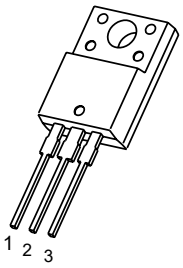
TO-220F Plastic-Encapsulate MOSFETS

7N65 N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$TYP	I_D
650V	1.1Ω@10V	7.4A

TO-220F



1. GATE
2. DRAIN
3. SOURCE

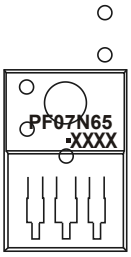
GENERAL DESCRIPTION

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Desighed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

FEATURE

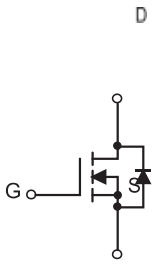
- High Current Rating
- Lower $R_{DS(on)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter V_{SD} Specifications
- Avalanche Energy Specified
- Fast Switching Capability

MARKING



PF07N65 = Device code.
Solid dot = Green molding compound device, if none, the normal device.
XXXX = Code.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current	I_D ①	7.4	A
Pulsed Drain Current	I_{DM} ②	29.6	A
Single Pulsed Avalanche Energy	E_{AS} ③	500	mJ
Maximum Power Dissipation	P_D ①	50	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	℃/ W
Thermal Resistance from Junction to Case	$R_{\theta JC}$ ①	2.5	℃/ W
Operating Junction and Storage Temperature Range	T_J , T_{stg}	-55~+150	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_a=25 ℃ unless otherwise specified

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Off characteristics							
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D =250μA		650			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =520V, V_{GS} =0V	T_J =25C			10	μA
			T_J =125C			20	
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±30V				±100	nA
On characteristics ④							
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS} , I_D =250μA		2	3.2	4	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =3.7A			1.1	1.3	Ω
Forward transconductance	g_{FS}	V_{DS} =40V, I_D =3.7A		5			S
Dynamic characteristics ④⑤							
Input capacitance	C_{iss}	V_{DS} =25V,V_{GS} =0V, f =1MHz			1130	2260	pF
Output capacitance	C_{oss}				91	182	
Reverse transfer capacitance	C_{rss}				3	6	
Gate resistance	R_g	f =1MHz			4.6		Ω
Switching characteristics ④⑤							
Total gate charge	Q_g	V_{GS}=10V, V_{DS}=520V, I_D=7.4A			23	46	nC
Gate-source charge	Q_{gs}				4.7	9.4	
Gate-drain charge	Q_{gd}				8.5	17	
Turn-on delay time	$t_{d(on)}$	V_{DD}=325V, V_{GS}=10V,R_G=25Ω , ID=7.4A			70		ns
Turn-on rise time	t_r				170		
Turn-off delay time	$t_{d(off)}$				140		
Turn-off fall time	t_f				130		
Drain-Source Diode Characteristics							
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=7.4A				1.4	V
Continuous drain-source diode forward current	I_S ①					7.4	A
Pulsed drain-source diode forward current	I_{SM} ②					29.6	A

Notes:

1.T_C=25C Limited only by maximum temperature allowed.

2.P_W≤10μs, Duty cycle≤1%.

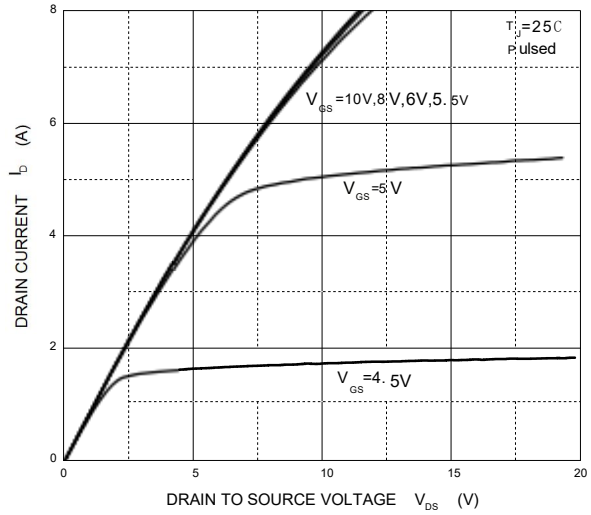
3.EAS condition: V_{DD}=50V,V_{GS}=10V, L=10mH, R_g=25Ω Starting T_J = 25°C.

4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

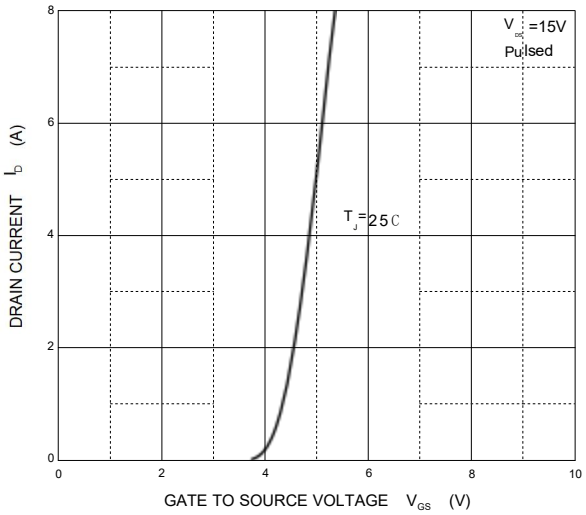
5.Guaranteed by design, not subject to production.

Typical Characteristics

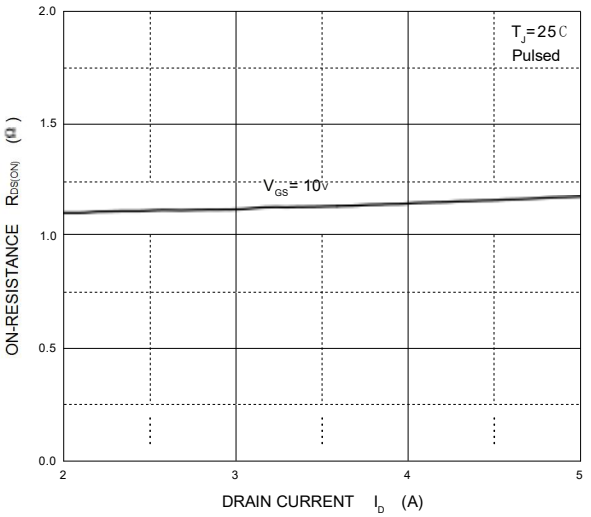
Output Characteristics



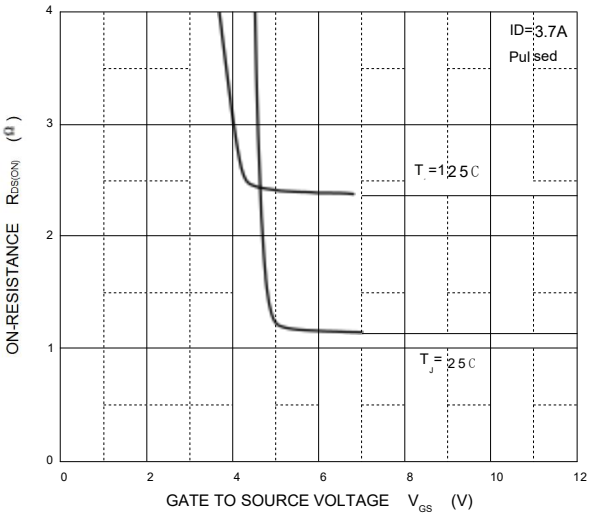
Transfer Characteristics



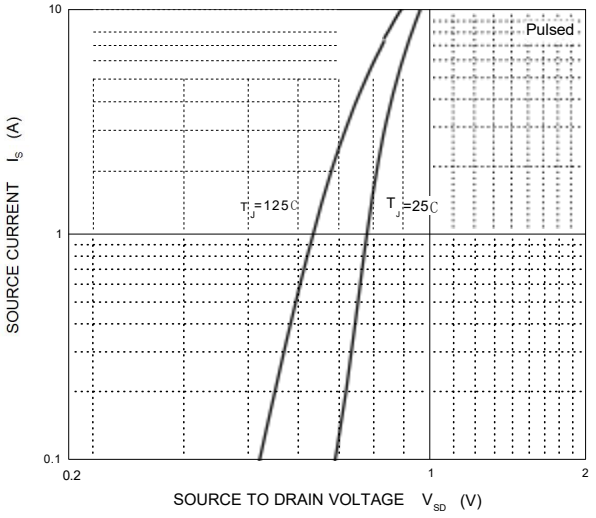
$R_{DS(ON)}$ —— I_D



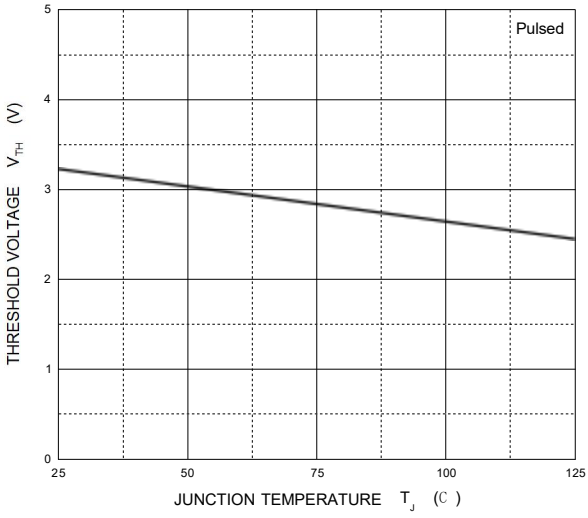
$R_{DS(ON)}$ —— V_{GS}



I_S —— V_{SD}

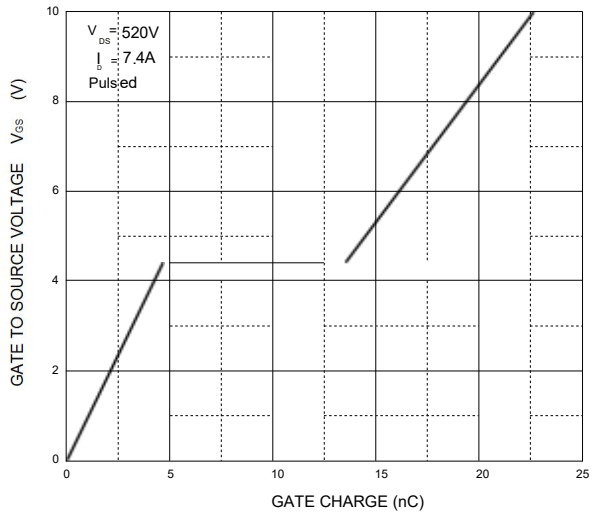


Threshold Voltage

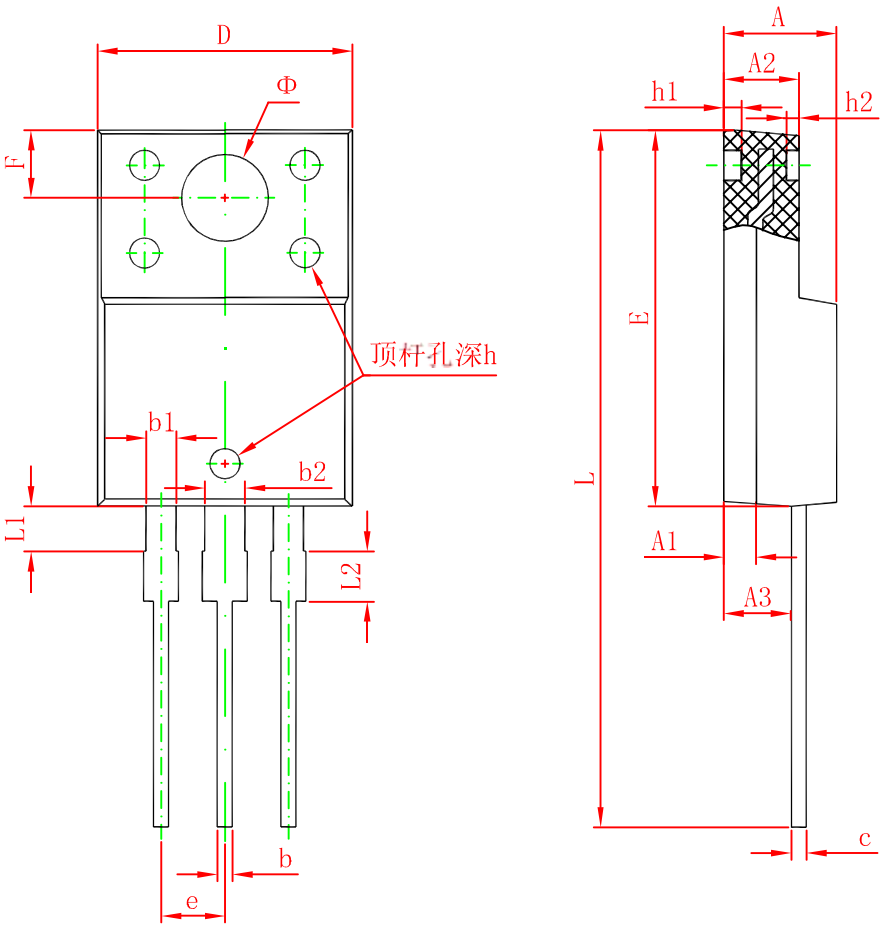


Typical Characteristics

Gate Charge



TO-220F Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300 REF.		0.051 REF.	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP .		0.100 TYP .	
F	2.700 REF.		0.106 REF.	
Φ	3.500 REF.		0.138 REF.	
h	0.000	0.300	0.000	0.012
h1	0.800 REF.		0.031 REF.	
h2	0.500 REF.		0.020 REF.	
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	0.900	1.100	0.075	0.083