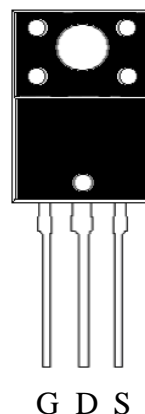


## N-Channel Enhancement Mode Power MOSFET

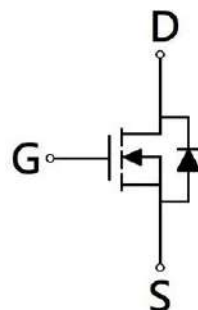
### Features:

- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic

TO-220FP



$BV_{DSS}$	250V
$I_D @ V_{GS}=10V, T_C=25^\circ C$	7A
$I_D @ V_{GS}=10V, T_A=25^\circ C$	3A
$R_{DS(ON)} @ V_{GS}=10V, I_D=3A$	150m $\Omega$
$R_{DS(ON)} @ V_{GS}=4.5V, I_D=3A$	160m $\Omega$



G : Gate S : Source D : Drain

### Ordering Information

Device	Package	Shipping
KEB200N25P	TO-220FP (RoHS compliant)	50 pcs/tube, 20 tubes/box, 5 boxes / carton

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

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage	V <sub>DS</sub>	250	V	
Gate-Source Voltage	V <sub>GS</sub>	±20		
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>C</sub> =25°C	I <sub>D</sub>	7	A	
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>C</sub> =100°C		4.4		
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =25°C		3		
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =70°C		2.5		
Pulsed Drain Current	I <sub>DM</sub>	28		
Continuous Body Diode Forward Current @ T <sub>C</sub> =25°C	I <sub>S</sub>	7		
Avalanche Current @ L=0.1mH	I <sub>AS</sub>	5		
Avalanche Energy @ L=0.5mH	E <sub>AS</sub>	5	mJ	
Total Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	23	W
		T <sub>C</sub> =100°C	9.3	
		T <sub>A</sub> =25°C	4.5	
		T <sub>A</sub> =70°C	3	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55~+150	°C	

### Thermal Data

Parameter	Symbol	Steady State	Unit
Thermal Resistance, Junction-to-case	R <sub>θJC</sub>	5.4	°C/W
Thermal Resistance, Junction-to-ambient	R <sub>θJA</sub>	28	

Note:

- \*a. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=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<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> 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.
- \*c. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and low duty cycles to keep initial T<sub>J</sub>=25°C.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	250	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	1	-	2.5		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
G <sub>FS</sub>	-	12	-	S	V <sub>DS</sub> =5V, I <sub>D</sub> =3A
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> =200V, V <sub>GS</sub> =0V
R <sub>DS(ON)</sub>	-	150	200	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =3A
	-	160	225		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A
<b>Dynamic</b>					
C <sub>iss</sub>	-	1487	-	pF	V <sub>DS</sub> =125V, V <sub>GS</sub> =0V, f=1MHz
C <sub>oss</sub>	-	59	-		
C <sub>rss</sub>	-	30	-		
R <sub>g</sub>	-	2	-	Ω	f=1MHz
Q <sub>g</sub> *1, 2	-	38	-	nC	V <sub>DS</sub> =125V, I <sub>D</sub> =3A, V <sub>GS</sub> =10V
Q <sub>gs</sub> *1, 2	-	4.7	-		
Q <sub>gd</sub> *1, 2	-	11	-		
t <sub>d(ON)</sub> *1, 2	-	15	-	ns	V <sub>DS</sub> =125V, I <sub>D</sub> =3A, V <sub>GS</sub> =10V, R <sub>GS</sub> =1.6Ω
t <sub>r</sub> *1, 2	-	21	-		
t <sub>d(OFF)</sub> *1, 2	-	65	-		
t <sub>f</sub> *1, 2	-	21	-		
<b>Source-Drain Diode</b>					
V <sub>SD</sub> *1	-	0.8	1.2	V	I <sub>S</sub> =3A, V <sub>GS</sub> =0V
t <sub>rr</sub>	-	80	-	ns	I <sub>F</sub> =3A, dI <sub>F</sub> /dt=100A/μs
Q <sub>rr</sub>	-	211	-	nC	

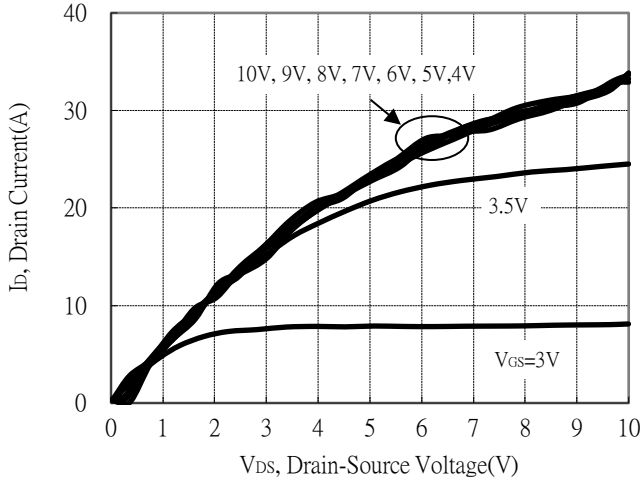
Note:

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

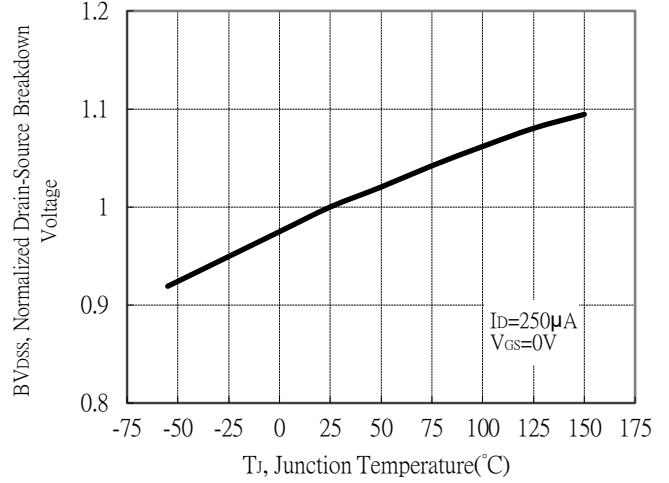
\*2. Independent of operating temperature

## Typical Characteristics

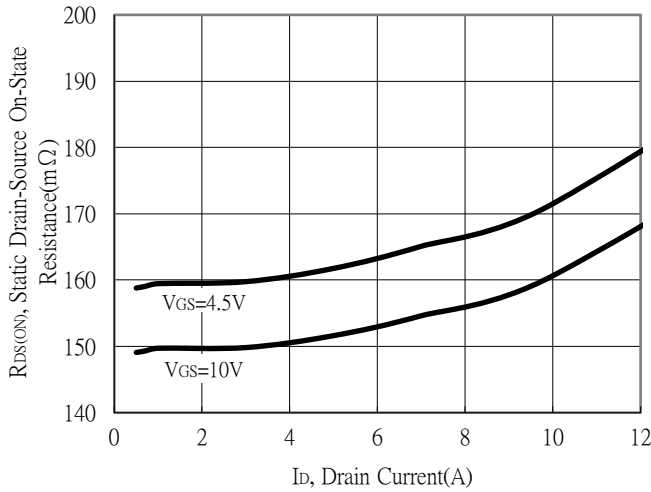
Typical Output Characteristics



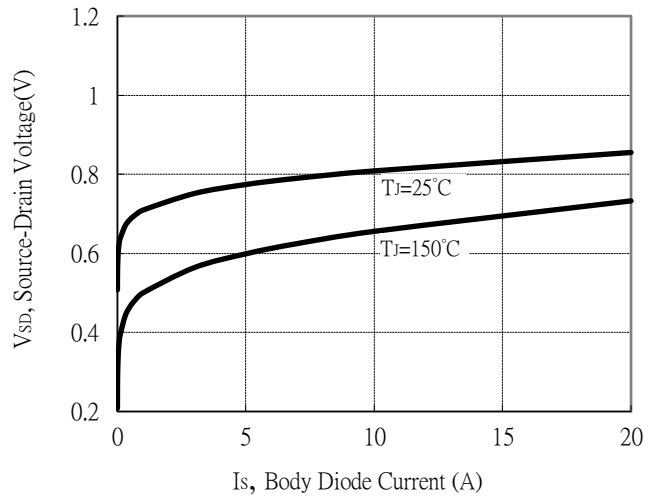
Brekdown Voltage vs Ambient Temperature



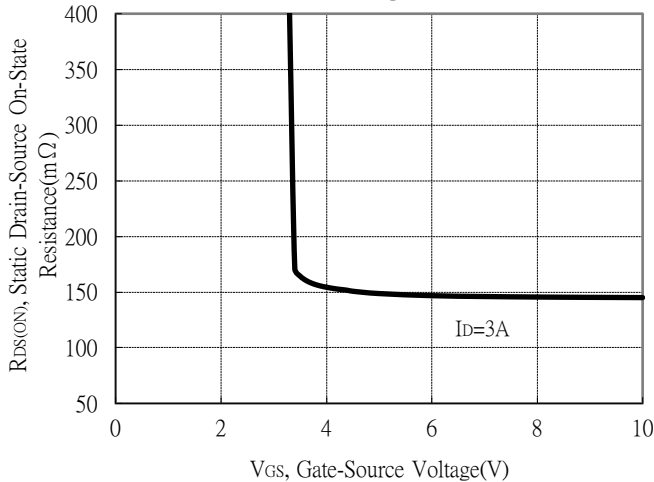
Static Drain-Source On-State resistance vs Drain Current



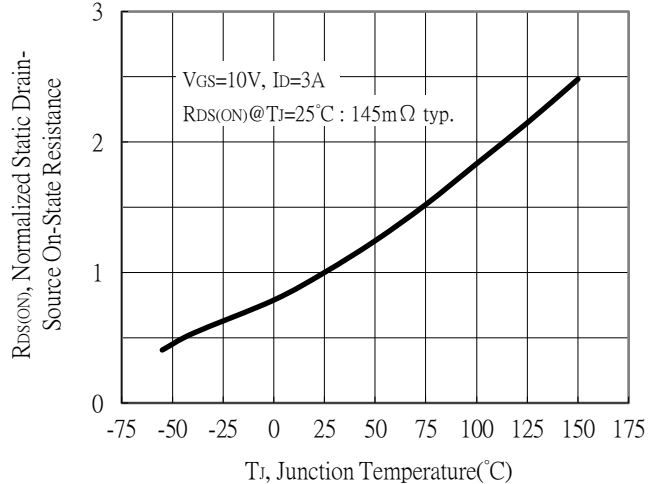
Body Diode Current vs Source-Drain Voltage



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

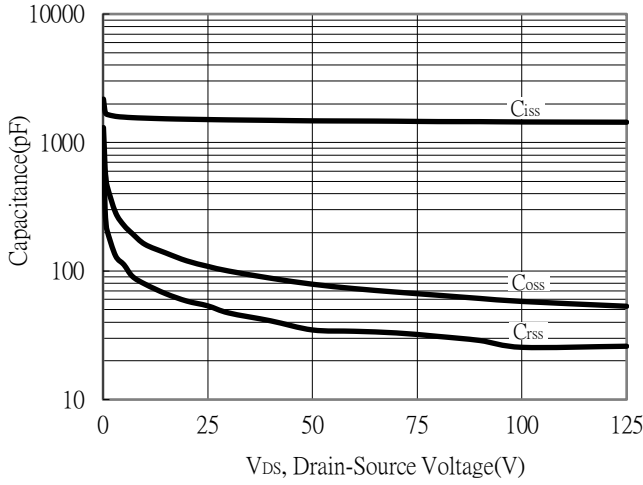


Drain-Source On-State Resistance vs Junction Temperature

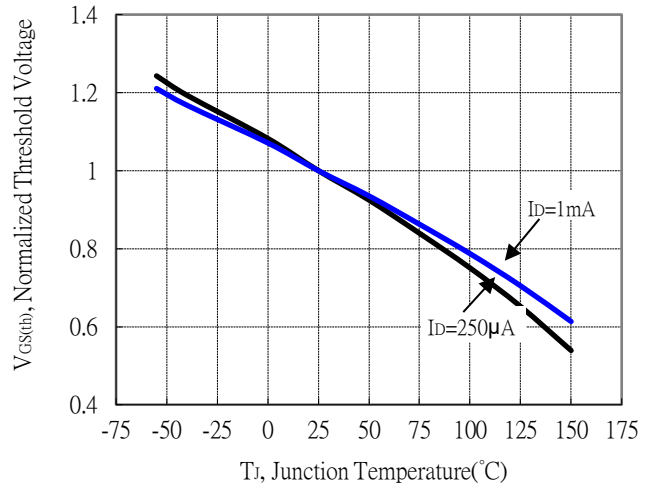


**Typical Characteristics (Cont.)**

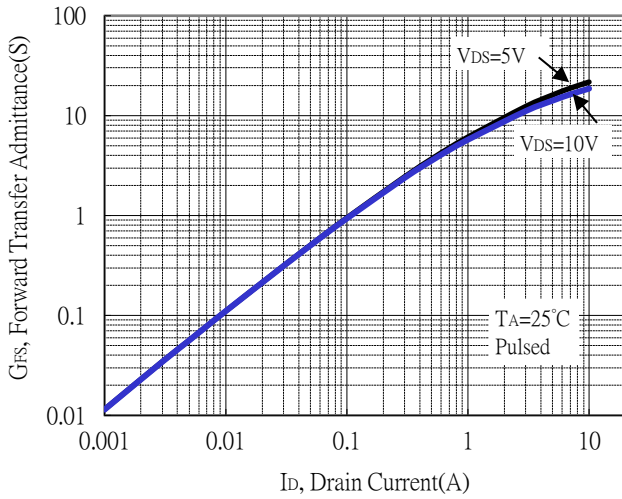
Capacitance vs Drain-to-Source Voltage



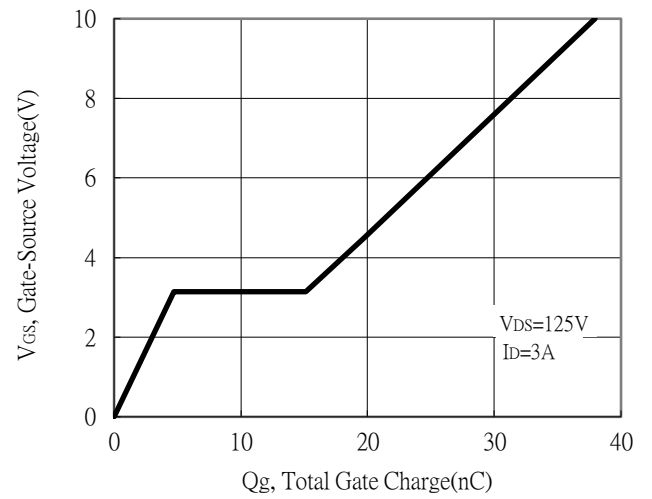
Threshold Voltage vs Junction Temperature



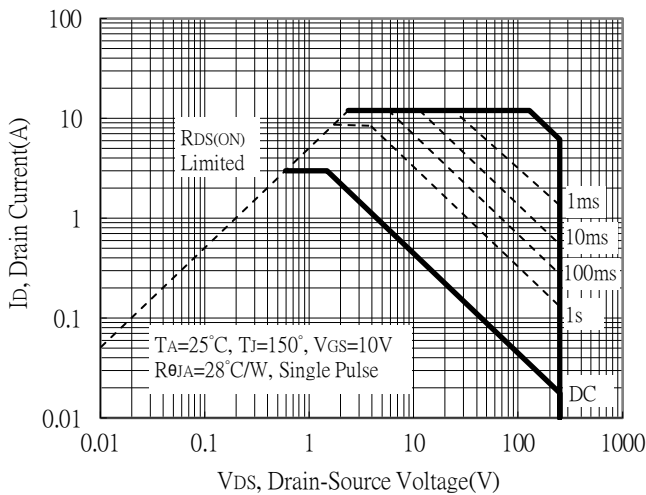
Forward Transfer Admittance vs Drain Current



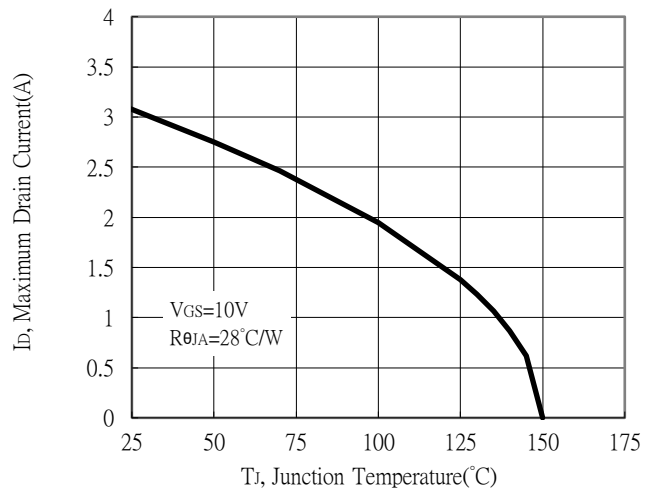
Gate Charge Characteristics



Maximum Safe Operating Area

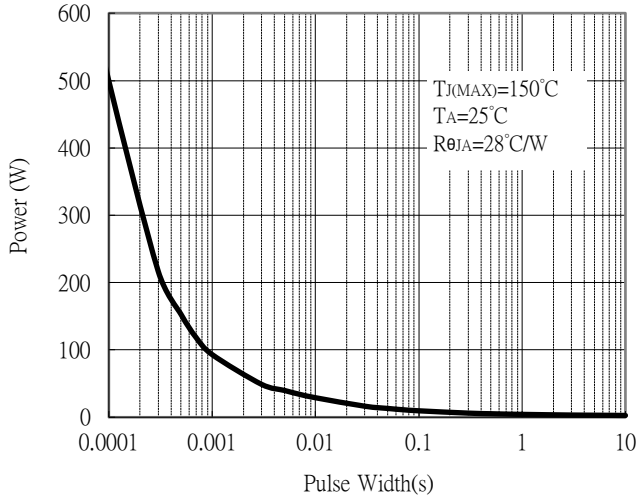


Maximum Drain Current vs Junction Temperature

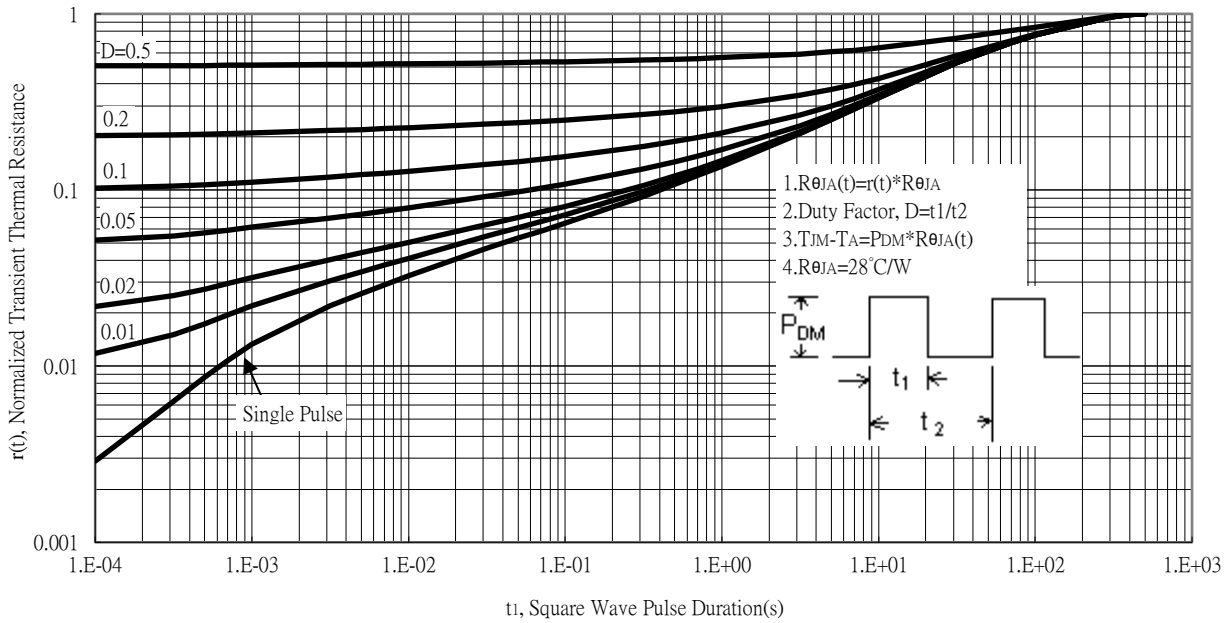


**Typical Characteristics (Cont.)**

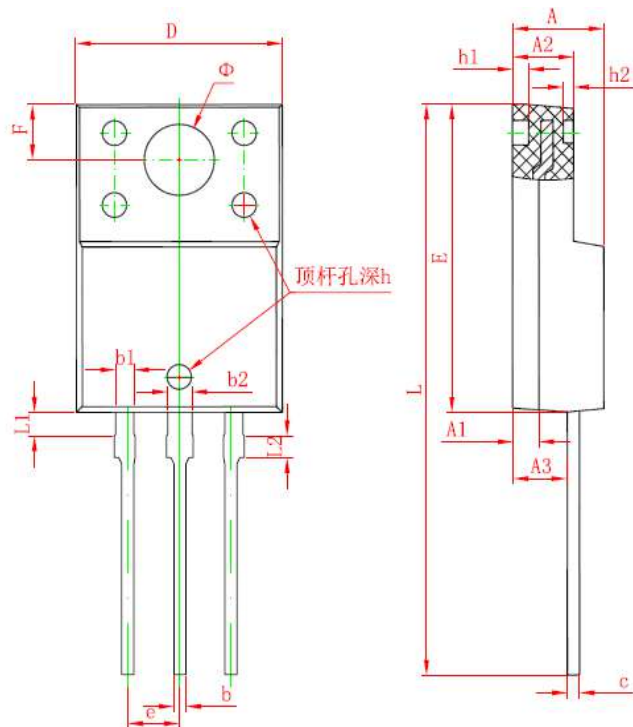
Single Pulse Power Rating, Junction to Case



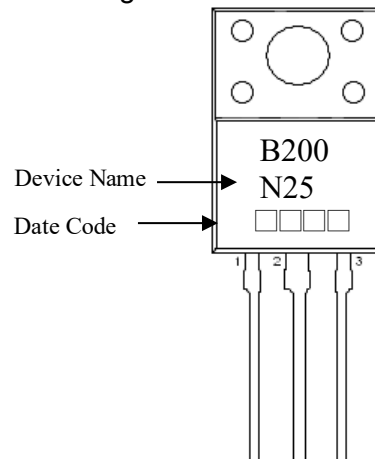
Transient Thermal Response Curves



**TO-220FP Dimension**



Marking:



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

Date Code(counting from left to right) :  
 1<sup>st</sup> code: year code, the last digit of Christian year  
 2<sup>nd</sup> code : month code, Jan→A, Feb→B, Mar→C, Apr→D,  
 May→E, Jun→F, Jul→G, Aug→H, Sep→J,  
 Oct→K, Nov→L, Dec→M  
 3<sup>rd</sup> and 4<sup>th</sup> codes : production serial number, 01~99

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.169	0.185	4.35	4.65	e	0.100 *		2.54*	
A1	0.051 REF		1.300 REF		F	0.106 REF		2.70 REF	
A2	0.112	0.124	2.85	3.15	Φ	0.138 REF		3.500 REF	
A3	0.102	0.110	2.60	2.80	h	0.000	0.012	0.000	0.300
b	0.020	0.030	0.50	0.75	h1	0.031 REF		0.800 REF	
b1	0.031	0.041	0.80	1.05	h2	0.020 REF		0.500 REF	
b2	0.043	0.053	1.100	1.350	L	1.102	1.118	28.00	28.40
c	0.020	0.030	0.500	0.750	L1	0.043	0.051	1.10	1.30
D	0.392	0.408	9.960	10.360	L2	0.036	0.043	0.92	1.08
E	0.583	0.598	14.80	15.20					