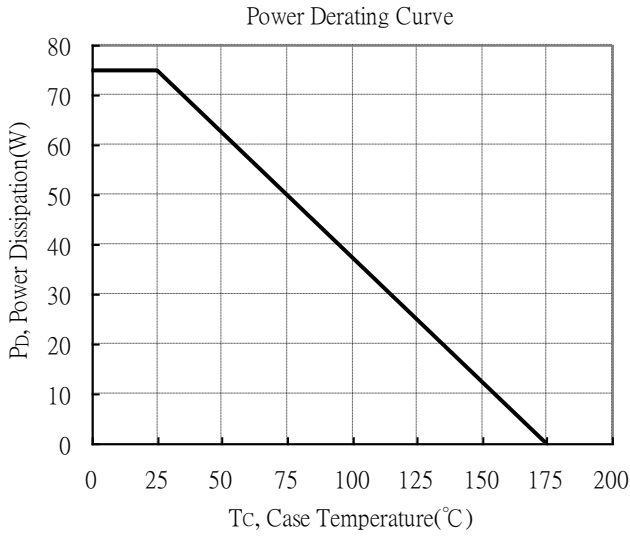
Typical Transfer Characteristics



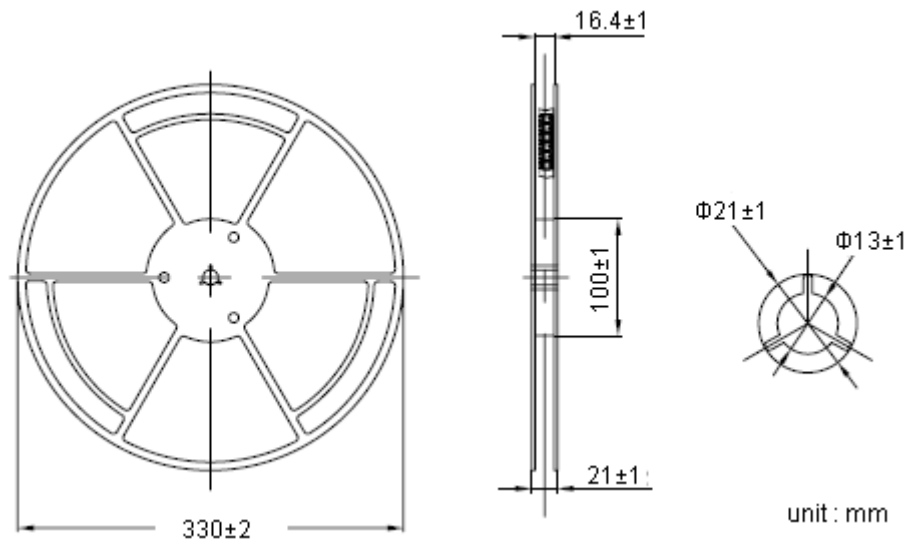
Single Pulse Power Rating, Junction to Case



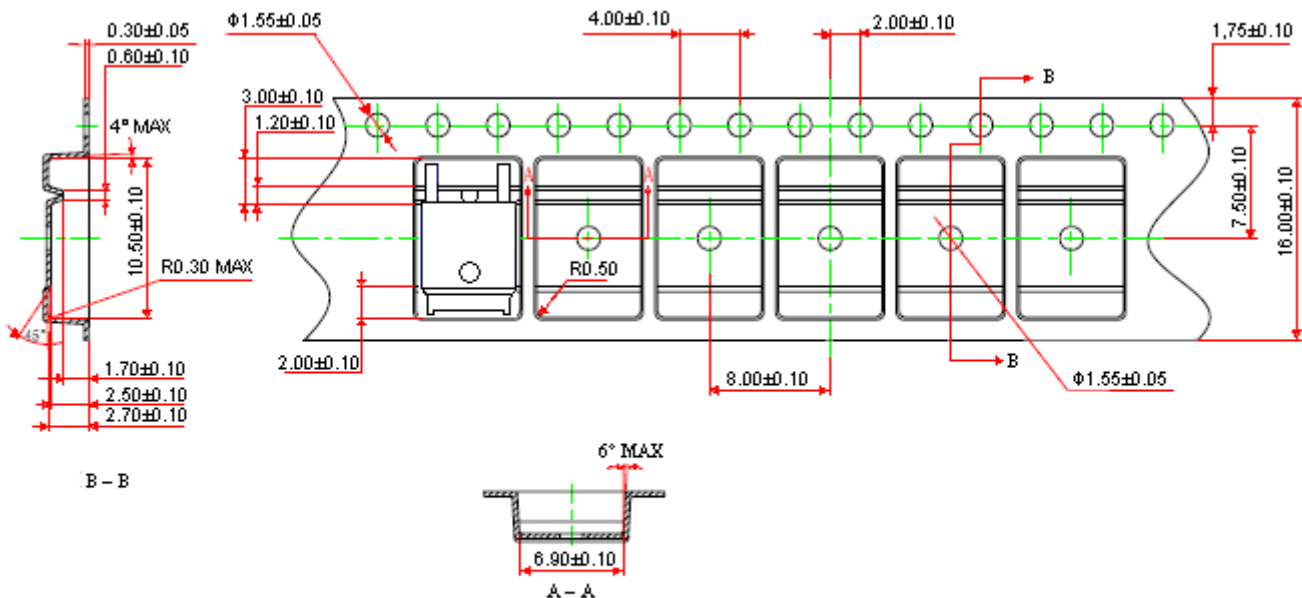
**Typical Characteristics(Cont.)**



### Reel Dimension



### Carrier Tape Dimension

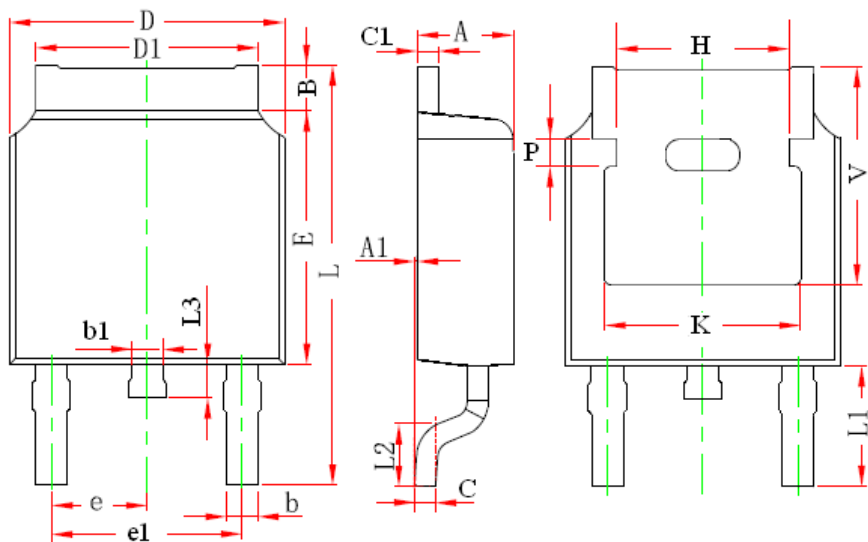


Notes:

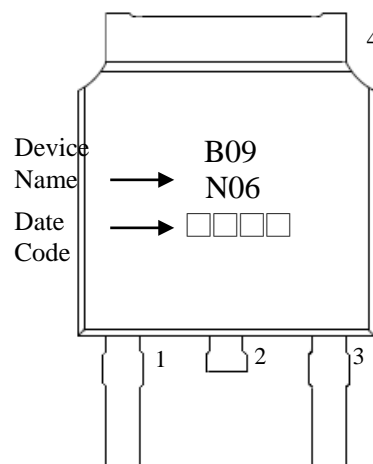
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$ .
2. Camber not to exceed 1mm in 100mm.
3. Material: conductive black polystyrene, antistatic coated :  $10^5 \Omega/\square \sim 10^{11} \Omega/\square$

unit : mm

**TO-252 Dimension**



Marking:



3-Lead TO-252 Plastic Surface Mount Package

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

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.087	0.094	2.200	2.400	e	0.086	0.094	2.186	2.386
A1	0.000	0.005	0.000	0.127	e1	0.172	0.188	4.372	4.772
B	0.039	0.048	0.990	1.210	H	0.163	REF	4.140	REF
b	0.026	0.034	0.660	0.860	K	0.190	REF	4.830	REF
b1	0.026	0.034	0.660	0.860	L	0.386	0.409	9.800	10.400
C	0.018	0.023	0.460	0.580	L1	0.114	REF	2.900	REF
C1	0.018	0.023	0.460	0.580	L2	0.055	0.067	1.400	1.700
D	0.256	0.264	6.500	6.700	L3	0.024	0.039	0.600	1.000
D1	0.201	0.215	5.100	5.460	P	0.026	REF	0.650	REF
E	0.236	0.244	6.000	6.200	V	0.211	REF	5.350	REF