

## N-Channel Enhancement Mode Power MOSFET

### Features:

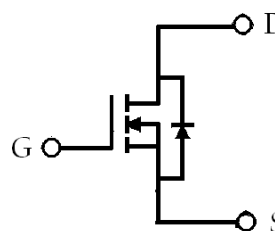
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and halogen-free package

TO-252(DPAK)



G D S

<b>BV<sub>DSS</sub></b>	<b>100V</b>
<b>I<sub>D</sub>@ V<sub>GS</sub>=10V, T<sub>C</sub>=25°C</b>	<b>42A</b>
<b>I<sub>D</sub>@ V<sub>GS</sub>=10V, T<sub>A</sub>=25°C</b>	<b>9A</b>
<b>R<sub>DS(ON)</sub>@ V<sub>GS</sub>=10V, I<sub>D</sub>=15A</b>	<b>12.5mΩ (typ)</b>
<b>R<sub>DS(ON)</sub>@ V<sub>GS</sub>=4.5V, I<sub>D</sub>=10A</b>	<b>14.5 mΩ (typ)</b>



G : Gate D : Drain S : Source

### Ordering Information

Device	Package	Shipping
KJB013N10R	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>	100	V	
Gate-Source Voltage	V <sub>GS</sub>	±20		
Continuous Drain Current @T <sub>C</sub> =25°C, V <sub>GS</sub> =10V (Note 1)	I <sub>D</sub>	42	A	
Continuous Drain Current @T <sub>C</sub> =100°C, V <sub>GS</sub> =10V (Note 1)		29.7		
Continuous Drain Current @T <sub>A</sub> =25°C, V <sub>GS</sub> =10V (Note 4)	I <sub>DSM</sub>	9		
Continuous Drain Current @T <sub>A</sub> =70°C, V <sub>GS</sub> =10V (Note 4)		7.2		
Pulsed Drain Current @ V <sub>GS</sub> =10V (Note 3)	I <sub>DM</sub>	168		
Avalanche Current @L=0.1mH (Note 5)	I <sub>AS</sub>	42		
Single Pulse Avalanche Energy @ L=0.5mH, I <sub>D</sub> =33 Amps, V <sub>DD</sub> =50V (Note 5)	E <sub>AS</sub>	272	mJ	
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C (Note 1)	60	W
		T <sub>C</sub> =100°C (Note 1)	30	
	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/W	

\*Drain current limited by maximum junction temperature

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R <sub>θJC</sub>	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max (Note2)	R <sub>θJA</sub>	50	
Thermal Resistance, Junction-to-ambient, max (Note4)		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. 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<sub>≤</sub>10s.
5. 100% tested by condition of V<sub>DD</sub>=25V, I<sub>D</sub>=10A, L=2mH, V<sub>GS</sub>=10V.

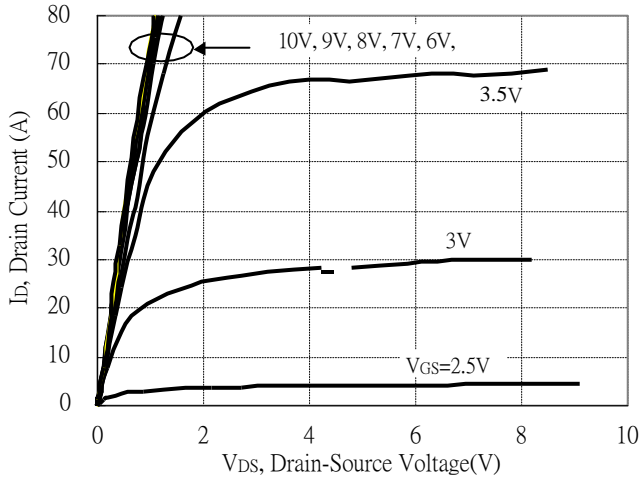
**Characteristics (T<sub>j</sub>=25°C, unless otherwise specified)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	100	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	70	-	mV/°C	Reference to 25°C, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	1	-	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA
*G <sub>FS</sub>	-	23.5	-	S	V <sub>DS</sub> = 10V, I <sub>D</sub> =10A
I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±20V
I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
	-	-	5		V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V, T <sub>j</sub> =55°C
*R <sub>DS(ON)</sub>	-	12.5	16	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> =15A
	-	14.5	20		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =10A
<b>Dynamic</b>					
*Q <sub>g</sub>	-	55	-	nC	V <sub>DD</sub> =80V, I <sub>D</sub> =15A, V <sub>GS</sub> =10V
*Q <sub>gs</sub>	-	9.1	-		
*Q <sub>gd</sub>	-	9.9	-		
*t <sub>d(ON)</sub>	-	18.2	-	ns	V <sub>DD</sub> =50V, I <sub>D</sub> =15A, V <sub>GS</sub> =10V, R <sub>G</sub> =1Ω
*t <sub>r</sub>	-	17.2	-		
*t <sub>d(OFF)</sub>	-	60	-		
*t <sub>f</sub>	-	8	-		
C <sub>iss</sub>	-	3050	-	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz
C <sub>oss</sub>	-	185	-		
C <sub>rss</sub>	-	14	-		
<b>Source-Drain Diode</b>					
*I <sub>S</sub>	-	-	42	A	
*I <sub>SM</sub>	-	-	168		
*V <sub>SD</sub>	-	0.82	1.2	V	I <sub>S</sub> =15A, V <sub>GS</sub> =0V
*t <sub>rr</sub>	-	33	-	ns	V <sub>GS</sub> =0V, I <sub>F</sub> =15A, dI <sub>F</sub> /dt=100A/μs
*Q <sub>rr</sub>	-	48	-	nC	

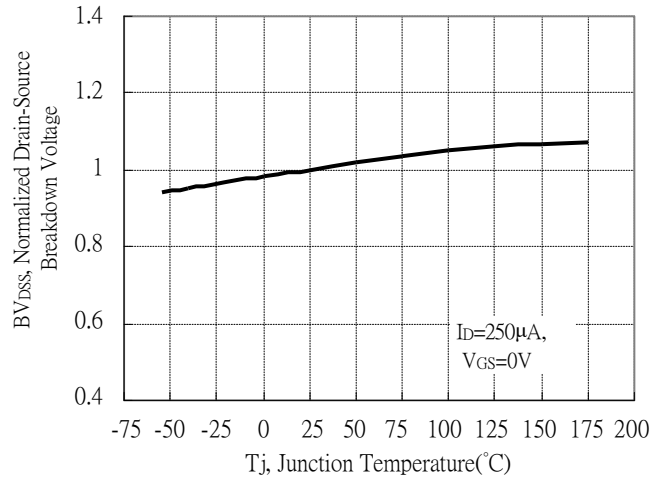
\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

## Typical Characteristics

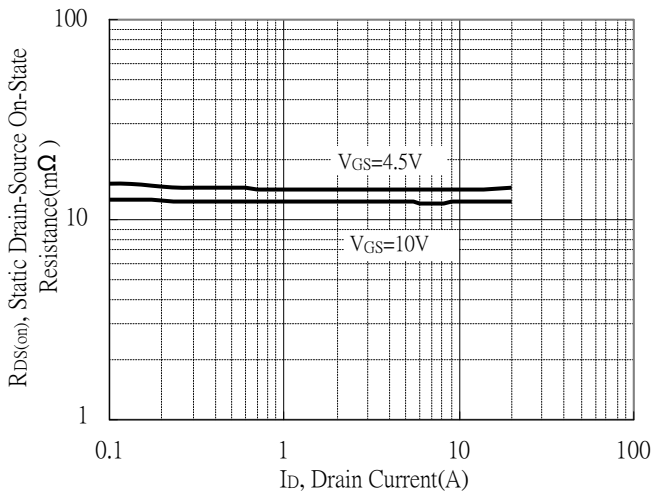
Typical Output Characteristics



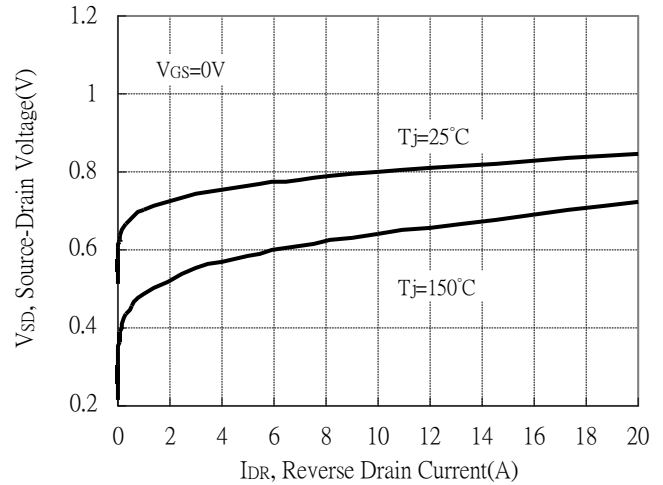
Brekdown Voltage vs Ambient Temperature



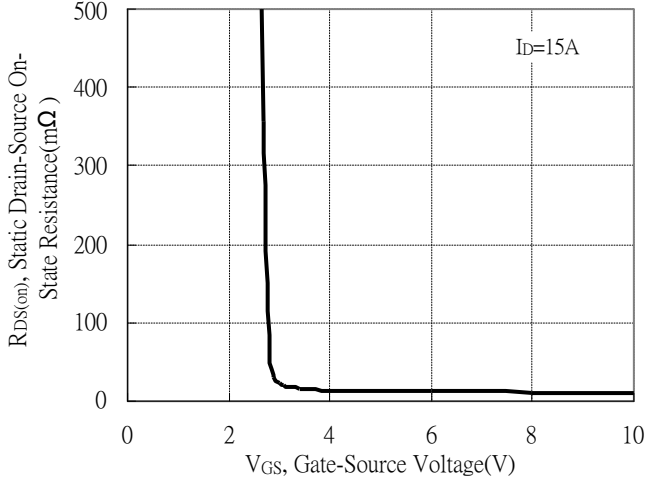
Static Drain-Source On-State resistance vs Drain Current



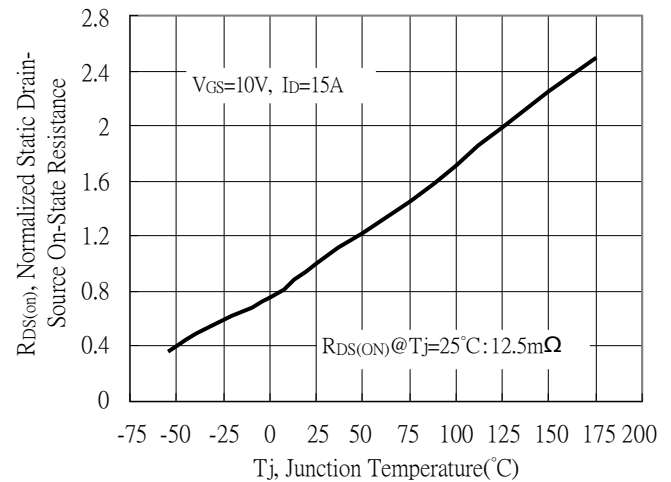
Reverse Drain Current vs Source-Drain Voltage



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

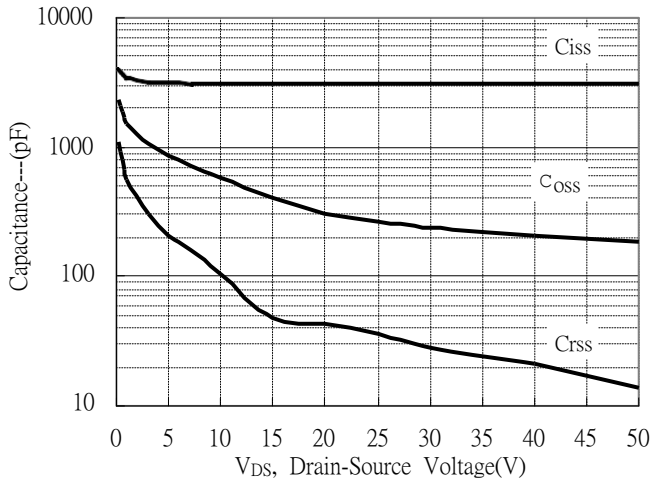


Drain-Source On-State Resistance vs Junction Temperature

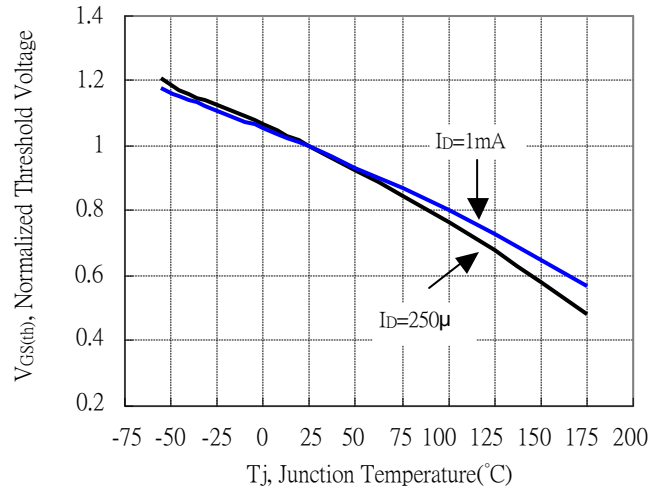


**Typical Characteristics(Cont.)**

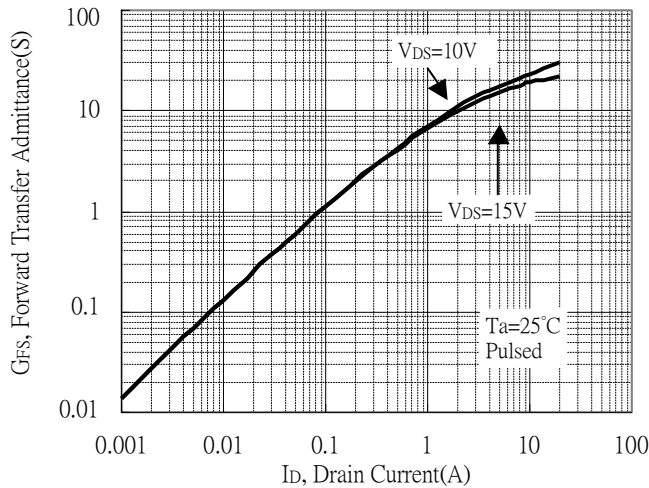
Capacitance vs Drain-to-Source Voltage



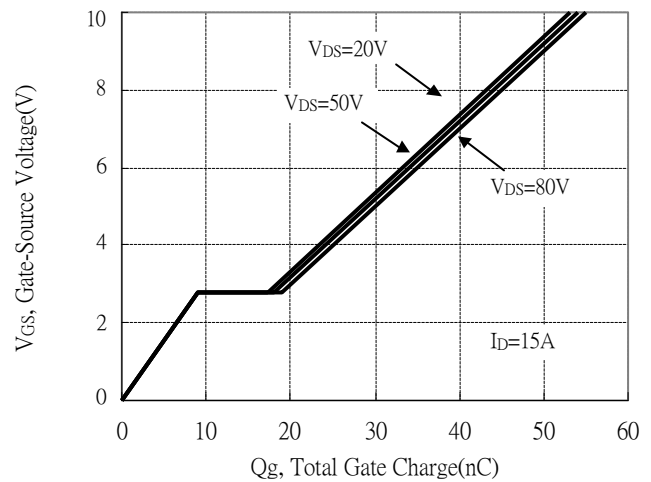
Threshold Voltage vs Junction Temperature



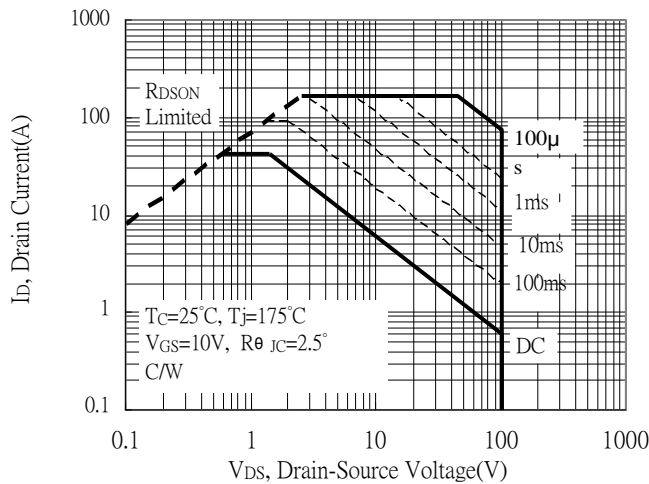
Forward Transfer Admittance vs Drain Current



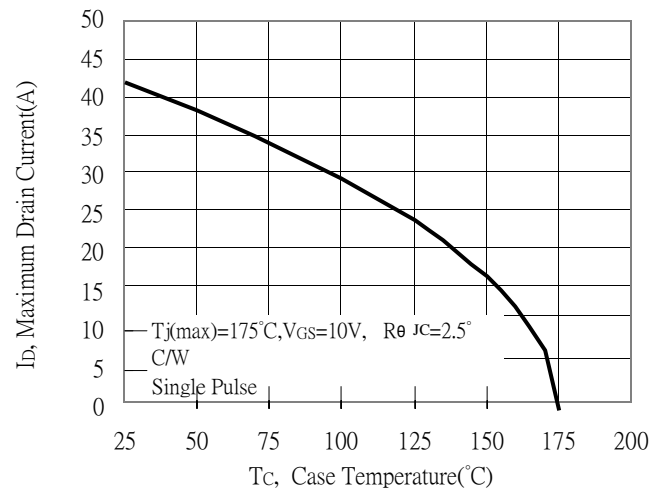
Gate Charge Characteristics



Maximum Safe Operating Area

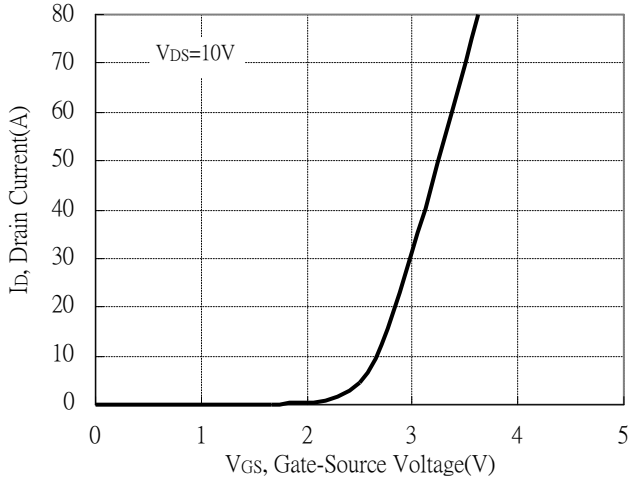


Maximum Drain Current vs Case Temperature

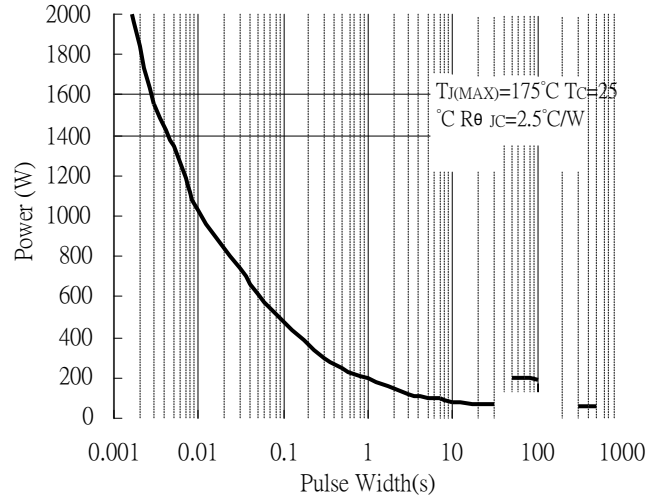


**Typical Characteristics(Cont.)**

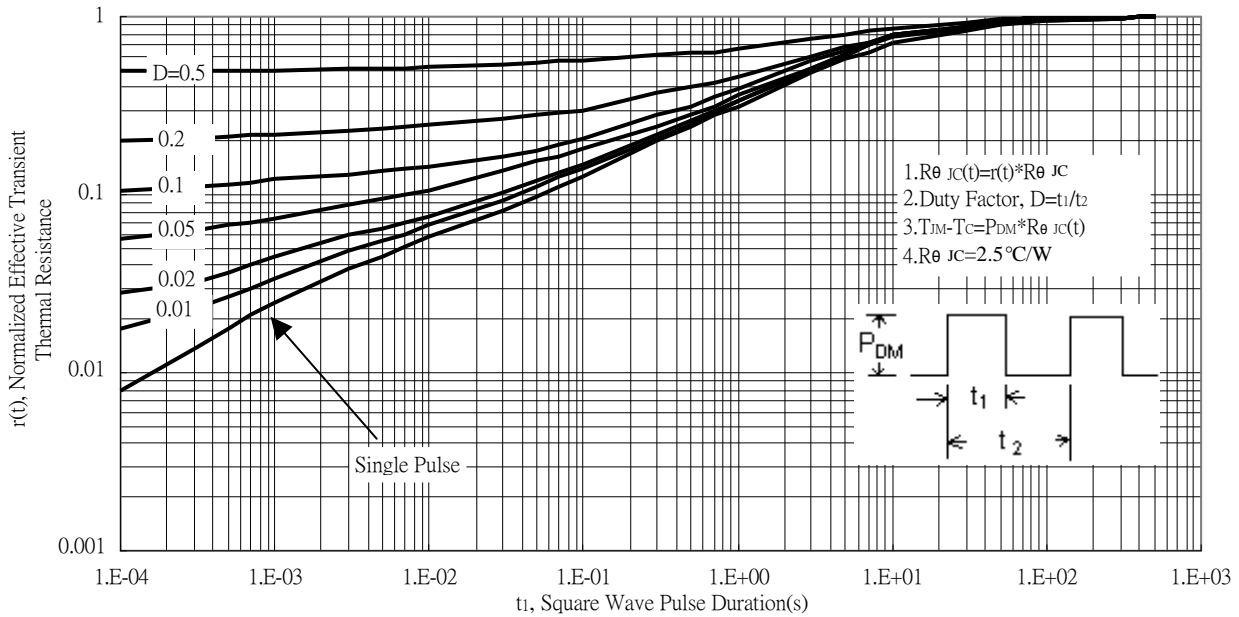
Typical Transfer Characteristics



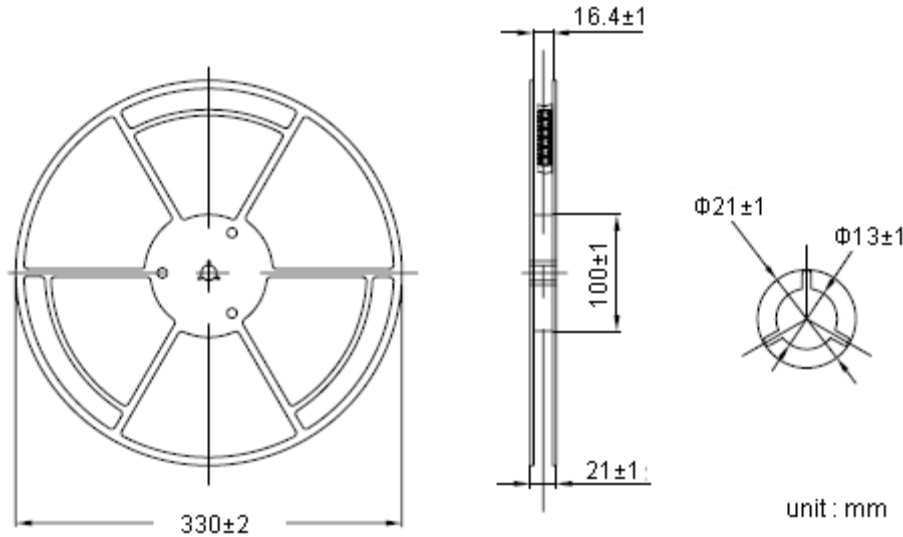
Single Pulse Power Rating, Junction to Case



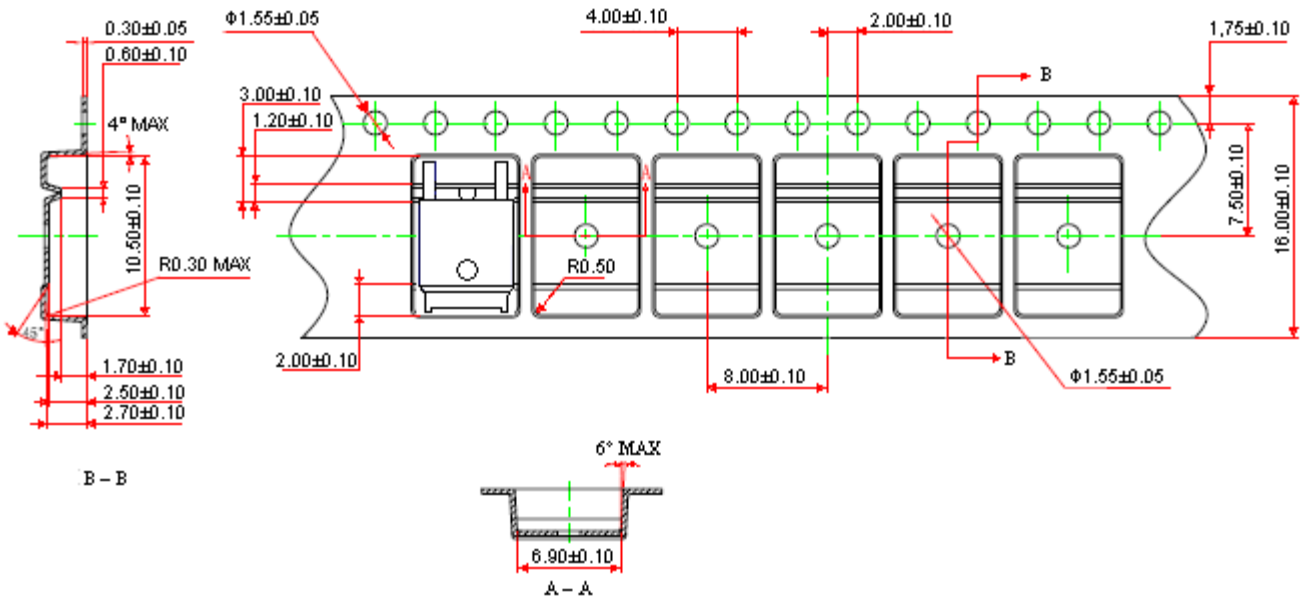
Transient Thermal Response Curves



### Reel Dimension



### Carrier Tape Dimension

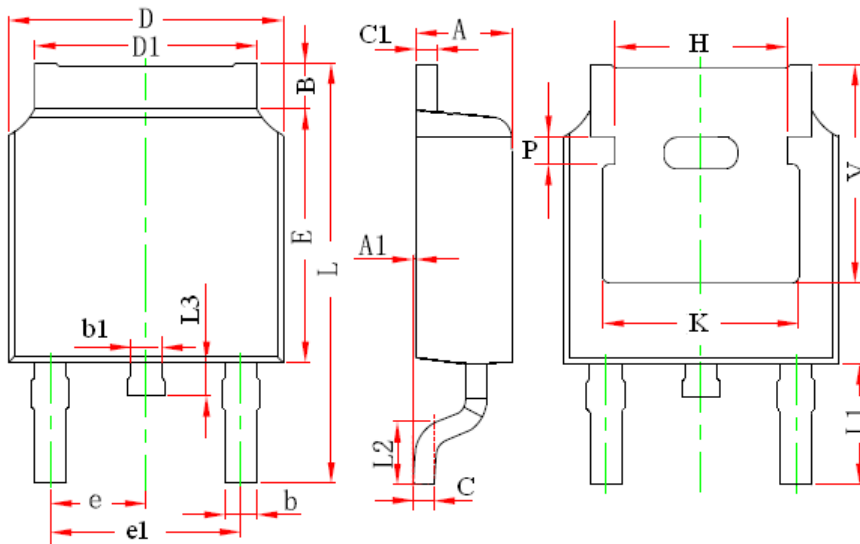


Notes:

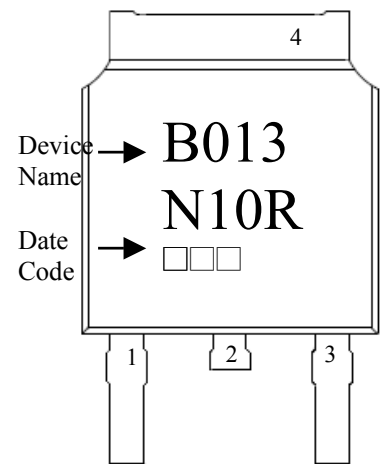
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$ .
2. Camber not to exceed 1mm in 100mm.
3. Material: conductive black polystyrene, antistatic coated :  $10^5 \Omega/\square \sim 10^{11} \Omega/\square$

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