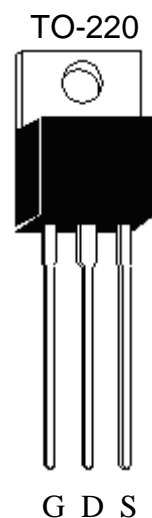


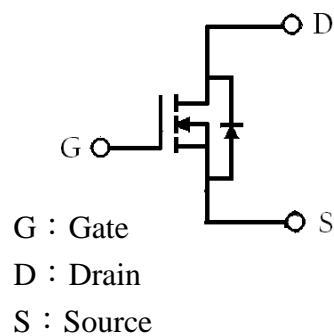
## N-Channel Enhancement Mode Power MOSFET

### Features:

- Simple Drive Requirement
- Fast Switching Characteristic
- RoHS compliant package



$BV_{DSS}$	60V
$I_D @ V_{GS}=10V$	120A
$R_{DS(on)(TYP)} @ V_{GS}=10V, I_D=20A$	2.6m $\Omega$
$R_{DS(on)(TYP)} @ V_{GS}=7V, I_D=20A$	2.8m $\Omega$



### Ordering Information

Device	Package	Shipping
KE2D4N06	TO-220 (Pb-free lead plating package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton

**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		$V_{GS}$	$\pm 30$	
Continuous Drain Current @ $T_C=25^{\circ}\text{C}$ (silicon limit)		$I_D$	200	A
Continuous Drain Current @ $T_C=100^{\circ}\text{C}$ (silicon limit)			141	
Continuous Drain Current @ $T_C=25^{\circ}\text{C}$ (package limit) (Note 1)			120	
Pulsed Drain Current (Note 3)		$I_{DM}$	480	
Continuous Drain Current @ $T_A=25^{\circ}\text{C}$ (Note 2)		$I_{DSM}$	15.4	
Continuous Drain Current @ $T_A=70^{\circ}\text{C}$ (Note 2)			12.3	
Avalanche Current (Note 3)		$I_{AS}$	30	
Avalanche Energy @ $L=100\mu\text{H}$ , $I_D=30\text{A}$ , $R_G=25\Omega$ (Note 2)		$E_{AS}$	45	mJ
Power Dissipation	$T_C=25^{\circ}\text{C}$ (Note 1)	$P_D$	330	W
	$T_C=100^{\circ}\text{C}$ (Note 1)		165	
Power Dissipation	$T_A=25^{\circ}\text{C}$ (Note 2)	$P_{DSM}$	2	W
	$T_A=70^{\circ}\text{C}$ (Note 2)		1.3	
Operating Junction and Storage Temperature		$T_j, T_{stg}$	-55~+175	$^{\circ}\text{C}$

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	0.45	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-ambient, max, (Note 2)	$R_{th,j-a}$	62.5	$^{\circ}\text{C}/\text{W}$

- Note : 1. The power dissipation  $P_D$  is based on  $T_{J(MAX)}=175^{\circ}\text{C}$ , 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, and the maximum temperature of  $175^{\circ}\text{C}$  may be used if the PCB allows it.
3. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=175^{\circ}\text{C}$ . Ratings are based on low frequency and low duty cycles to keep initial  $T_J=25^{\circ}\text{C}$ .
4. The maximum current limited by package is 60A.
5. The static characteristics are obtained using  $<300\mu\text{s}$  pulses, duty cycle 0.5% maximum.
6. The  $R_{\theta JA}$  is the sum of thermal resistance from junction to case  $R_{\theta JC}$  and case to ambient.

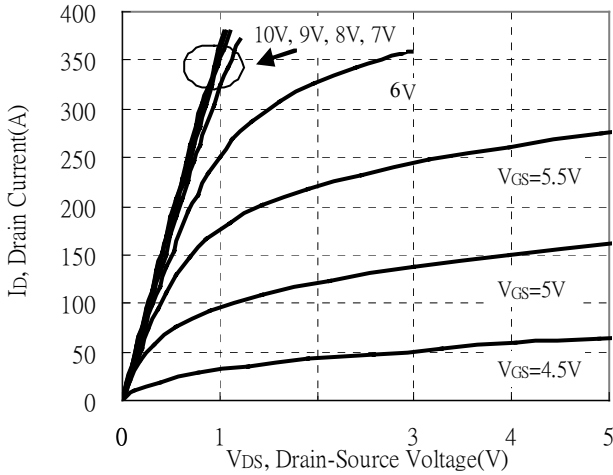
**Characteristics (T<sub>c</sub>=25°C, unless otherwise specified)**

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>	2.0	2.7	4.0		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA
G <sub>FS</sub>	-	56	-	S	V <sub>DS</sub> =5V, I <sub>D</sub> =15A
I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±30V
I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> =48V, 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>	-	2.6	3.5	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =20A
	-	2.8	4.0		V <sub>GS</sub> =7V, I <sub>D</sub> =20A
<b>Dynamic</b>					
*Q <sub>g</sub>	-	148	-	nC	I <sub>D</sub> =120A, V <sub>DS</sub> =30V, V <sub>GS</sub> =10V
*Q <sub>gs</sub>	-	34.3	-		
*Q <sub>gd</sub>	-	58.5	-		
*t <sub>d(ON)</sub>	-	32	-	ns	V <sub>DS</sub> =30V, I <sub>D</sub> =60A, V <sub>GS</sub> =10V, R <sub>G</sub> =4.7Ω
*t <sub>r</sub>	-	55	-		
*t <sub>d(OFF)</sub>	-	147	-		
*t <sub>f</sub>	-	143	-		
C <sub>iss</sub>	-	6674	-	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz
C <sub>oss</sub>	-	1241	-		
C <sub>rss</sub>	-	1137	-		
R <sub>g</sub>	-	1.9	-	Ω	f=1MHz
<b>Source-Drain Diode</b>					
*I <sub>S</sub>	-	-	120	A	
*I <sub>SM</sub>	-	-	480		
*V <sub>SD</sub>	-	0.65	0.9	V	I <sub>S</sub> =1A, V <sub>GS</sub> =0V
*t <sub>rr</sub>	-	70	-	ns	I <sub>F</sub> =120A, V <sub>GS</sub> =0V, dI/dt=100A/μs
*Q <sub>rr</sub>	-	150	-	nC	

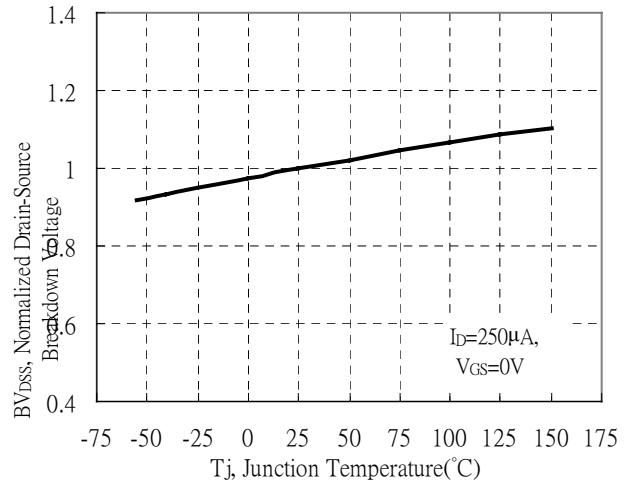
\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

## Typical Characteristics

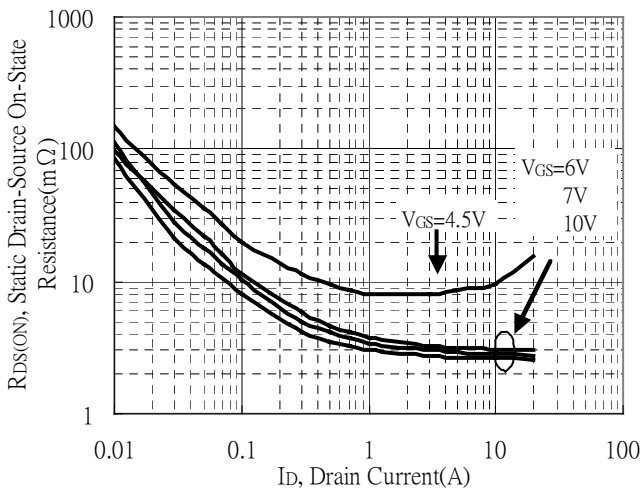
Typical Output Characteristics



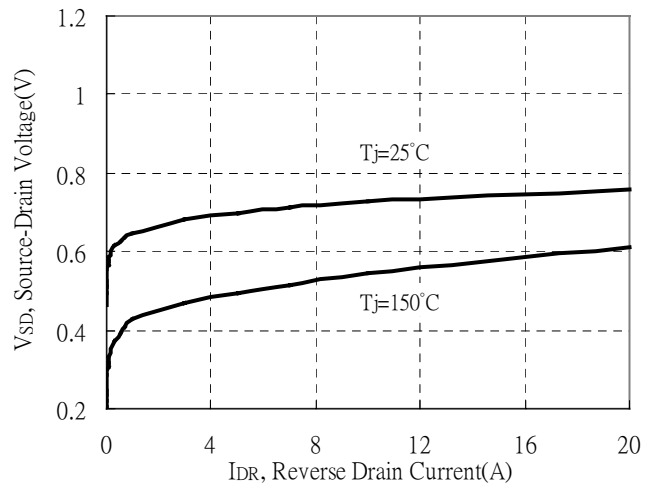
Brekdown Voltage vs Ambient Temperature



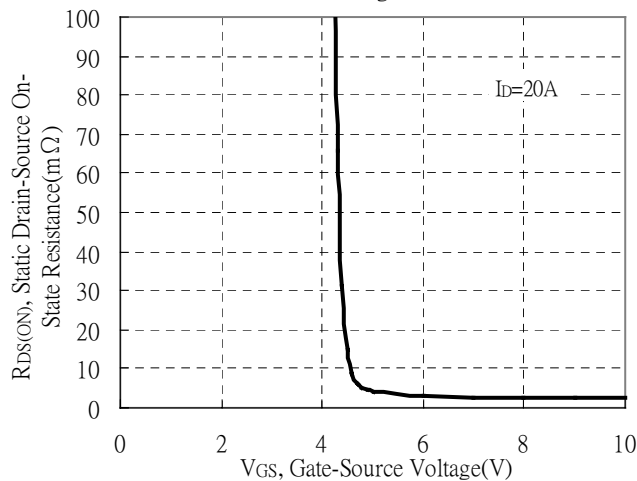
Static Drain-Source On-State resistance vs Drain Current



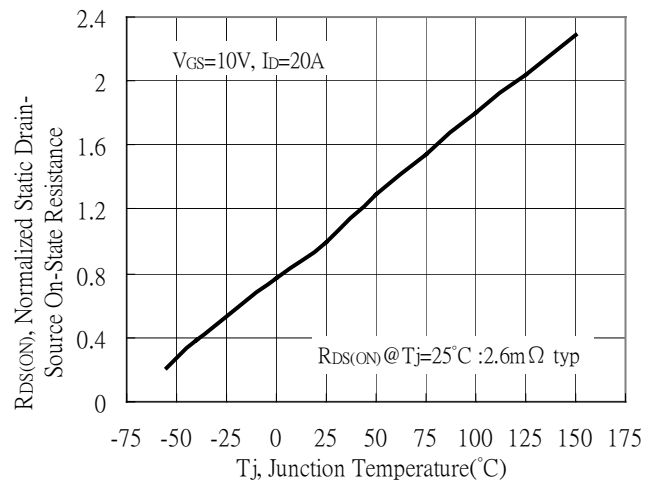
Reverse Drain Current vs Source-Drain Voltage



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

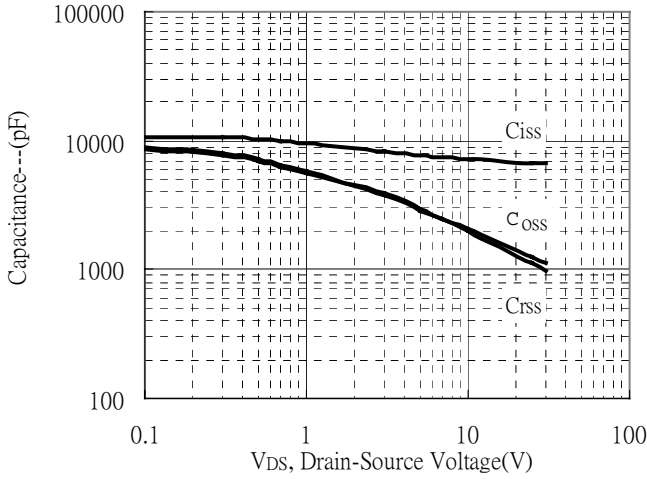


Drain-Source On-State Resistance vs Junction Temperature

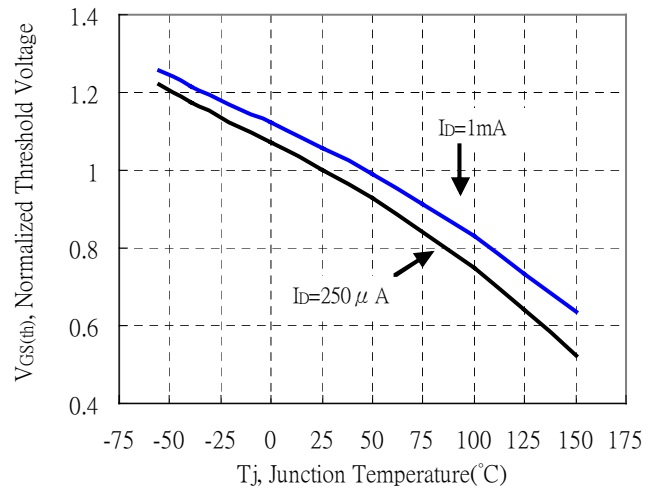


**Typical Characteristics(Cont.)**

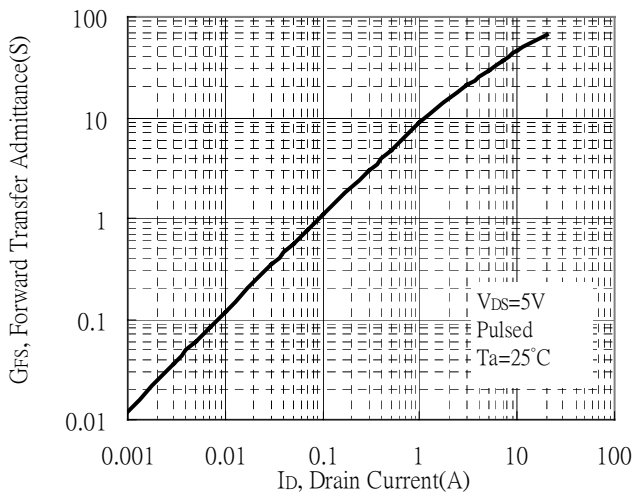
Capacitance vs Drain-to-Source Voltage



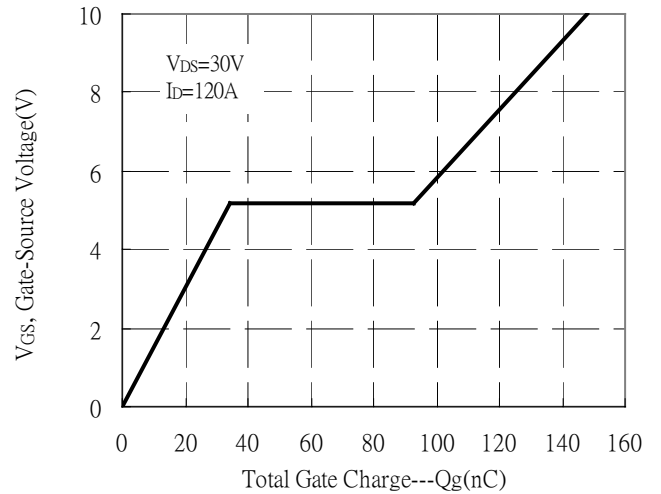
Normalized Threshold Voltage vs Junction Temperature



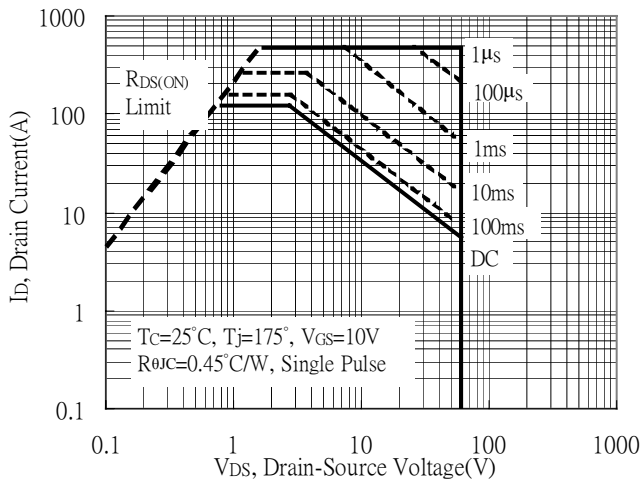
Forward Transfer Admittance vs Drain Current



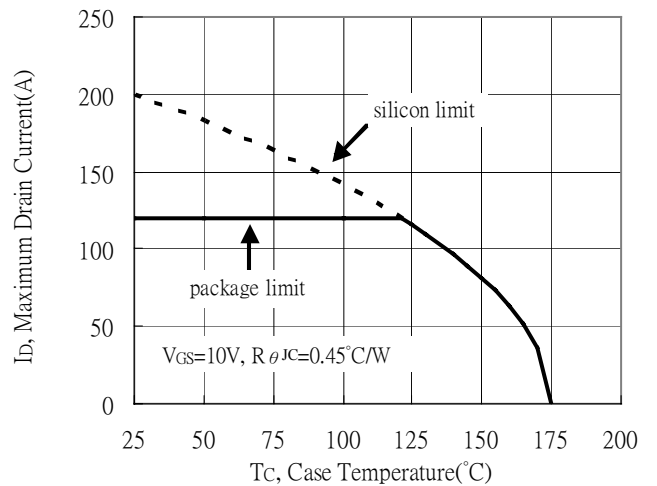
Gate Charge Characteristics



Maximum Safe Operating Area

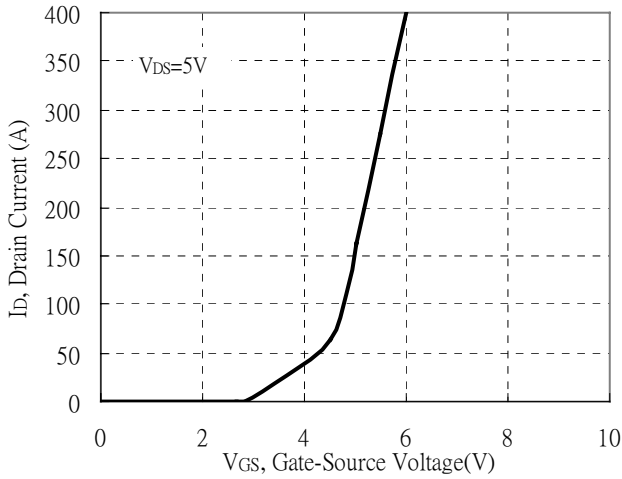


Maximum Drain Current vs Case Temperature

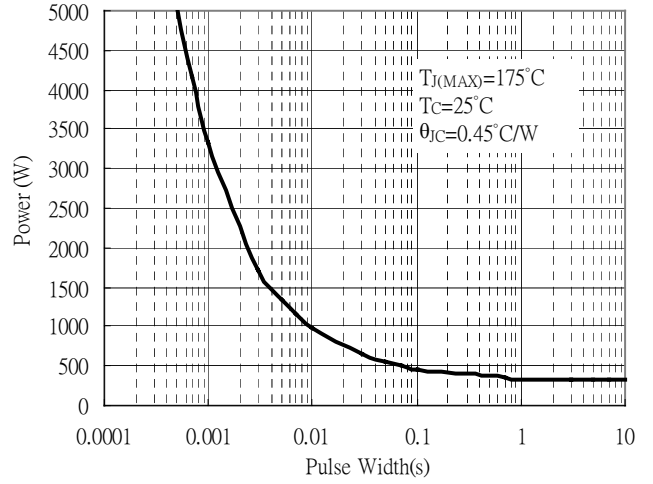


**Typical Characteristics(Cont.)**

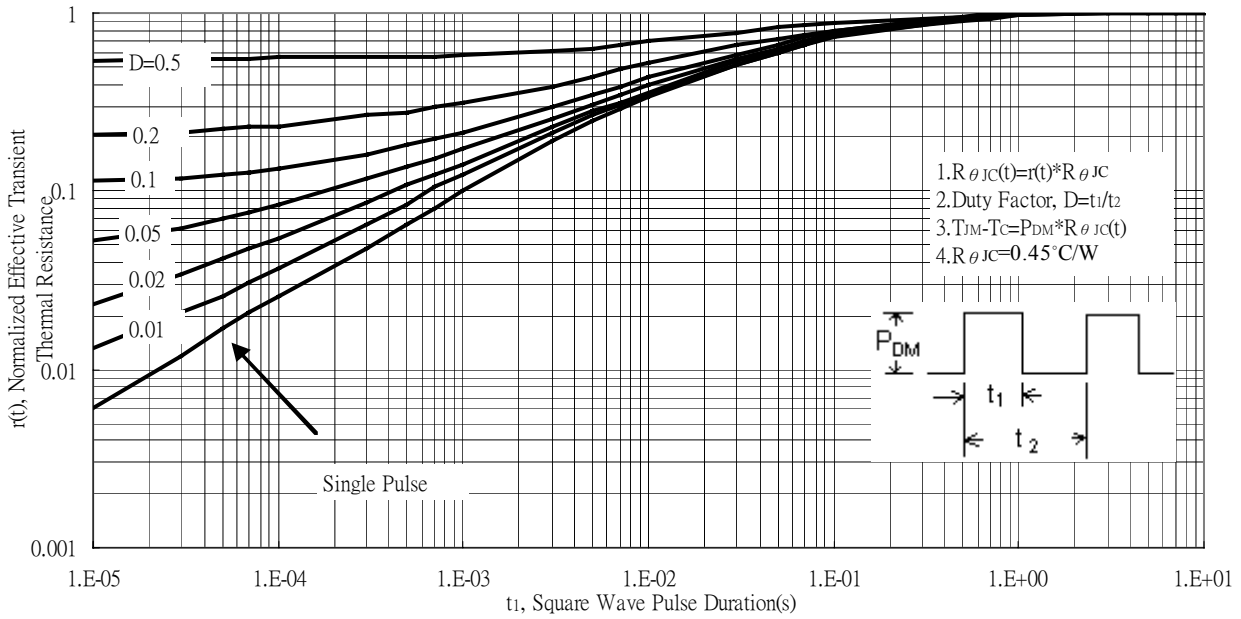
Typical Transfer Characteristics



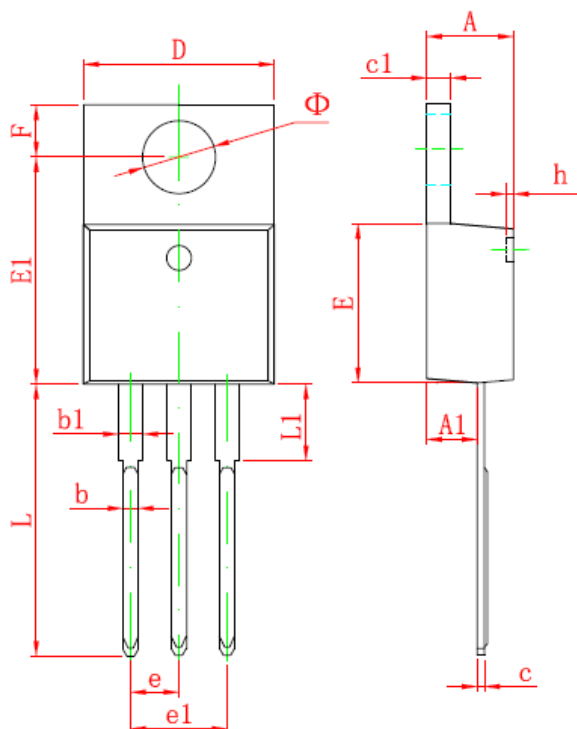
Single Pulse Maximum Power Dissipation



Transient Thermal Response Curves

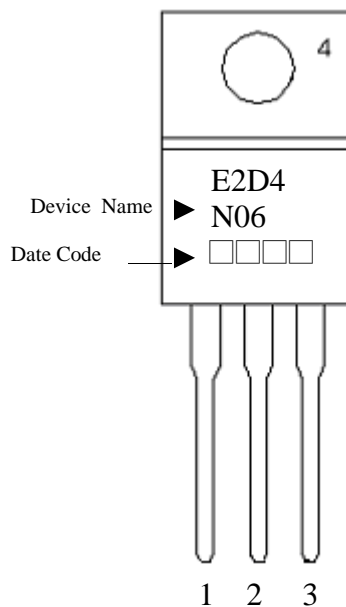


### TO-220 Dimension



3-Lead TO-220 Plastic Package

Marking:



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

\*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184	E1	12.060	12.460	0.475	0.491
A1	2.520	2.820	0.099	0.111	e	2.540*		0.100*	
b	0.710	0.910	0.028	0.036	e1	4.980	5.180	0.196	0.204
b1	1.170	1.370	0.046	0.054	F	2.590	2.890	0.102	0.114
c	0.310	0.530	0.012	0.021	h	0.000	0.300	0.000	0.012
c1	1.170	1.370	0.046	0.054	L	13.400	13.800	0.528	0.543
D	10.010	10.310	0.394	0.406	L1	3.560	3.960	0.140	0.156
E	8.500	8.900	0.335	0.350	Φ	3.735	3.935	0.147	0.155