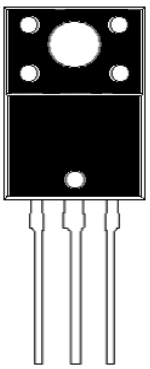
N-Channel Enhancement Mode Power MOSFET

Features:

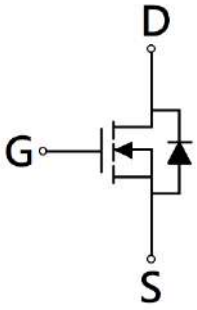
- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic

TO-220FP



G D S

BV_{DSS}	60V
I_D@V_{GS}=10V, T_C=25°C	56A
I_D@V_{GS}=10V, T_A=25°C	14A
$R_{DS(ON)\ typ.}$ @ V_{GS}=10V, I_D=20A	5.3mΩ



G : Gate S : Source D : Drain

Ordering Information

Device	Package	Shipping
KE4D5N06RP	TO-220FP (RoHS compliant)	50 pcs/tube, 20 tubes/box, 5 boxes / carton

Absolute Maximum Ratings (T_A=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ V_{GS}=10V, T_C=25°C (silicon limit)	*a	I_D	64	A
Continuous Drain Current @ V_{GS}=10V, T_C=25°C (package limit)	*a		56	
Continuous Drain Current @ V_{GS}=10V, T_C=100°C	*a		40	
Continuous Drain Current @ V_{GS}=10V, T_A=25°C	*b		14	
Continuous Drain Current @ V_{GS}=10V, T_A=70°C	*b		11	
Pulsed Drain Current	*c	I_{DM}	256	
Continuous Body Diode Forward Current @ T_C=25°C	*a	I_S	35	
Avalanche Current @ L=0.1mH		I_{AS}	33	
Avalanche Energy @ L=0.5mH		E_{AS}	81	mJ
Total Power Dissipation	T_C=25°C *a	P_D	42	W
	T_C=100°C *a		17	
	T_A=25°C *b		2	
	T_A=70°C *b		1.3	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	°C

Thermal Data

Parameter		Symbol	Steady State	Unit
Thermal Resistance, Junction-to-case		$R_{\theta JC}$	3	°C/W
Thermal Resistance, Junction-to-ambient	*b	$R_{\theta JA}$	62.5	

Note:

*a. The power dissipation P_D is based on $T_{J(MAX)}$=150℃, 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 $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR -4 board with 2 oz. copper, in a still air environment with T_A=25℃. The power dissipation P_D is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

*c. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150℃. Ratings are based on low frequency and low duty cycles to keep initial T_J=25℃.

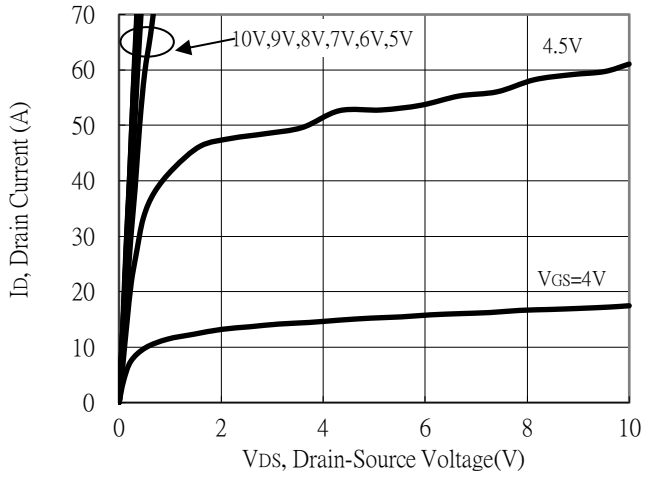
Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	2	-	4.5		V_{DS}=V_{GS}, I_D=250μA
G_{FS}	-	22	-	S	V_{DS}=10V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=48V, V_{GS}=0V
$R_{DS(ON)}$	-	5.3	7	mΩ	V_{GS}=10V, I_D=20A
Dynamic					
Ciss	-	2500	-	pF	V_{DS}=30V, V_{GS}=0V, f=1MHz
Coss	-	522	-		
Crss	-	42	-		
Rg	-	1.3	-	Ω	f=1MHz
Qg *1, 2	-	36	-	nC	V_{DS}=30V, I_D=20A, V_{GS}=10V
Qgs *1, 2	-	14	-		
Qgd *1, 2	-	7	-		
$t_{d(ON)}$ *1, 2	-	26	-	ns	V_{DS}=30V, I_D=20A, V_{GS}=10V, R_{GS}=1Ω
tr *1, 2	-	18	-		
$t_{d(OFF)}$ *1, 2	-	37	-		
t_f *1, 2	-	11	-		
Source-Drain Diode					
V_{SD} *1	-	0.9	1.2	V	I_S=20A, V_{GS}=0V
trr	-	32	-	ns	I_F=20A, dI_F/dt=100A/μs
Qrr	-	24	-	nC	

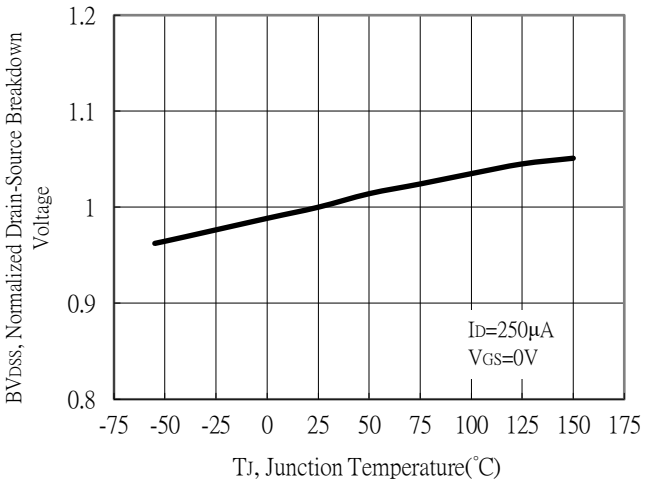
Note:
*1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2. Independent of operating temperature

Typical Characteristics

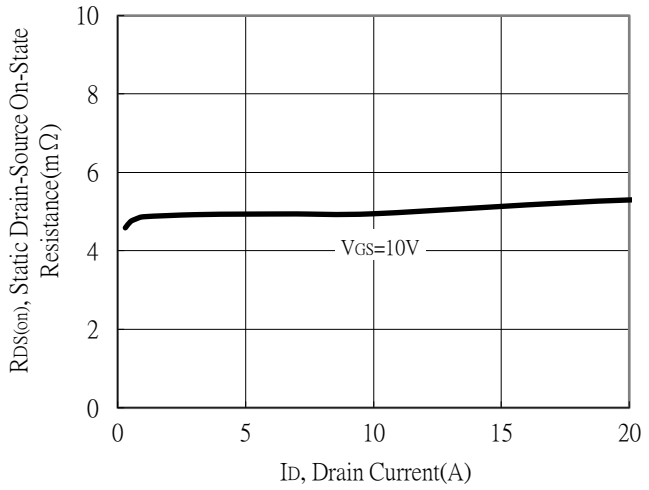
Typical Output Characteristics



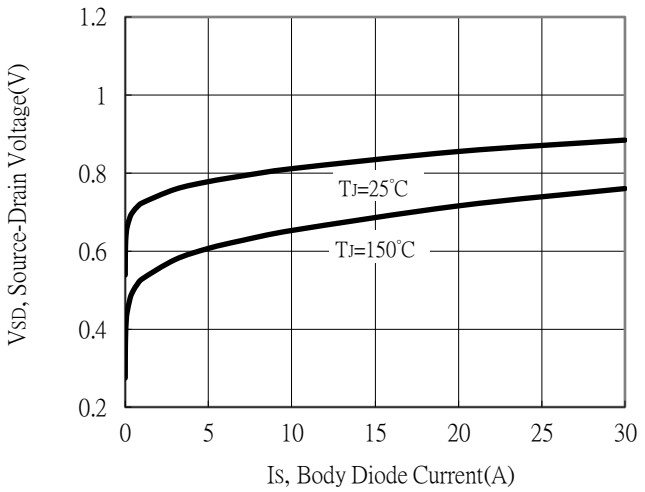
Breakdown Voltage vs Ambient Temperature



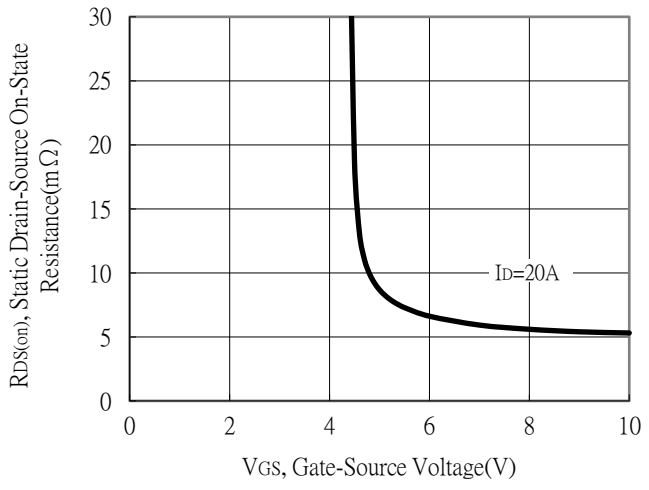
Static Drain-Source On-State resistance vs Drain Current



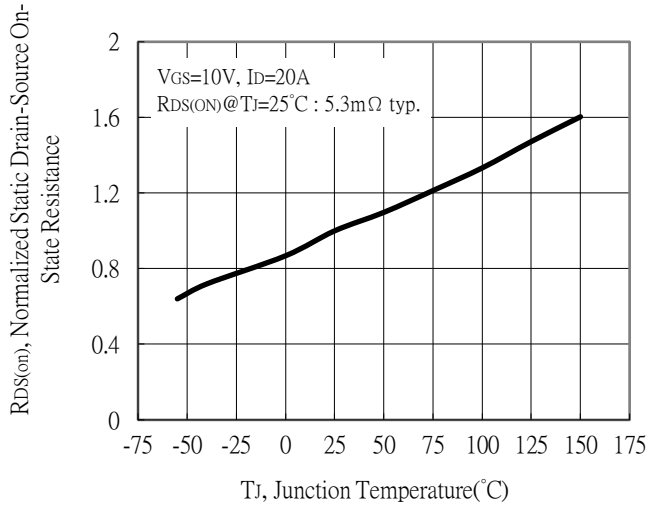
Body Diode Current vs Source-Drain Voltage



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

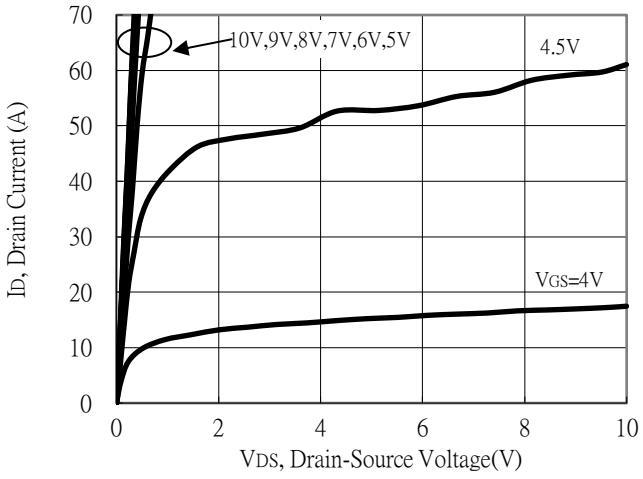


Drain-Source On-State Resistance vs Junction Temperature

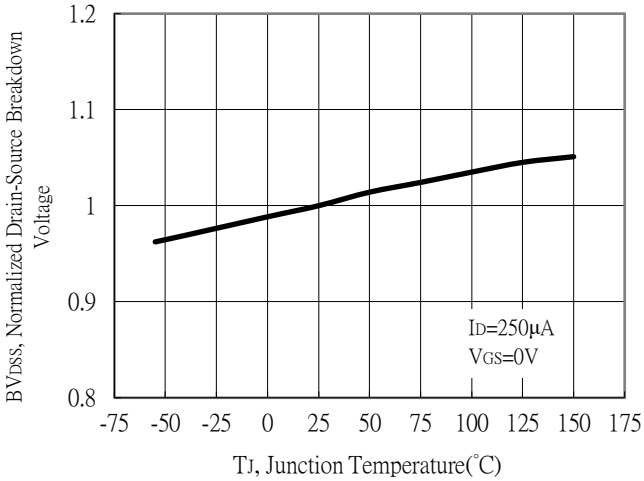


Typical Characteristics

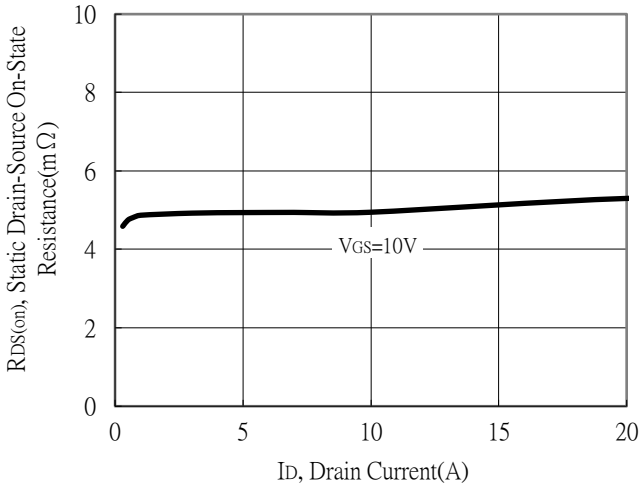
Typical Output Characteristics



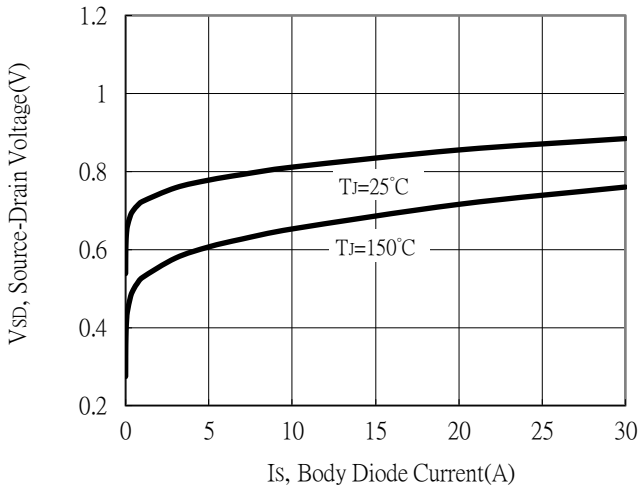
Breakdown Voltage vs Ambient Temperature



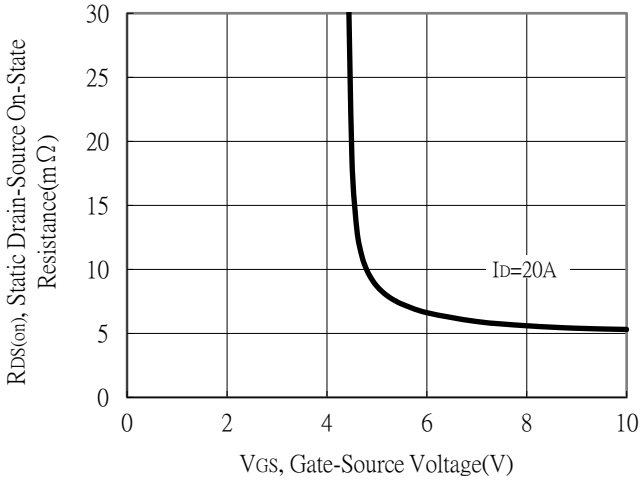
Static Drain-Source On-State resistance vs Drain Current



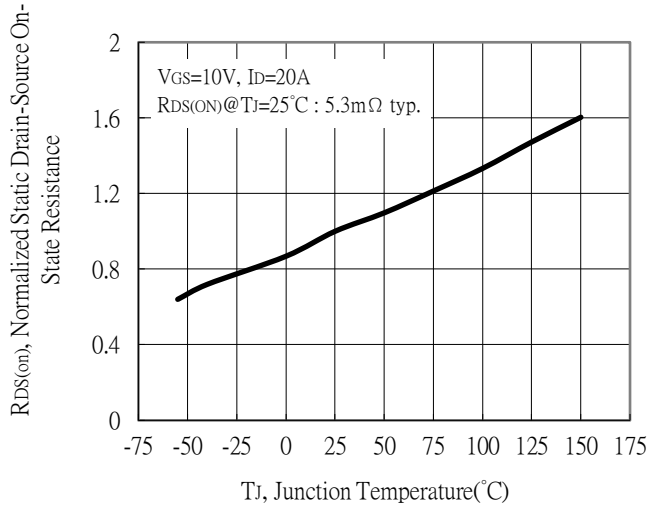
Body Diode Current vs Source-Drain Voltage



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

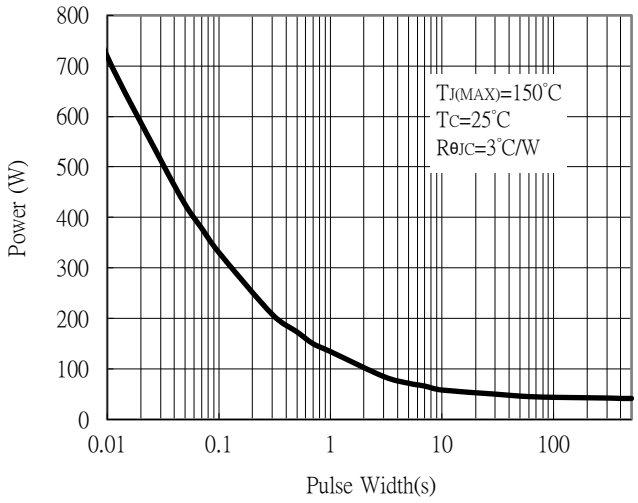


Drain-Source On-State Resistance vs Junction Temperature

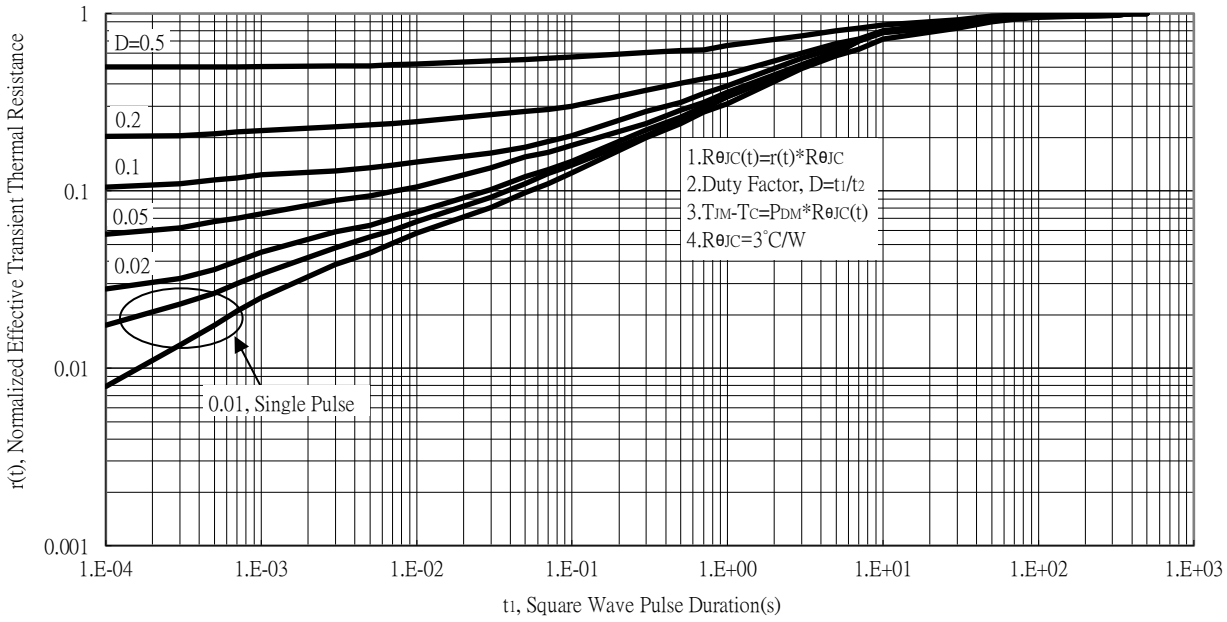


Typical Characteristics (Cont.)

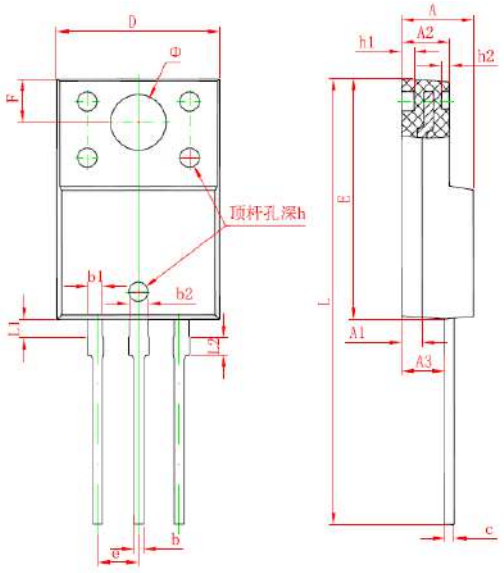
Single Pulse Power Rating, Junction to Case



Transient Thermal Response Curves

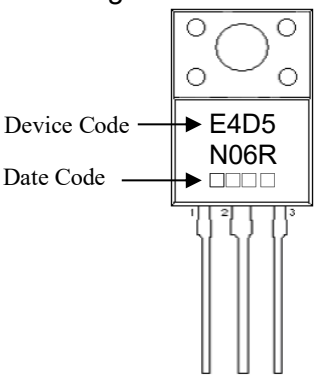


TO-220FP Dimension



3-Lead TO-220FP Plastic Package

Marking:



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

Date Code(counting from left to right) :
1st code: year code, the last digit of Christian year
2nd 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
3rd and 4th 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 TYP		2.54 TYP	
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		3.50 REF	
A3	0.102	0.110	2.60	2.80	h	0.000	0.012	0.00	0.30
b	0.020	0.030	0.50	0.75	h1	0.031 REF		0.80 REF	
b1	0.031	0.041	0.80	1.05	h2	0.020 REF		0.50 REF	
b2	0.043	0.053	1.10	1.35	L	1.102	1.118	28.00	28.40
c	0.020	0.030	0.50	0.75	L1	0.043	0.051	1.10	1.30
D	0.392	0.408	9.96	10.36	L2	0.036	0.043	0.92	1.08
E	0.583	0.598	14.80	15.20					