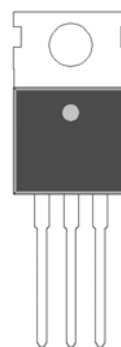


N-Channel Enhancement Mode Power MOSFET

Features:

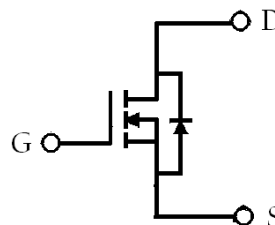
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

TO-220



G D S

BV_{DSS}	80V
I_D@V_{GS}=10V, T_C=25°C	58A
I_D@V_{GS}=10V, T_A=25°C	9.4A
R_{S(ON)}@V_{GS}=10V, I_D=20A	9.5 mΩ (typ)



G : Gate D : Drain S : Source

Ordering Information

Device	Package	Shipping
KE013N08	TO-220 (RoHS compliant)	50 pcs/tube, 20 tubes/box, 4 boxes / carton

Absolute Maximum Ratings (T_C=25°C)

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage (Note 1)	V _{DS}	80	V	
Gate-Source Voltage	V _{GS}	±20		
Continuous Drain Current @T _C =25°C, V _{GS} =10V(silicon limit) (Note 5)	I _D	70	A	
Continuous Drain Current @T _C =25°C, V _{GS} =10V(package limit) (Note 5)		58		
Continuous Drain Current @T _C =100°C, V _{GS} =10V (Note 1)		49.6		
Continuous Drain Current @T _A =25°C, V _{GS} =10V (Note 2)	I _{DSM}	9.4		
Continuous Drain Current @T _A =70°C, V _{GS} =10V (Note 2)		7.5		
Pulsed Drain Current	I _{DM}	232		
Single Pulse Avalanche Current @ L=0.1mH	I _{AS}	40	mJ	
Single Pulse Avalanche Energy @ L=5mH, I _D =20 Amps, V _{DD} =30V (Note 4)	E _{AS}	1000		
Repetitive Avalanche Energy (Note 3)	E _{AR}	13.6		
Power Dissipation	T _C =25°C (Note 1)	P _D	136	W
	T _C =100°C (Note 1)		68	
	T _A =25°C (Note 2)	P _{DSM}	2.1	
	T _A =70°C (Note 2)		1.3	
Maximum Temperature for Soldering @ Lead at 0.063 in(1.6mm) from case for 10 seconds	T _L	300	°C	
Maximum Temperature for Soldering @ Package Body for 10 seconds	T _{PKG}	260		
Operating Junction and Storage Temperature	T _J , T _{stg}	-55~+175		

*Drain current limited by maximum junction temperature

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R _{θJC}	1.1	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	R _{θJA}	60	

- Note : 1. The power dissipation P_D is based on T_{J(MAX)}=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_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_{DSM} is based on R_{θJA} 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. Pulse width limited by junction temperature T_{J(MAX)}=175°C.
4. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C. 100% tested by conditions of V_{DD}=30V, I_D=20A, L=0.1mH, V_{GS}=10V.
5. Calculated continuous drain current based on maximum allowable junction temperature.
6. The static characteristics are obtained using <300μs pulses, duty cycle 0.5% maximum.
7. The R_{θJA} is the sum of thermal resistance from junction to case R_{θJC} and case to ambient.

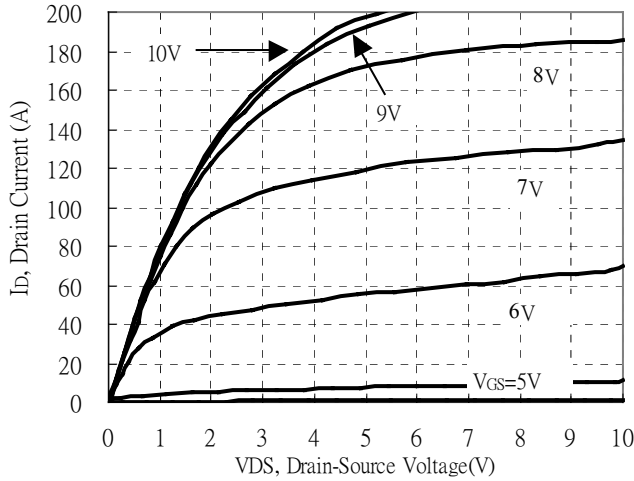
Characteristics (T_j=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	80	-	-	V	V _{GS} =0V, I _D =250μA
ΔBV _{DSS} /ΔT _j	-	68	-	mV/°C	Reference to 25°C, I _D =250μA
V _{GS(th)}	2	-	4	V	V _{DS} = V _{GS} , I _D =250μA
*G _{FS}	-	19	-	S	V _{DS} = 10V, I _D =20A
I _{GSS}	-	-	±100	nA	V _{GS} =±20V
I _{DSS}	-	-	1	μA	V _{DS} = 64V, V _{GS} = 0V
	-	-	5		V _{DS} = 64V, V _{GS} = 0V, T _j =55°C
*R _{DS(ON)}	-	9.5	12	mΩ	V _{GS} = 10V, I _D =20A
Dynamic					
*Q _g	-	34.4	-	nC	V _{DS} =40V, V _{GS} =10V, I _D =58A
*Q _{gs}	-	5.7	-		
*Q _{gd}	-	15.6	-		
*t _{d(ON)}	-	18	-	ns	V _{DS} =40V, I _D =58A, V _{GS} =10V, R _{GS} =10Ω
*t _r	-	34.8	-		
*t _{d(OFF)}	-	46.6	-		
*t _f	-	23	-		
C _{iss}	-	1483	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	-	221	-		
C _{rss}	-	105	-		
R _g	-	3.8	-	Ω	f=1MHz
Source-Drain Diode					
*I _s	-	-	58	A	
*I _{SM}	-	-	232		
*V _{SD}	-	0.73	1.1	V	I _s =2.8A, V _{GS} =0V
*t _{rr}	-	21	-	ns	V _{GS} =0V, I _F =58A, dI _F /dt=100A/μs
*Q _{rr}	-	20	-	nC	

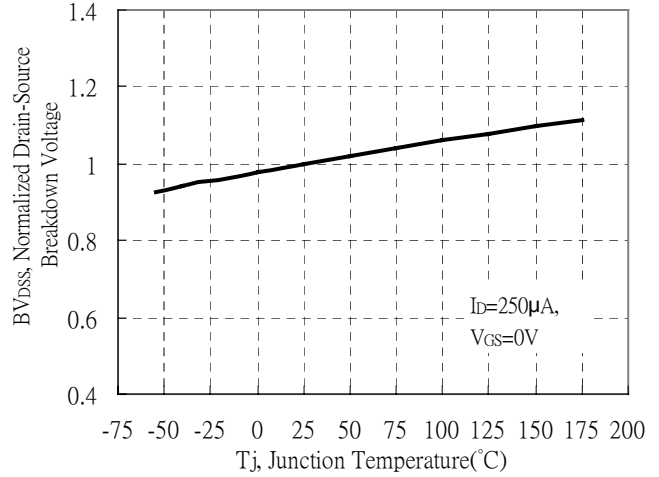
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

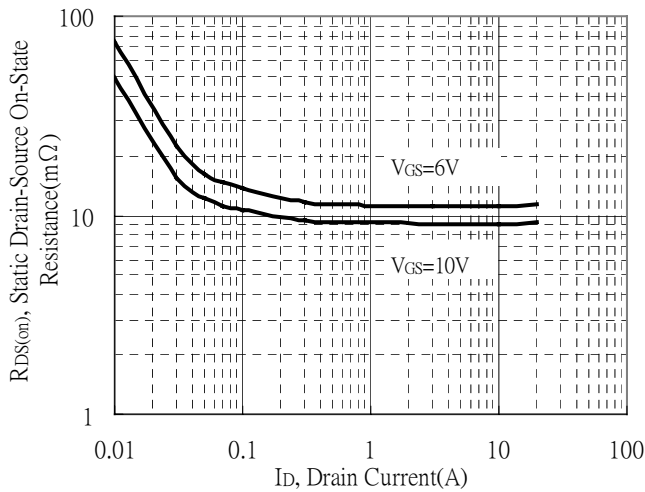
Typical Output Characteristics



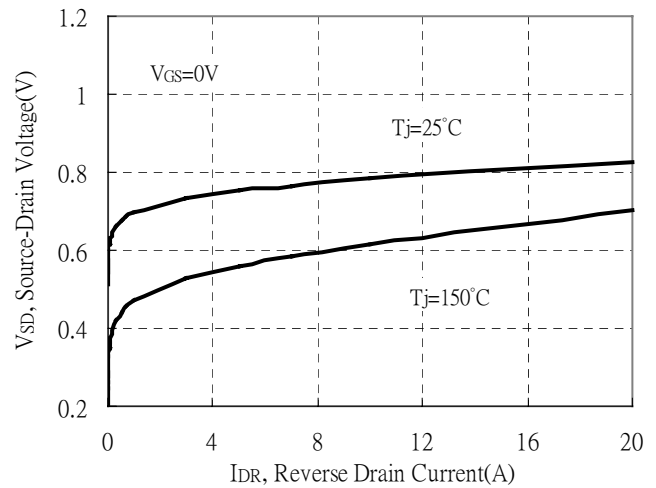
Brekdown Voltage vs Junction Temperature



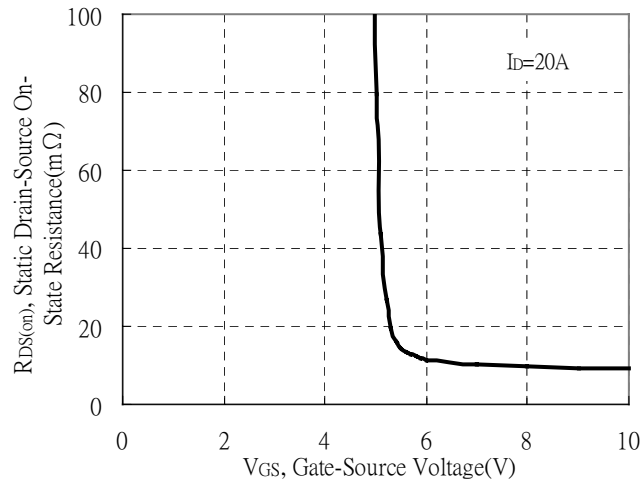
Static Drain-Source On-State resistance vs Drain Current



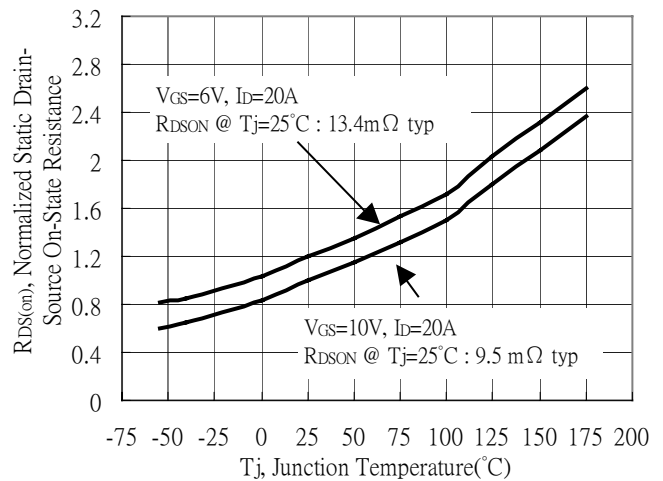
Reverse Drain Current vs Source-Drain Voltage



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

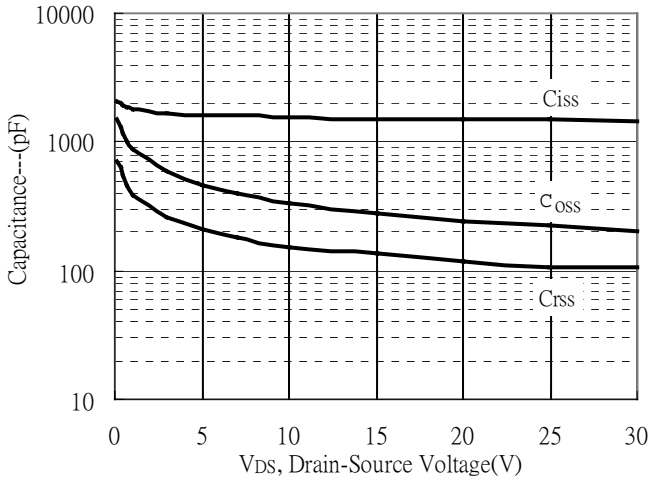


Drain-Source On-State Resistance vs Junction Temperature

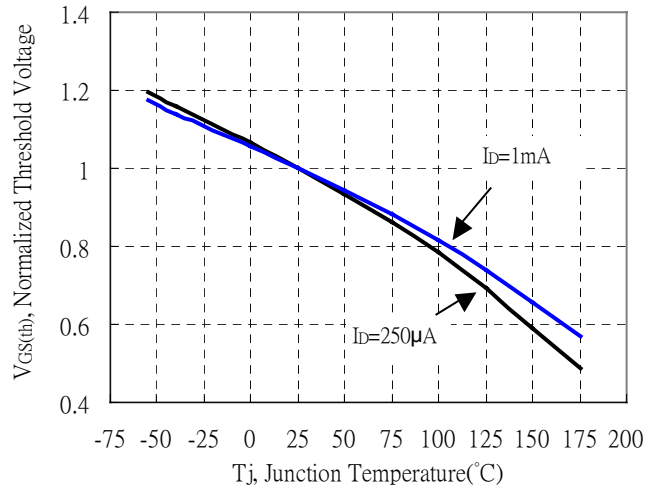


Typical Characteristics(Cont.)

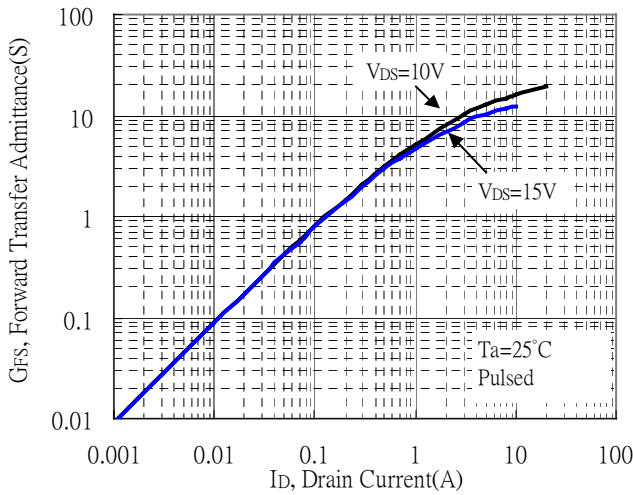
Capacitance vs Drain-to-Source Voltage



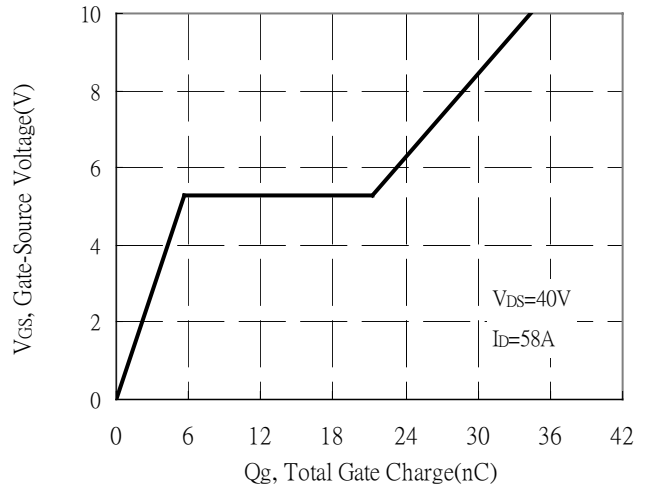
Threshold Voltage vs Junction Temperature



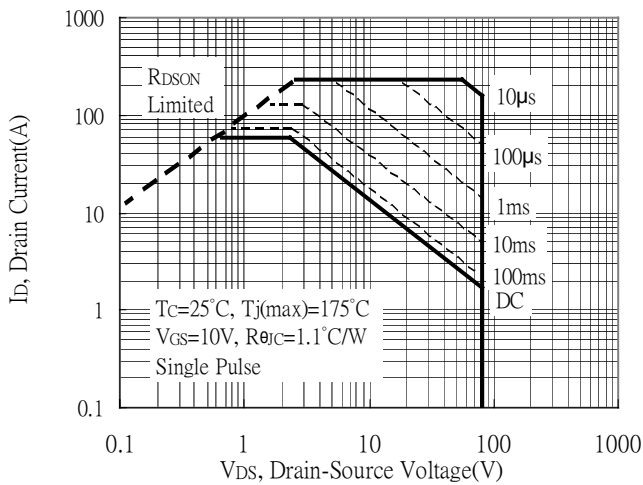
Forward Transfer Admittance vs Drain Current



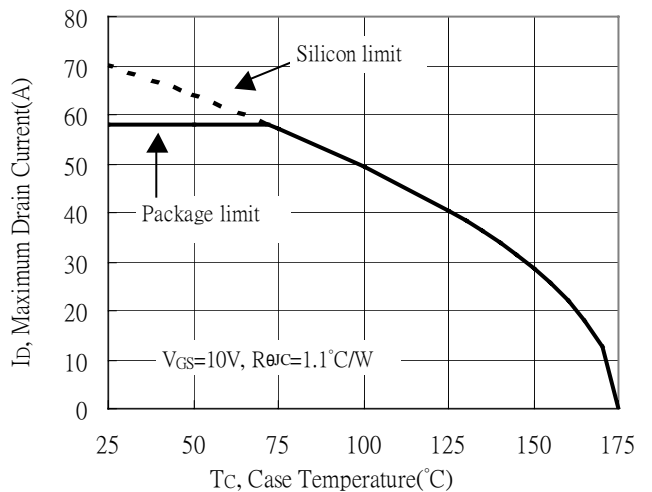
Gate Charge Characteristics



Maximum Safe Operating Area

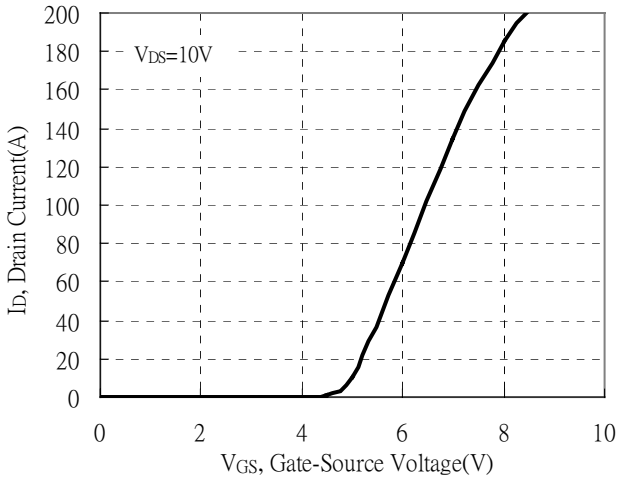


Maximum Drain Current vs Case Temperature

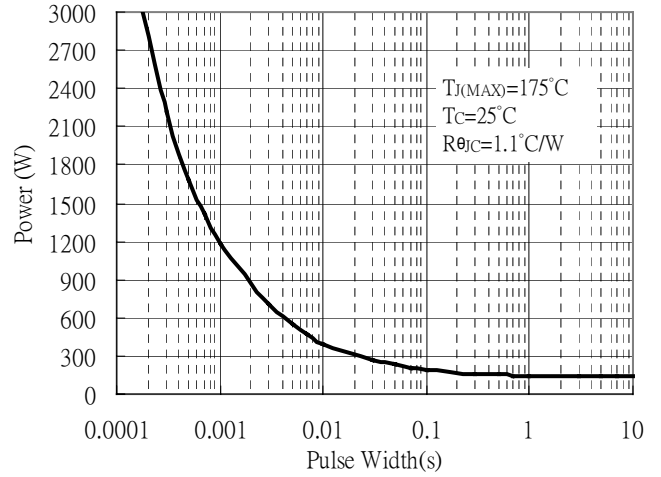


Typical Characteristics(Cont.)

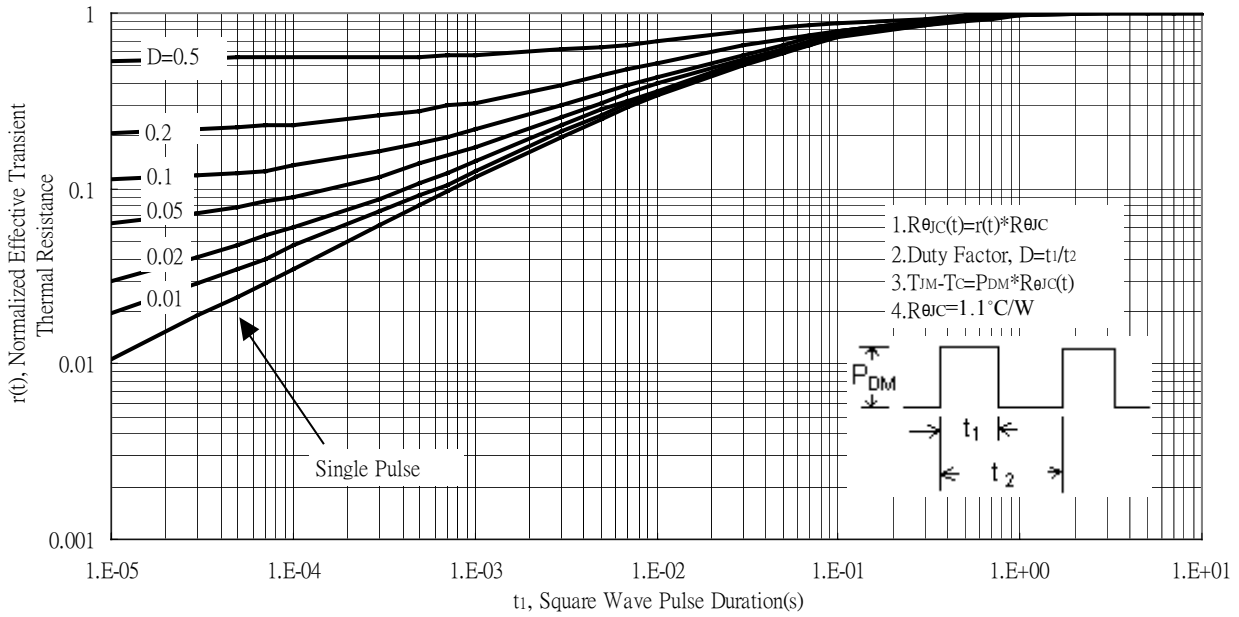
Typical Transfer Characteristics



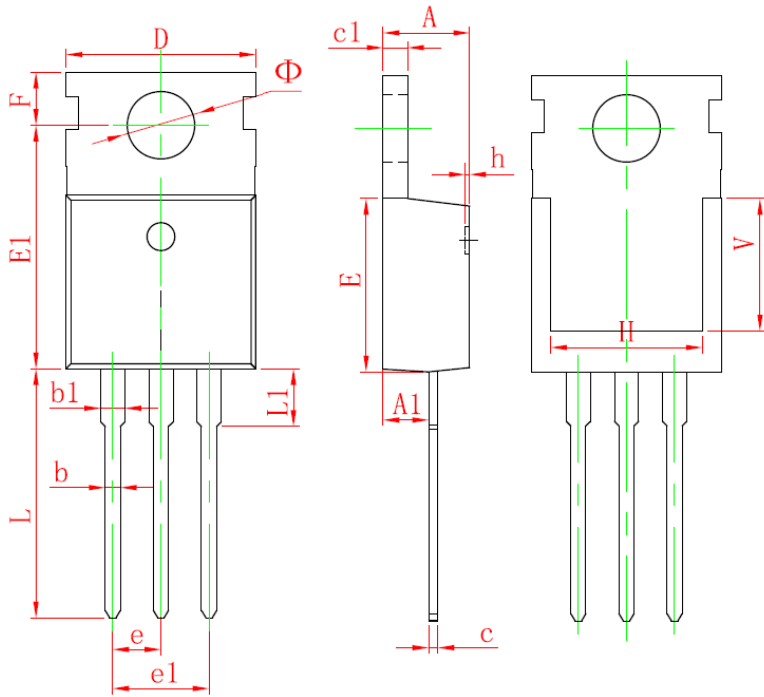
Single Pulse Power Rating, Junction to Case



Transient Thermal Response Curves

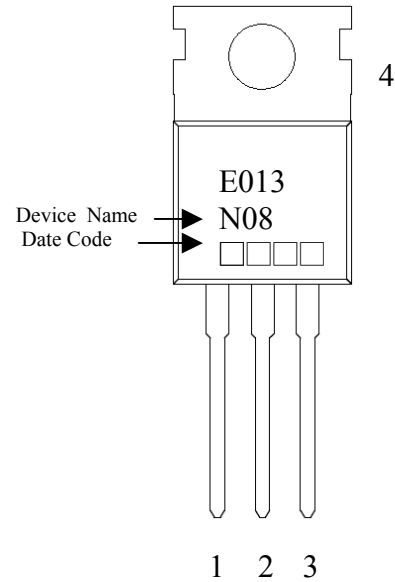


TO-220 Dimension



3-Lead TO-220 Plastic Package

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	4.400	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