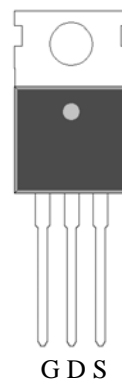


## N-Channel Enhancement Mode Power MOSFET

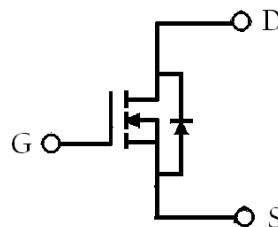
### Features:

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

TO-220



<b>B<sub>V</sub>D<sub>SS</sub></b>	<b>100V</b>
<b>I<sub>D</sub>@V<sub>GS</sub>=10V, T<sub>C</sub>=25°C</b>	<b>72A</b>
<b>I<sub>D</sub>@V<sub>GS</sub>=10V, T<sub>A</sub>=25°C</b>	<b>10.9A</b>
<b>R<sub>DS(ON)</sub>@V<sub>GS</sub>=10V, I<sub>D</sub>=20A</b>	<b>6.7 mΩ (typ)</b>



G : Gate D : Drain S : Source

### Ordering Information

Device	Package	Shipping
KEB9D0N10RE3	TO-220 (RoHS compliant)	50 pcs/tube, 20 tubes/box, 4 boxes / carton

### 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>	72	A
Continuous Drain Current @T <sub>C</sub> =100°C, V <sub>GS</sub> =10V (Note 1)		51	
Continuous Drain Current @T <sub>A</sub> =25°C, V <sub>GS</sub> =10V (Note 2)	I <sub>DSM</sub>	10.9	
Continuous Drain Current @T <sub>A</sub> =70°C, V <sub>GS</sub> =10V (Note 2)		8.7	
Pulsed Drain Current @ V <sub>GS</sub> =10V	I <sub>DM</sub>	266	
Avalanche Current @L=0.1mH	I <sub>AS</sub>	68	
Single Pulse Avalanche Energy @ L=1mH, I <sub>D</sub> =32 Amps, V <sub>DD</sub> =50V (Note 4)	E <sub>AS</sub>	512	mJ
Repetitive Avalanche Energy (Note 3)	E <sub>AR</sub>	10	W
Power Dissipation	T <sub>C</sub> =25°C (Note 1)	100	
	T <sub>C</sub> =100°C (Note 1)	50	
	T <sub>A</sub> =25°C (Note 2)	2.1	
	T <sub>A</sub> =70°C (Note 2)	1.3	
Maximum Temperature for Soldering @ Lead at 0.063 in(1.6mm) from case for 10 seconds	T <sub>L</sub>	300	°C
Maximum Temperature for Soldering @ Package Body for 10 seconds	T <sub>PKG</sub>	260	
Operating Junction and Storage Temperature	T <sub>J</sub> , T <sub>stg</sub>	-55~+175	

\*Drain current limited by maximum junction temperature

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R <sub>θJC</sub>	1.5	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	R <sub>θJA</sub>	60	

- 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>DSM</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, and the maximum temperature of 175°C may be used if the PCB allows it.
  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. 100% tested by condition of V<sub>DD</sub>=50V, I<sub>D</sub>=20A, L=0.5mH, V<sub>GS</sub>=10V.

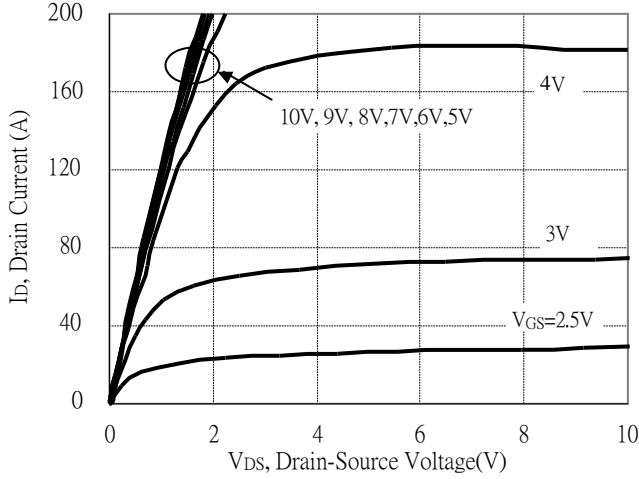
**Characteristics (T<sub>j</sub>=25°C, unless otherwise specified)**

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>	-	28.9	-	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>	-	6.7	9.4	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> =20A
	-	7.9	12		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =20A
<b>Dynamic</b>					
*Q <sub>g</sub>	-	75.7	-	nC	V <sub>DD</sub> =50V, I <sub>D</sub> =13A, V <sub>GS</sub> =10V
*Q <sub>gs</sub>	-	9.3	-		
*Q <sub>gd</sub>	-	17.2	-		
*t <sub>d(ON)</sub>	-	20	-	ns	V <sub>DD</sub> =50V, I <sub>D</sub> =13A, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω
*t <sub>r</sub>	-	27	-		
*t <sub>d(OFF)</sub>	-	103	-		
*t <sub>f</sub>	-	29.8	-		
C <sub>iss</sub>	-	3519	-	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz
C <sub>oss</sub>	-	274	-		
C <sub>rss</sub>	-	16	-		
<b>Source-Drain Diode</b>					
*I <sub>S</sub>	-	-	72	A	
*I <sub>SM</sub>	-	-	266		
*V <sub>SD</sub>	-	0.84	1.2	V	I <sub>S</sub> =20A, V <sub>GS</sub> =0V
*t <sub>rr</sub>	-	39.5	-	ns	V <sub>GS</sub> =0V, I <sub>F</sub> =13A, dI <sub>F</sub> /dt=100A/μs
*Q <sub>rr</sub>	-	51.5	-	nC	

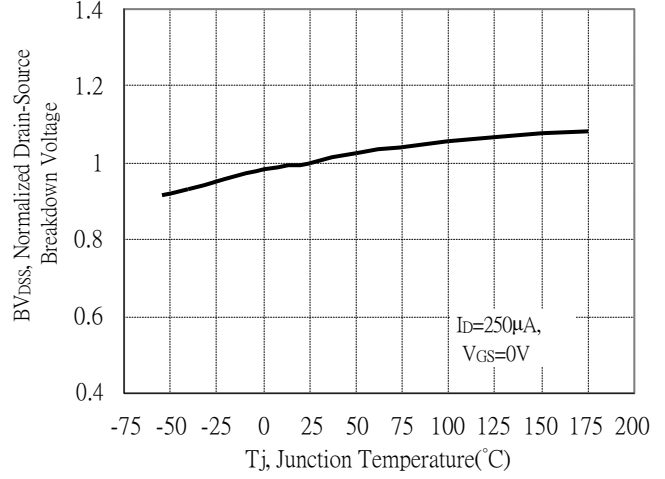
\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

## Typical Characteristics

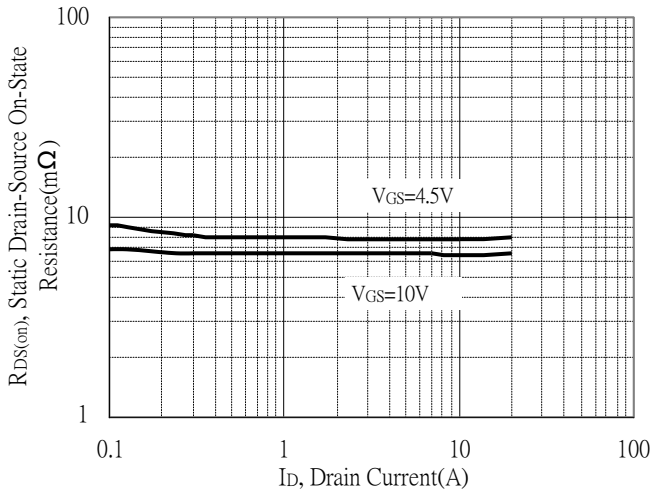
Typical Output Characteristics



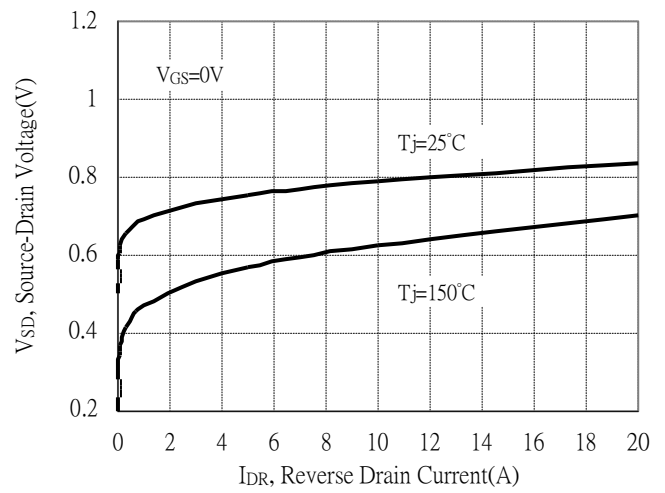
Brekdown Voltage vs Ambient Temperature



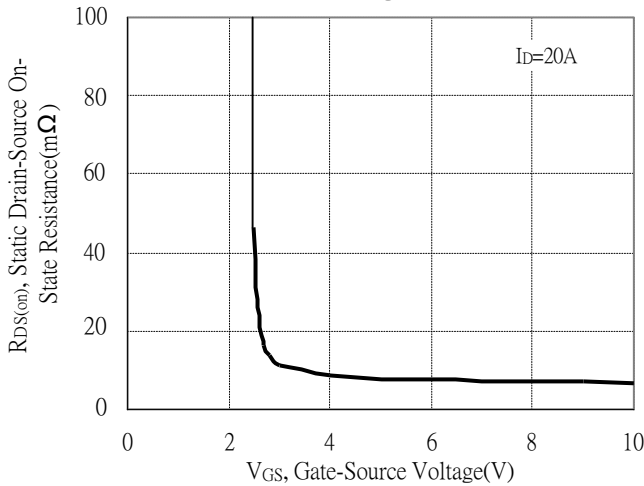
Static Drain-Source On-State resistance vs Drain Current



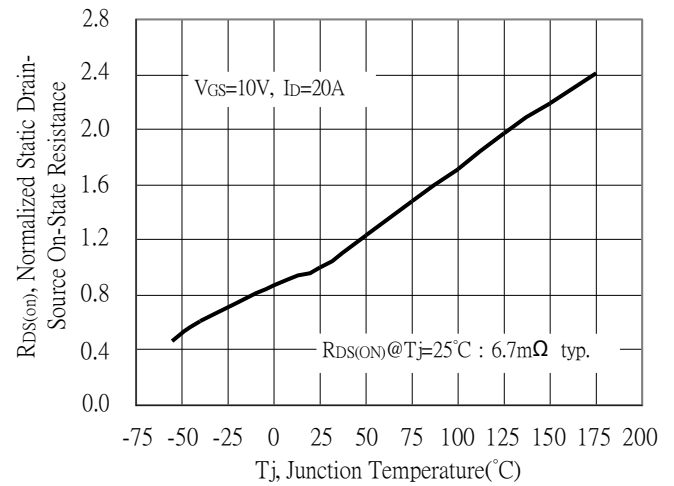
Reverse Drain Current vs Source-Drain Voltage



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

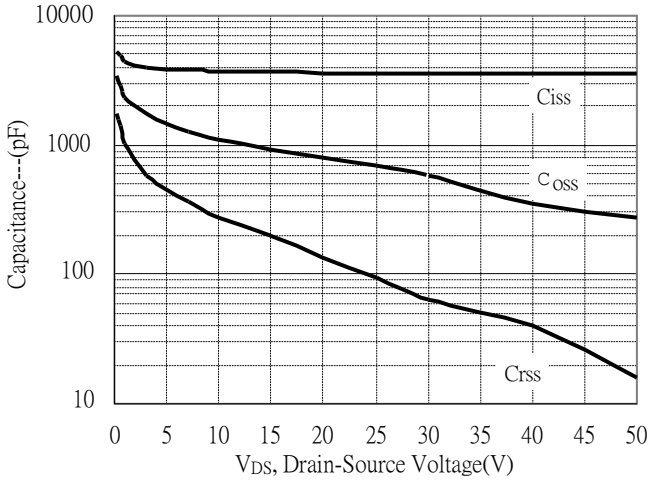


Drain-Source On-State Resistance vs Junction Temperature

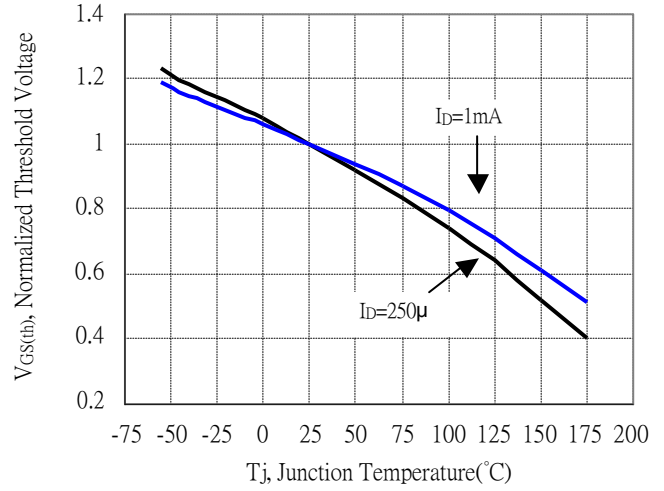


**Typical Characteristics(Cont.)**

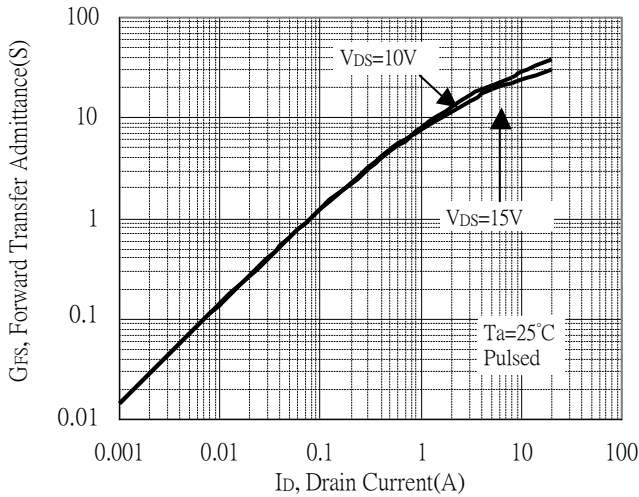
Capacitance vs Drain-to-Source Voltage



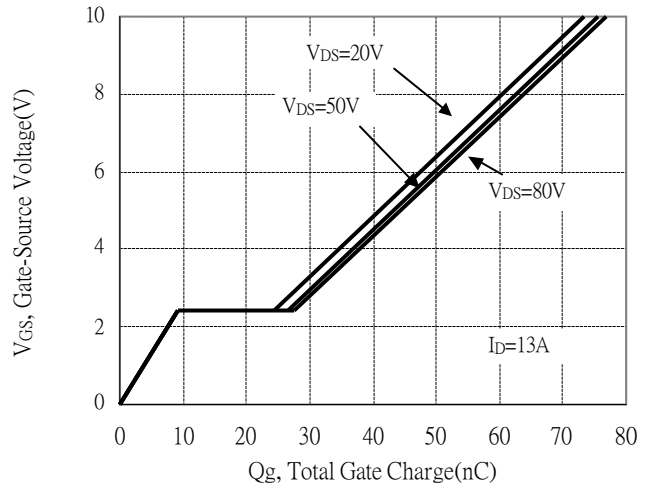
Threshold Voltage vs Junction Temperature



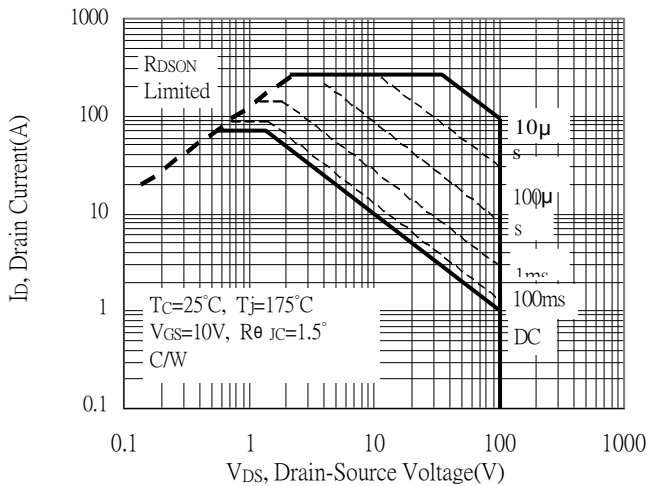
Forward Transfer Admittance vs Drain Current



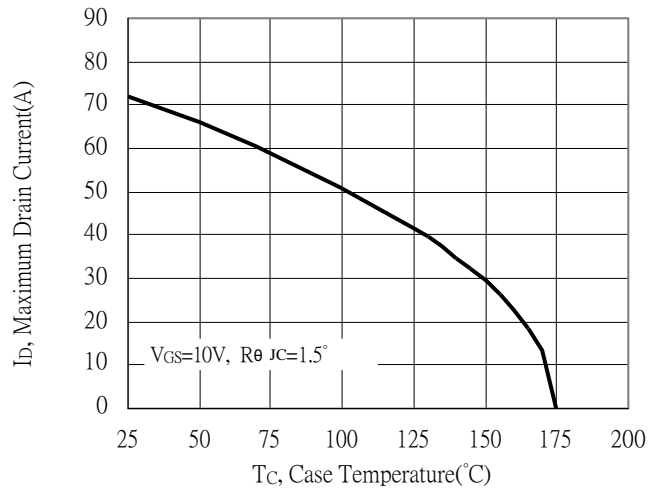
Gate Charge Characteristics



Maximum Safe Operating Area

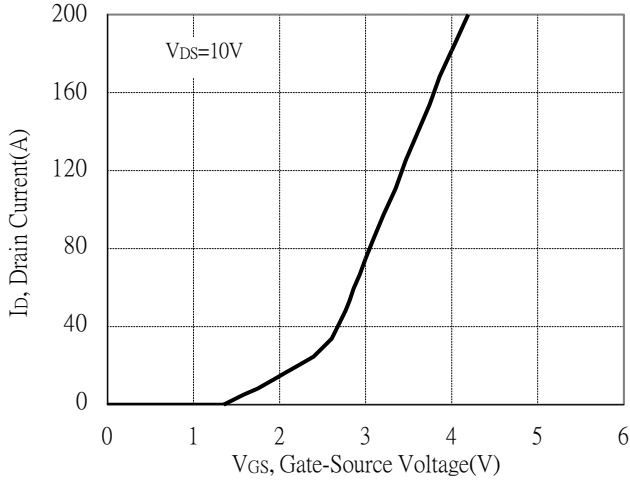


Maximum Drain Current vs Case Temperature

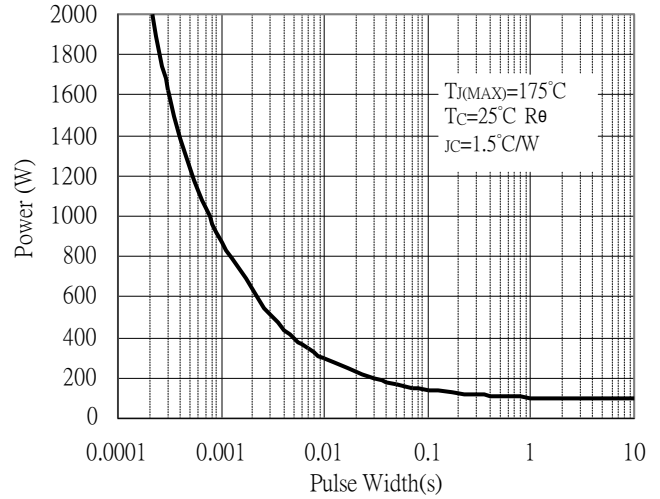


**Typical Characteristics(Cont.)**

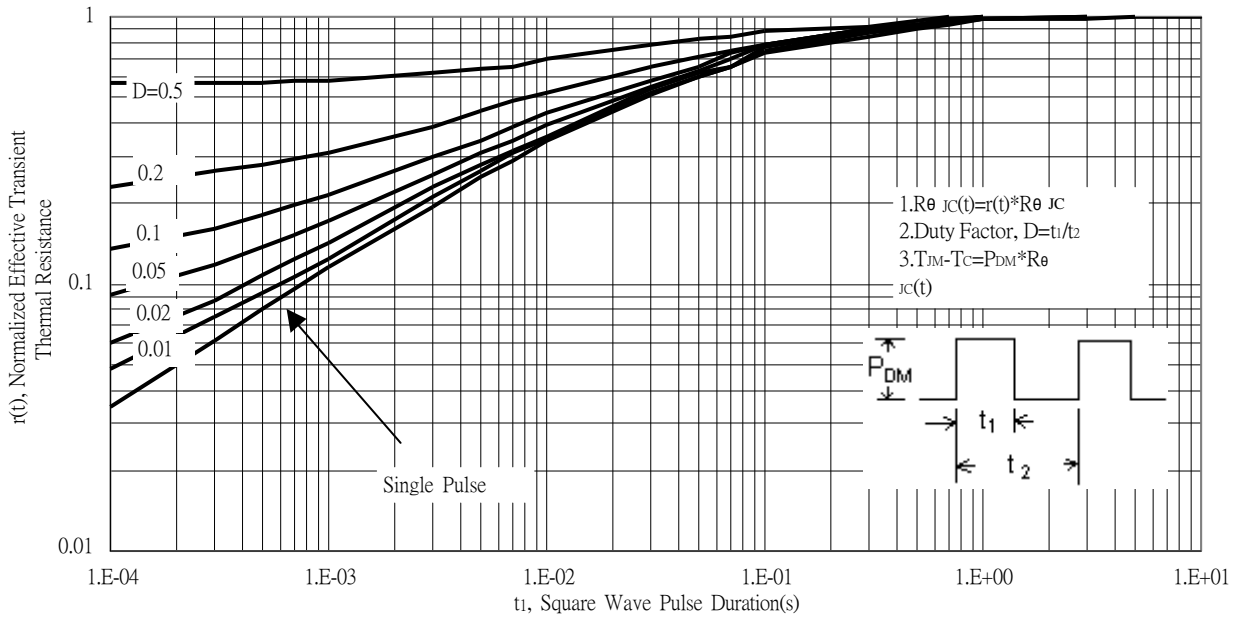
Typical Transfer Characteristics



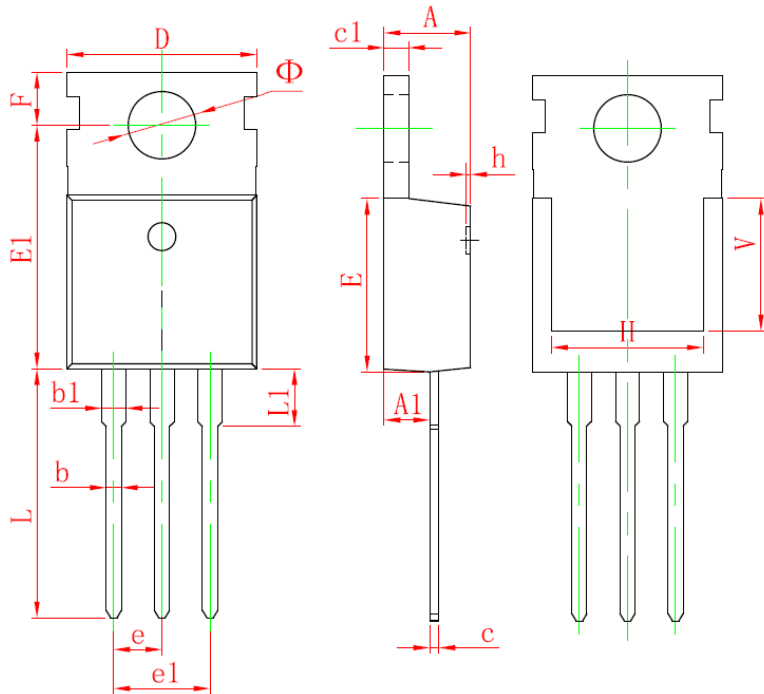
Single Pulse Power Rating, Junction to Case



Transient Thermal Response Curves

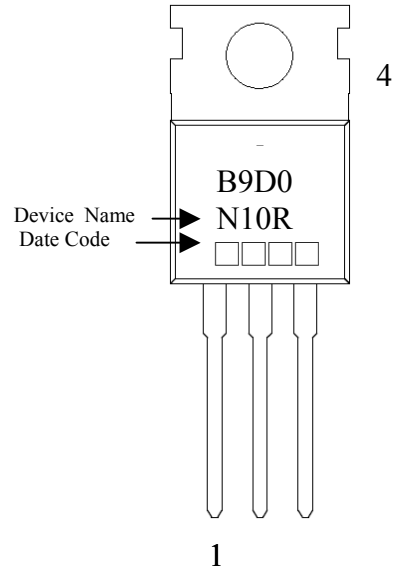


**TO-220 Dimension**



3-Lead TO-220 Plastic Package  
 Code: E3

Marking:



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

\*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181	e	2.540*		0.100*	
A1	2.250	2.550	0.089	0.100	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	F	2.650	2.950	0.104	0.116
b1	1.170	1.370	0.046	0.054	H	7.900	8.100	0.311	0.319
c	0.330	0.650	0.013	0.026	h	0.000	0.300	0.000	0.012
c1	1.200	1.400	0.047	0.055	L	12.900	13.400	0.508	0.528
D	9.910	10.250	0.390	0.404	L1	2.850	3.250	0.112	0.128
E	8.950	9.750	0.352	0.384	V	7/500	REF	0.295	REF
E1	12.650	12.950	0.498	0.510	Φ	3.400	3.800	0.134	0.150