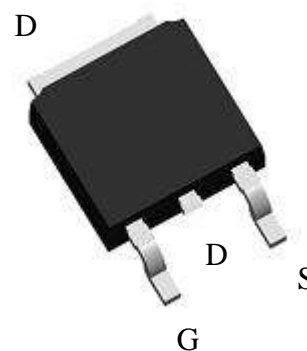


## P-Channel Enhancement Mode Power MOSFET

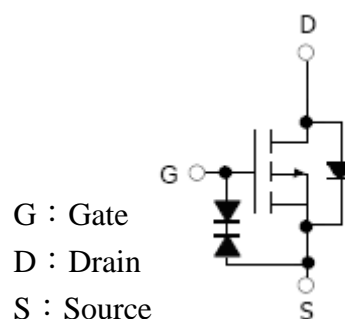
### Features:

- Low Gate Charge
- Simple Drive Requirement
- ESD Protected Gate
- Pb-free Lead Plating & Halogen-free Package

TO-252(DPAK)



<b>B<sub>V</sub>D<sub>SS</sub></b>	<b>-60V</b>
<b>I<sub>D</sub>@ V<sub>GS</sub>=-10V, T<sub>C</sub>=25°C</b>	<b>-23.6A</b>
<b>R<sub>DS(ON)</sub>@ V<sub>GS</sub>=-10V, I<sub>D</sub>=-6A</b>	<b>23mΩ(typ)</b>
<b>R<sub>DS(ON)</sub>@ V<sub>GS</sub>=-4.5V, I<sub>D</sub>=-4A</b>	<b>37mΩ(typ)</b>
<b>R<sub>DS(ON)</sub>@ V<sub>GS</sub>=-4V, I<sub>D</sub>=-3A</b>	<b>44mΩ(typ)</b>



### Ordering Information

Device	Package	Shipping
KJB30P06K	TO-252 (Pb-free lead plating & halogen-free package)	2500 pcs / Tape & Reel

**Absolute Maximum Ratings** ( $T_C=25^{\circ}\text{C}$ , unless otherwise noted)

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage	$V_{DS}$	-60	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current @ $T_J=175^{\circ}\text{C}$ , $T_C=25^{\circ}\text{C}$ , $V_{GS}=-10\text{V}$ (Note 1)	$I_D$	-23.6	A	
Continuous Drain Current @ $T_J=175^{\circ}\text{C}$ , $T_C=100^{\circ}\text{C}$ , $V_{GS}=-10\text{V}$ (Note 1)		-16.7		
Continuous Drain Current @ $T_A=25^{\circ}\text{C}$ , $V_{GS}=-10\text{V}$ (Note 2)	$I_{DSM}$	-6.7		
Continuous Drain Current @ $T_A=70^{\circ}\text{C}$ , $V_{GS}=-10\text{V}$ (Note 2)		-5.4		
Pulsed Drain Current (Note 3)	$I_{DM}$	-94		
Avalanche Current (Note 3)	$I_{AS}$	-23.6		
Avalanche Energy @ $L=0.5\text{mH}$ , $I_D=-23.6\text{A}$ , $V_{DD}=-30\text{V}$ (Note 2)	$E_{AS}$	139	mJ	
Total Power Dissipation	$P_D$	$T_C=25^{\circ}\text{C}$ (Note 1)	42	W
		$T_C=100^{\circ}\text{C}$ (Note 1)	21	
	$P_{DSM}$	$T_A=25^{\circ}\text{C}$ (Note 2)	2.5	
		$T_A=70^{\circ}\text{C}$ (Note 2)	1.6	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+175	$^{\circ}\text{C}$	

\* 100% UIS testing in condition of  $V_D=-15\text{V}$ ,  $L=0.5\text{mH}$ ,  $V_G=10\text{V}$ ,  $I_{AS}=-12\text{A}$ , Rated  $V_{DS}=-60\text{V}$

**Thermal Data**

Parameter	Symbol	Typical	Maximum	Unit
Thermal Resistance, Junction-to-case	$R_{\theta JC}$	2.7	3.6	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-ambient, $t \leq 10\text{s}$ (Note 2)	$R_{\theta JA}$	15	18	
Thermal Resistance, Junction-to-ambient, steady state		40	50	

Note : 1. The power dissipation  $P_D$  is based on  $T_{J(\text{MAX})}=175^{\circ}\text{C}$ , 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  $R_{\theta JA}$  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  $T_A=25^{\circ}\text{C}$ . The power dissipation  $P_{DSM}$  is based on  $R_{\theta JA}$  and the maximum allowed junction temperature of  $150^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.

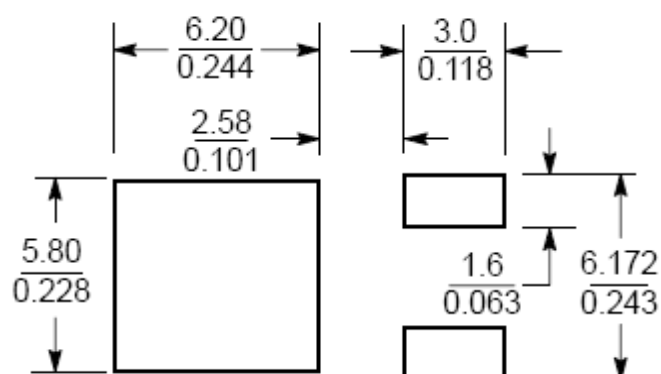
3. Pulse width limited by junction temperature  $T_{J(\text{MAX})}=175^{\circ}\text{C}$ . Ratings are based on low frequency and low duty cycles to keep initial  $T_J=25^{\circ}\text{C}$ .

**Characteristics (Tc=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
V <sub>GS(th)</sub>	-1.5	-	-2.5		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA
I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	-1		V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V
	-	-	-25		V <sub>DS</sub> =-48V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C
R <sub>DS(ON)</sub> *1	-	23	30	mΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A
	-	37	48		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A
	-	44	57		V <sub>GS</sub> =-4 V, I <sub>D</sub> =-3A
G <sub>FS</sub> *1	-	15	-	S	V <sub>DS</sub> =-5V, I <sub>D</sub> =-6A
<b>Dynamic</b>					
Q <sub>g</sub> *1, 2	-	31.9	47.9	nC	I <sub>D</sub> =-23A, V <sub>DS</sub> =-48V, V <sub>GS</sub> =-10V
Q <sub>gs</sub> *1, 2	-	4.4	-		
Q <sub>gd</sub> *1, 2	-	13	-		
t <sub>d(ON)</sub> *1, 2	-	14.2	21.3	ns	V <sub>DS</sub> =-30V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =3.3Ω
t <sub>r</sub> *1, 2	-	19	28.5		
t <sub>d(OFF)</sub> *1, 2	-	55.4	83.1		
t <sub>f</sub> *1, 2	-	34.6	51.9		
C <sub>iss</sub>	-	1430	-	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, f=1MHz
C <sub>oss</sub>	-	206	-		
C <sub>rss</sub>	-	121	-		
R <sub>g</sub>	-	4	-		
<b>Source-Drain Diode Ratings and Characteristics</b>					
I <sub>S</sub> *1	-	-	-23.6	A	
I <sub>SM</sub> *1	-	-	-94		
V <sub>SD</sub> *1	-	-0.78	-1.2	V	I <sub>S</sub> =-6A, V <sub>GS</sub> =0V
t <sub>rr</sub>	-	11	16.5	ns	I <sub>F</sub> =-23A, dI <sub>F</sub> /dt=100A/μs
Q <sub>rr</sub>	-	5	-	nC	

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

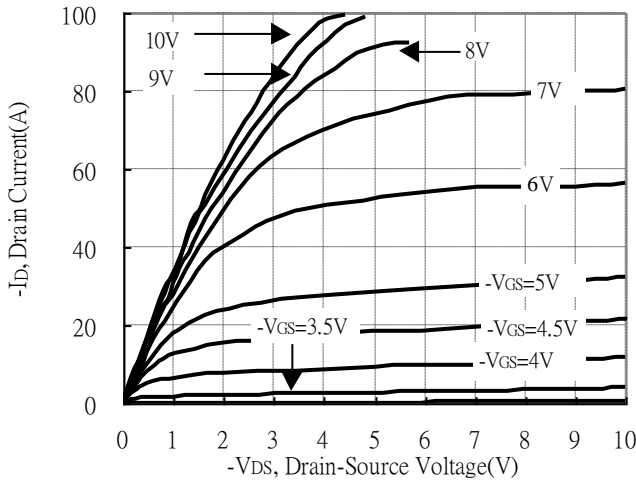
**Recommended soldering footprint**



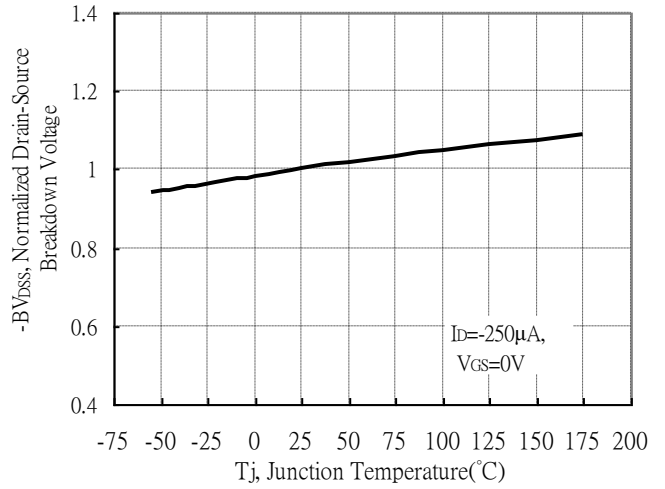
Unit (  $\frac{\text{mm}}{\text{inch}}$  )

### Typical Characteristics

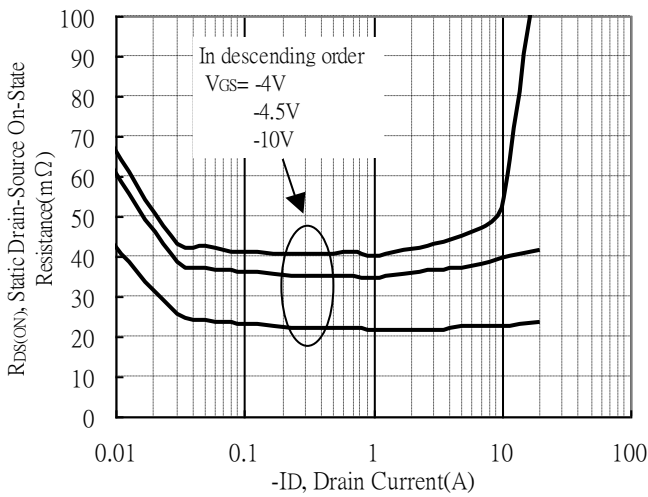
Typical Output Characteristics



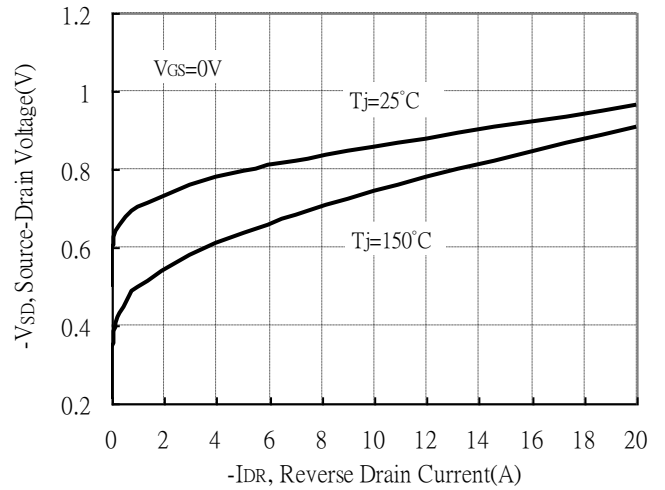
Breakdown Voltage vs Ambient Temperature



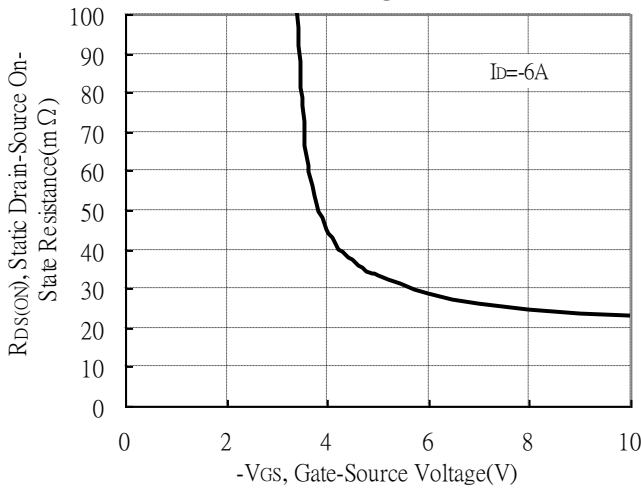
Static Drain-Source On-State resistance vs Drain Current



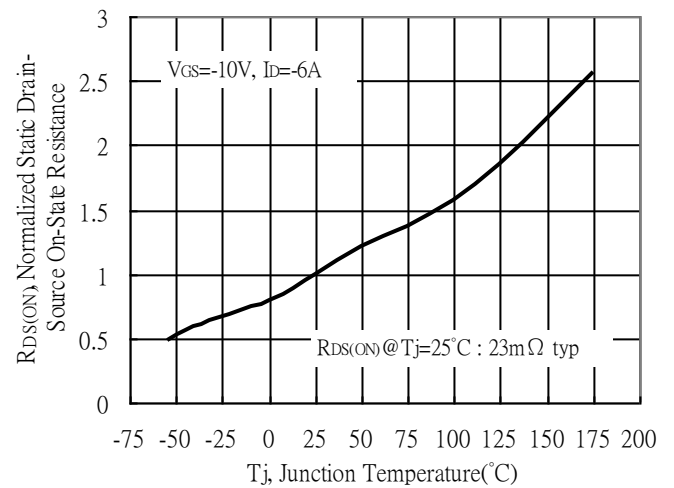
Reverse Drain Current vs Source-Drain Voltage



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

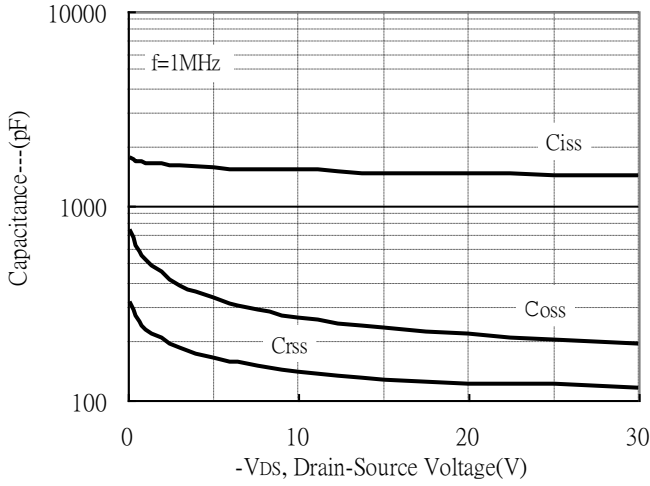


Drain-Source On-State Resistance vs Junction Temperature

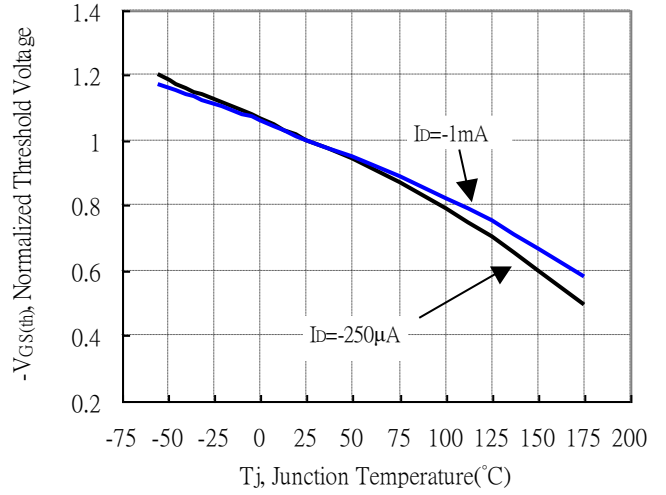


**Typical Characteristics (Cont.)**

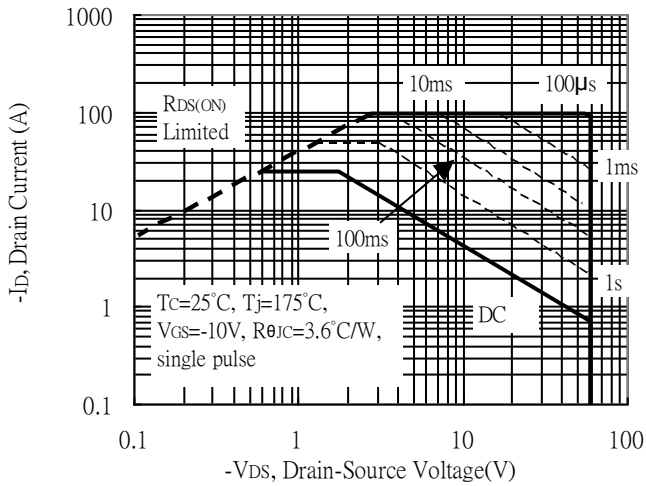
Capacitance vs Drain-to-Source Voltage



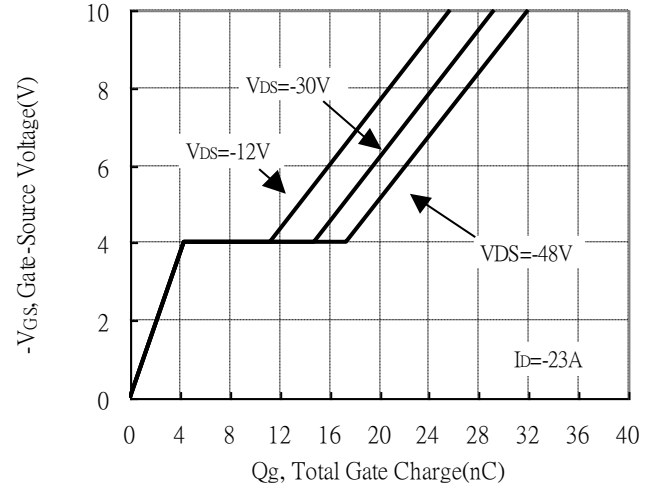
Threshold Voltage vs Junction Temperature



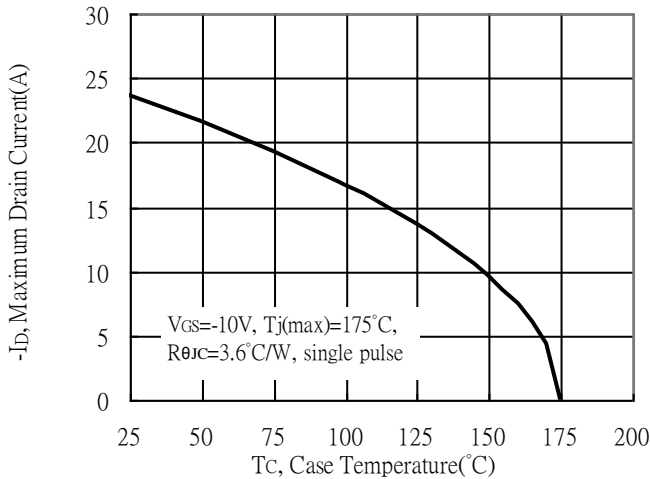
Maximum Safe Operating Area



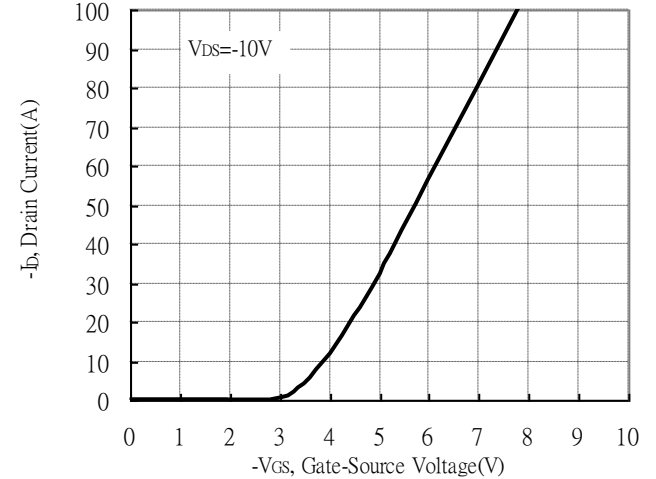
Gate Charge Characteristics



Maximum Drain Current vs Case Temperature

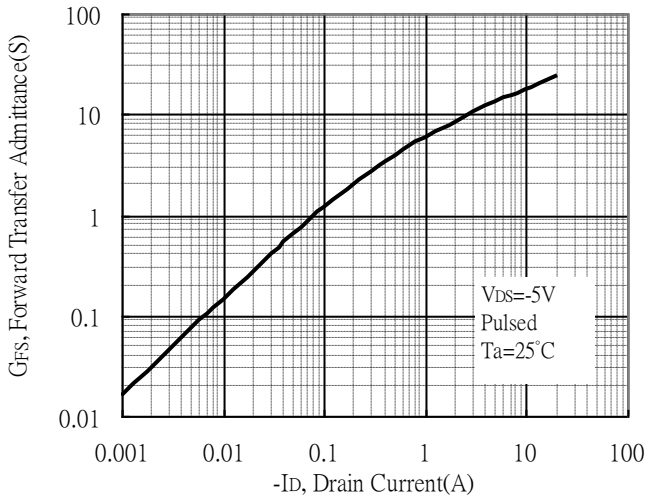


Typical Transfer Characteristics

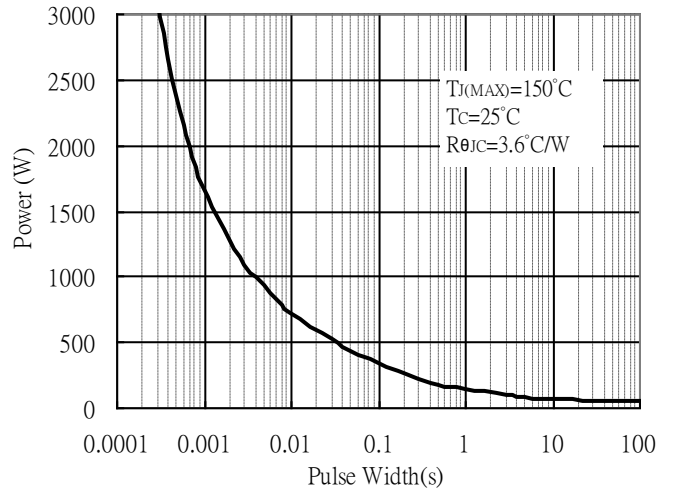


**Typical Characteristics (Cont.)**

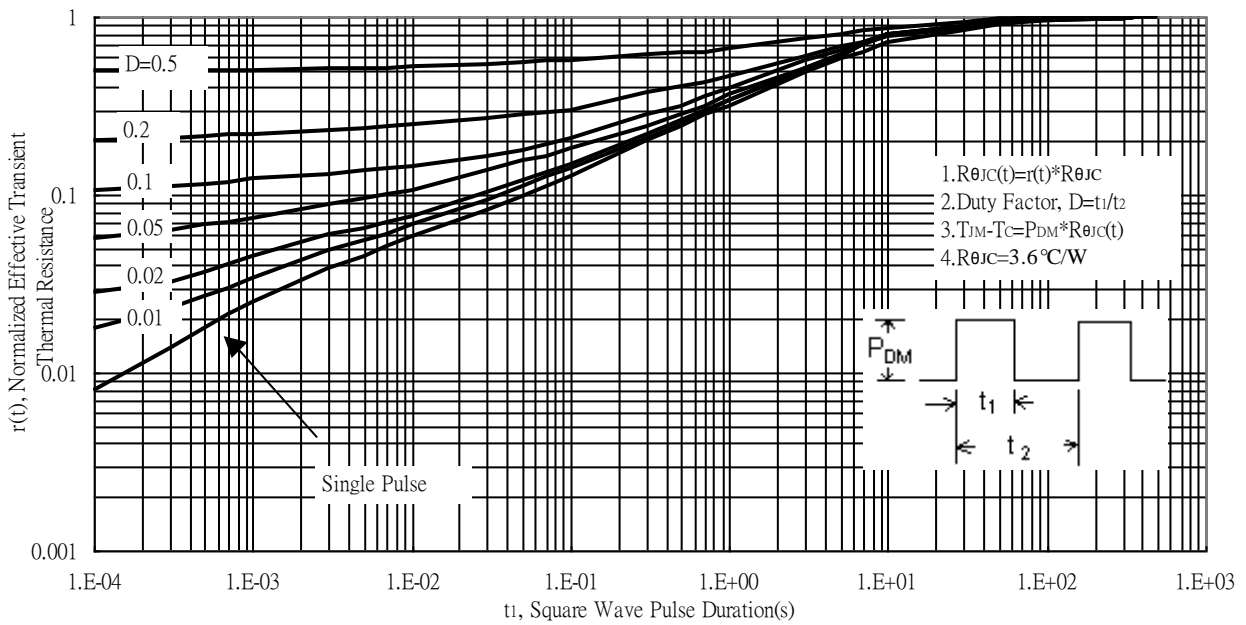
Forward Transfer Admittance vs Drain Current



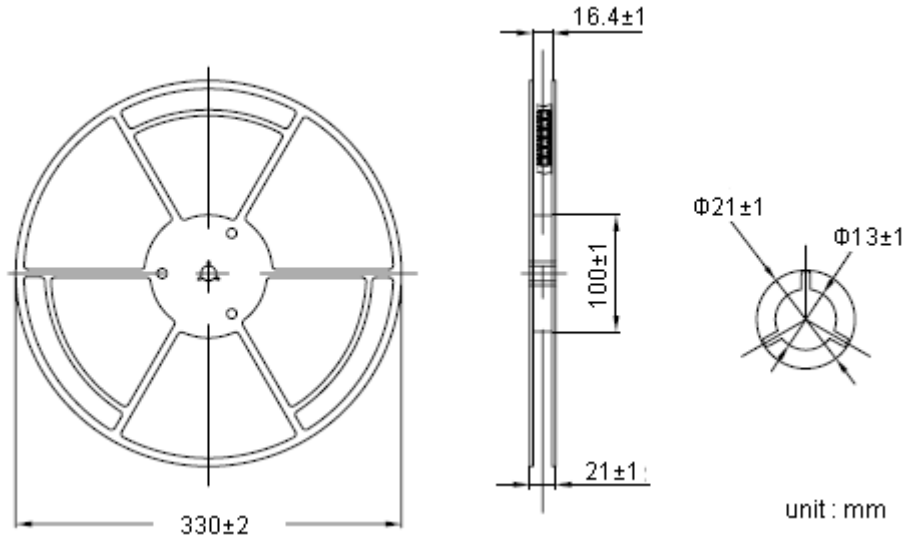
Single Pulse Power Rating, Junction to Case



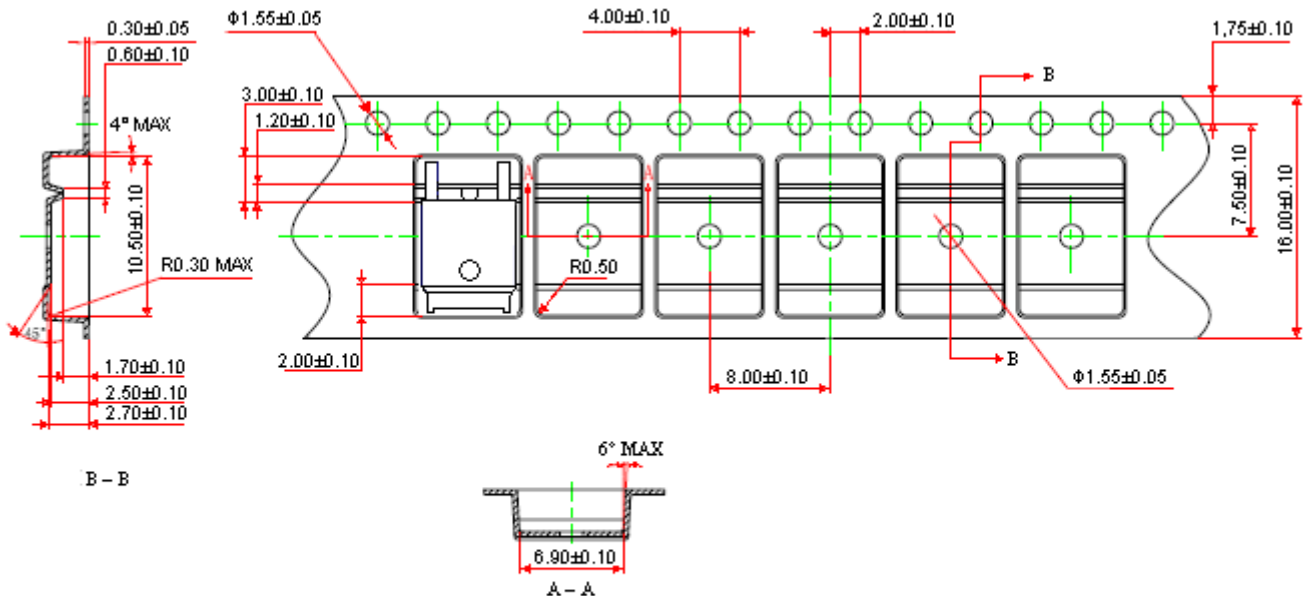
Transient Thermal Response Curves



### Reel Dimension



### Carrier Tape Dimension

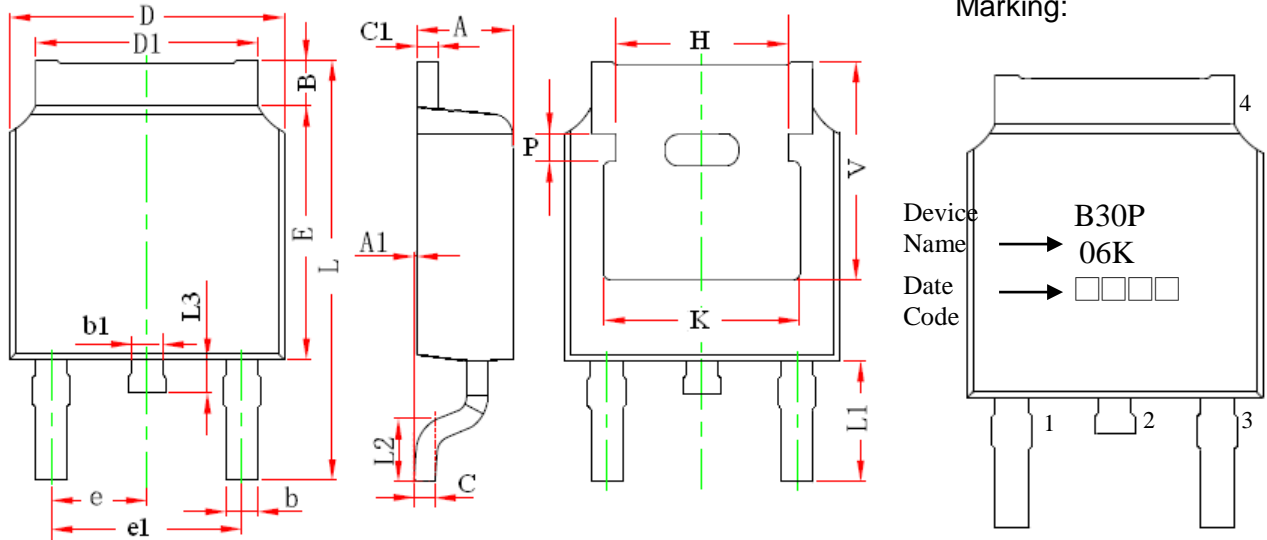


Notes:

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**



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