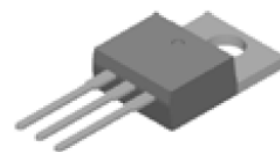


200V/9A Power MOSFET (N-Channel)

General Description

- IRF630/IRFS630 are N-Channel enhancement mode power MOSFETs with advanced technology. These power MOSFETs are designed for low voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.
- IRF630/IRFS630 are available in TO-220/TO-220F packages.



TO-220



TO-220F

Features

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Fast switching capability
- Ease of Paralleling
- Simple Drive Requirements
- RoHS Compliance and Halogen free



Application

- DC to DC Converter
- Adapter
- SMPS Application.

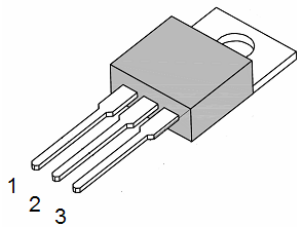
200V/9A POWER MOSFET (N-Channel)

IRF630/IRFS630

Ordering Information

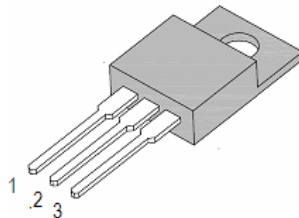
Outline	Part Number	Packing Type/Qty's
TO-220	IRF630	Tube/50pcs
TO-220F	IRFS630	Tube/50pcs

Pin Configuration and Symbol



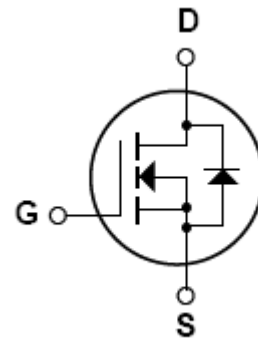
1: GATE 2: DRAIN 3: SOURCE

TO-220



1: GATE 2: DRAIN 3: SOURCE

TO-220F



Absolute Maximum Ratings *(T_C=25°C unless otherwise specified, Note)*

Symbol	Description	Ratings	Unit
V_{DSS}	Drain-Source Voltage	200	V
V_{GSS}	Gate-Source Voltage	± 30	V
I_D	Drain Current -Continuous	9	A
I_{DM}	Drain Current -Pulsed (Note1)	36	A
E_{AS}	Avalanche Energy	Single Pulsed (Note2)	mJ
E_{AR}		Repetitive (Note1)	
I_{AR}	Avalanche Current (Note1)	9	A
dv/dt	Peak Diode Recovery dv/dt (Note3)	5	V/ns

200V/9A POWER MOSFET (N-Channel)

IRF630/IRFS630

Symbol	Description		Ratings	Unit
P_D	Power Dissipation	TO-220	74	W
		TO-220F	38	
	Derate above 25°C	TO-220	0.58	W/°C
		TO-220F	0.3	
R_{θJA}	Thermal Resistance (Junction-to-Ambient)	TO-220/TO-220F	62	°C/W
R_{θJC}	Thermal Resistance (Junction-to-Case)	TO-220	1.71	°C/W
		TO-220F	3.3	
T_J	Operating Junction Temperature		-55 to +150	°C
T_{STG}	Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temperature for soldering purposes, 1/8" from case for 10 seconds		300	°C

Note: Absolute maximum ratings indicate limits beyond which damage to the device may occur. For guarantee specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed.

Electrical Characteristics (*T_C*=25°C unless otherwise specified)

Symbol	Description		Min.	Typ.	Max.	Unit	Conditions
OFF CHARACTERISTICS							
V_{(BR)DSS}	Drain-Source Breakdown Voltage		200	-	-	V	V _{GS} =0V, I _D =250μA
I_{DSS}	Drain-Source Leakage Current		-	-	1	μA	V _{DS} =200V, V _{GS} =0V
			-	-	50		V _{DS} =160V, V _{GS} =0V, T _J =125°C
I_{GSS}	Gate-Source Leakage Current	Forward	-	-	100	nA	V _{GS} =30V, V _{DS} =0V
		Reverse	-	-	-100		V _{GS} =-30V, V _{DS} =0V
ON CHARACTERISTICS							
V_{GS(th)}	Gate-Source Threshold Voltage		2.0	-	4.0	V	V _{DS} =V _{GS} , I _D =250μA
R_{DS(ON)}	Static Drain-Source On-State Resistance (Note 4)		-	-	0.4	Ω	V _{GS} =10V, I _D =5.4A
g_{FS}	Forward Transconductance		3.8	-	-	S	V _{DS} =50V, I _D =5.4A
DYNAMIC CHARACTERISTICS							
C_{iss}	Input Capacitance		-	800	-	pF	V _{DS} =25V, V _{GS} =0V, f=1.0MHz
C_{oss}	Output Capacitance		-	240	-		
C_{rss}	Reverse Transfer Capacitance		-	76	-		

200V/9A POWER MOSFET (N-Channel)

IRF630/IRFS630

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
SWITCHING CHARACTERISTICS						
t_{d(on)}	Turn-on Delay Time	-	9.4	-	nS	V _{DD} =100V, I _D =5.9A, R _G =12Ω, R _D =16Ω (Note 4)
t_r	Turn-on Rise Time	-	28	-		
t_{d(off)}	Turn-off Delay Time	-	39	-		
t_f	Turn-off Fall Time	-	20	-		
Q_g	Total Gate Charge	-	-	43	nC	V _{DS} =160V, I _D =5.9A, V _{GS} =10V (Note 4)
Q_{gs}	Gate-Source Charge	-	-	7		
Q_{gd}	Gate-Drain Charge	-	-	23		
L_d	Internal Drain inductance	-	4.5	-	nH	measured from the drain lead 0.25" from package to center of die
L_s	Internal Drain inductance	-	7.5	-		measured from the drain lead 0.25" from package to source bond pad
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V_{SD}	Drain-Source Diode Forward Voltage	-	-	2	V	V _{GS} =0V, I _S =9A (Note 4)
t_{rr}	Reverse Recovery Time	-	170	340	nS	V _{GS} =0V, I _F =5.9A di/dt=100A/us (Note4)
Q_{rr}	Reverse Recovery Charge	-	1.1	2.2	uC	
t_{on}	Forward turn-on time (Note5)	-	*	-	-	

Note 1: Repetitive Rating: Pulse width limited by maximum junction temperature

2: L=4.6mH, I_{AS}=9A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C

3: I_{SD}≤9A, di/dt≤120A/us, V_{DD}≤V_{BR(DSS)}, Starting T_J=25°C

4: Pulse test: Pulse width ≤300us, Duty cycle≤2%

5: *Negligible, Dominated by circuit inductance

Typical Characteristics Curves

Fig.1- On-Region Characteristics

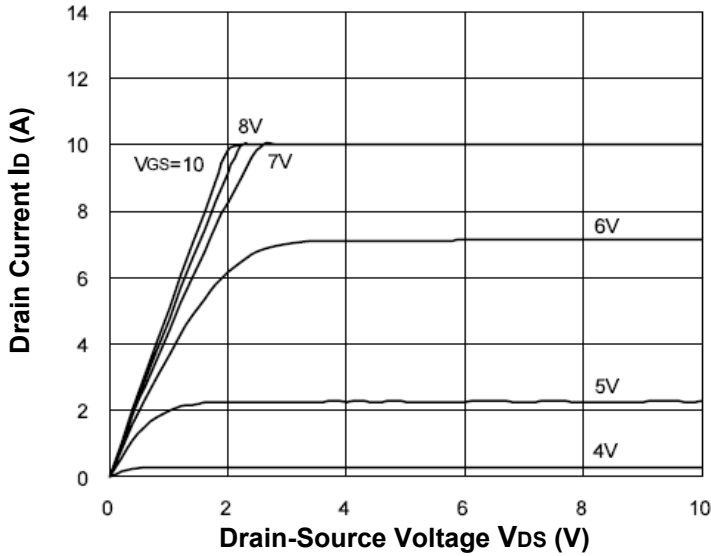


Fig.2- Transconductance Variation Vs. Drain Current and Temperature

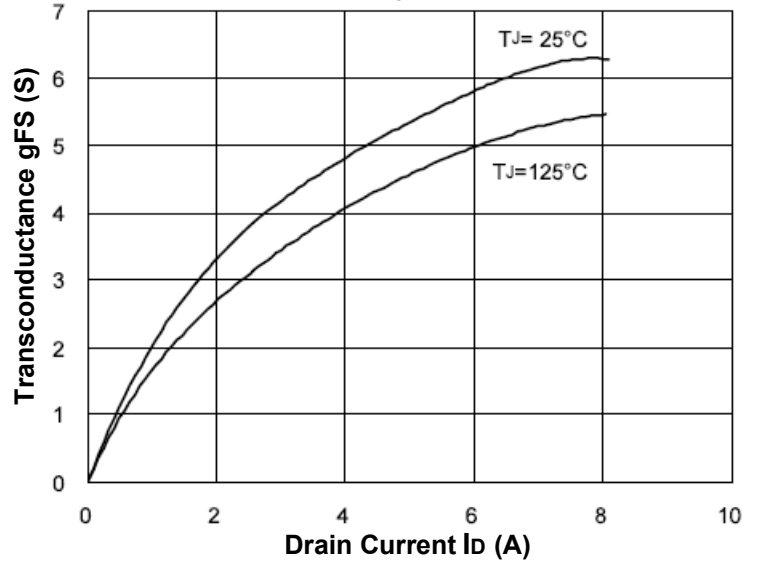


Fig.3- Drain Current Variation Vs. Gate Voltage and Temperature

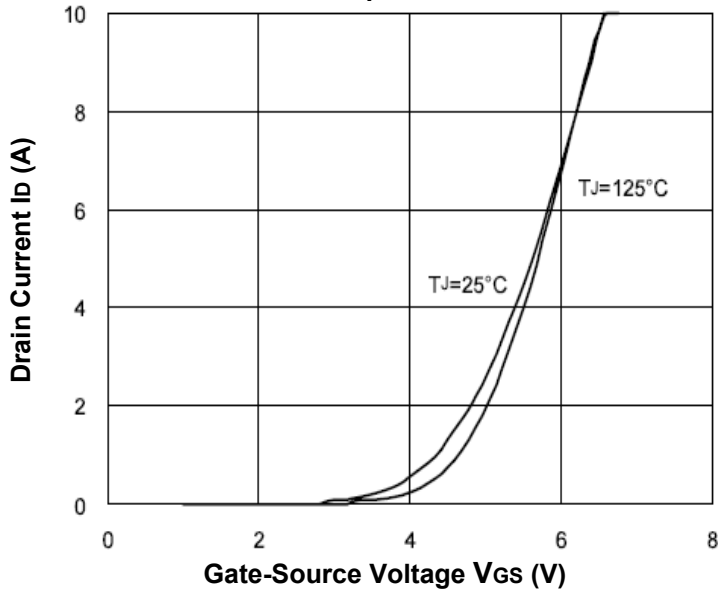
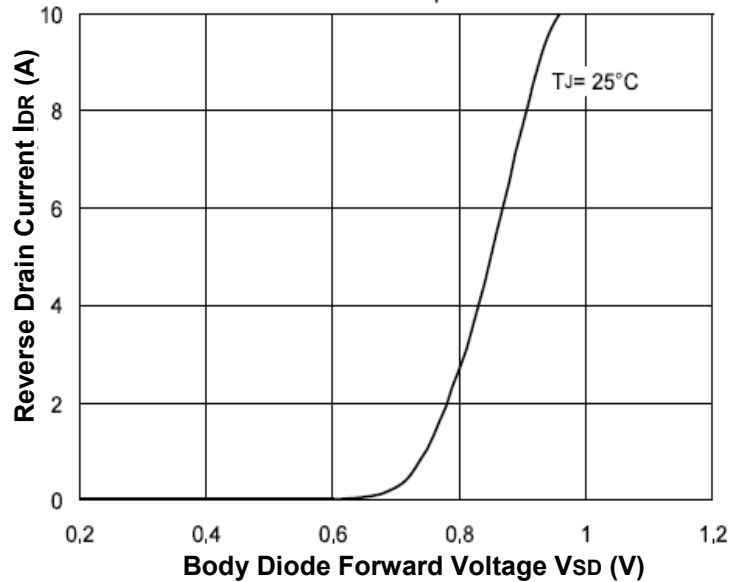


Fig.4- Body Diode Forward Voltage Variation Vs. Current and Temperature



200V/9A POWER MOSFET (N-Channel)

IRF630/IRFS630

Fig.5- Breakdown Voltage Variation Vs. Temperature

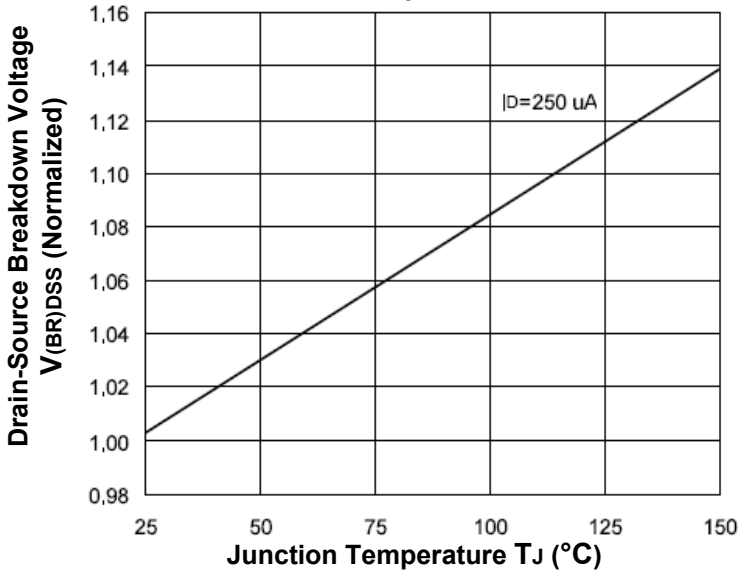


Fig.6- On Resistance Variation Vs. Temperature

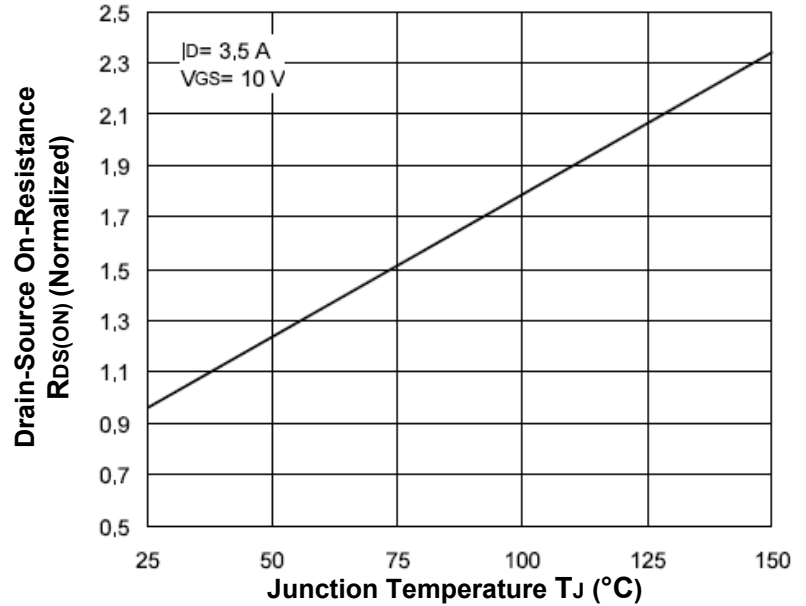
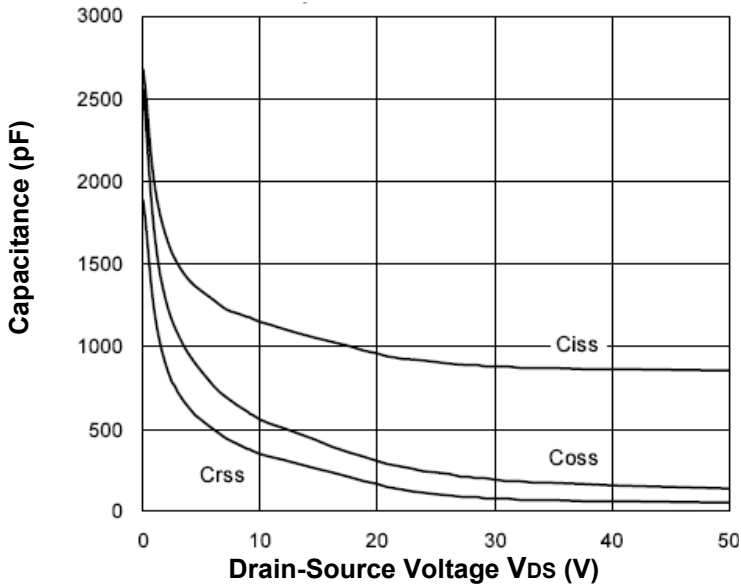


Fig.7- Capacitance Characteristics



200V/9A POWER MOSFET (N-Channel)

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Fig.8- Max. Safe Operation Area (TO-220)

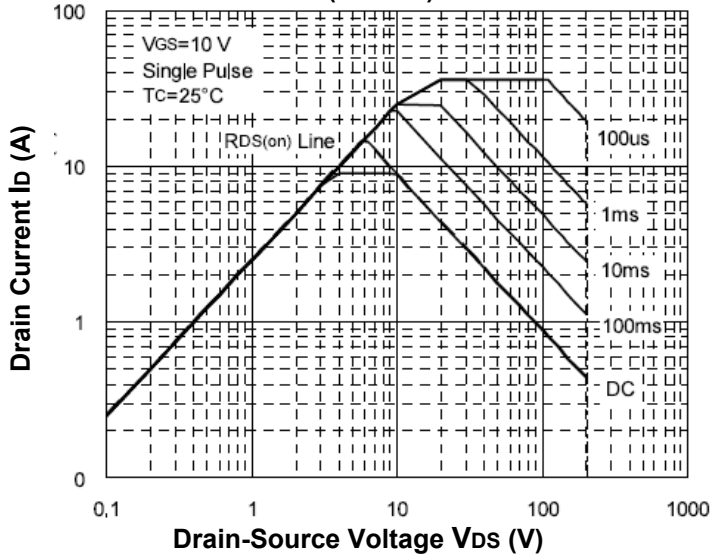


Fig.9- Max. Safe Operation Area (TO-220F)

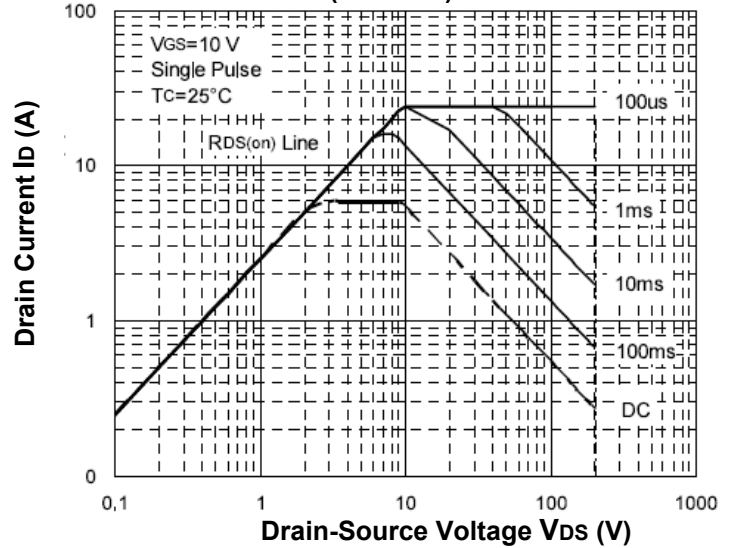


Fig.10- Transient Thermal Response (TO-220)

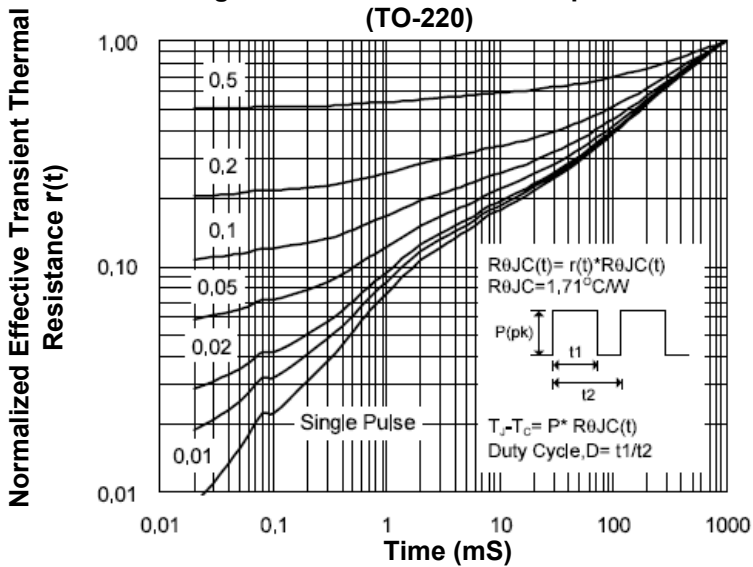
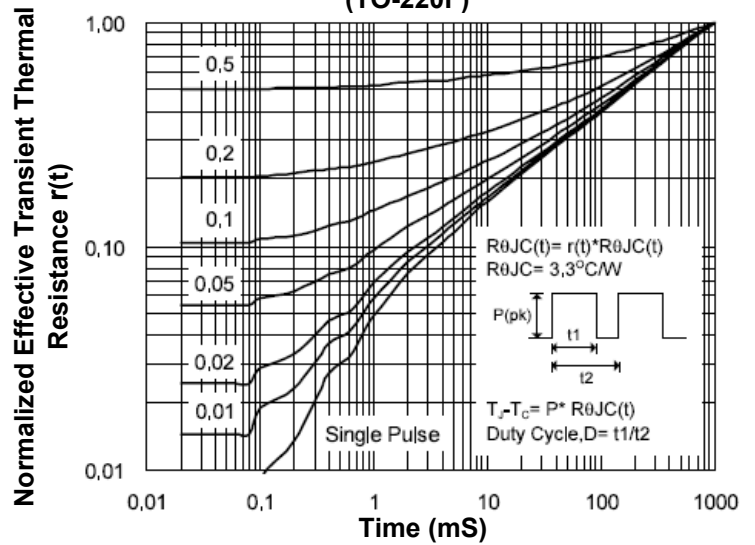


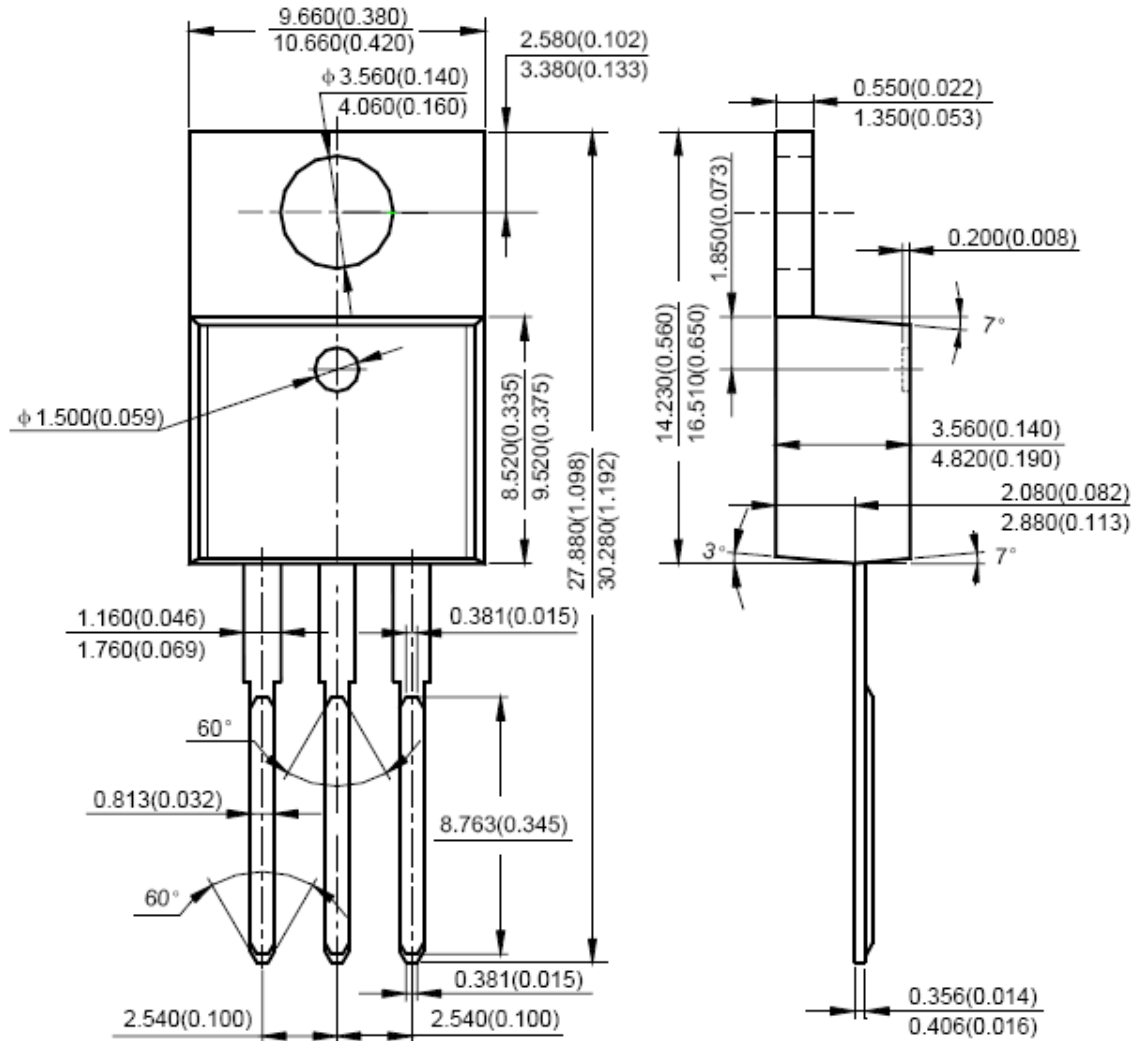
Fig.11- Transient Thermal Response (TO-220F)



200V/9A POWER MOSFET (N-Channel)

IRF630/IRFS630

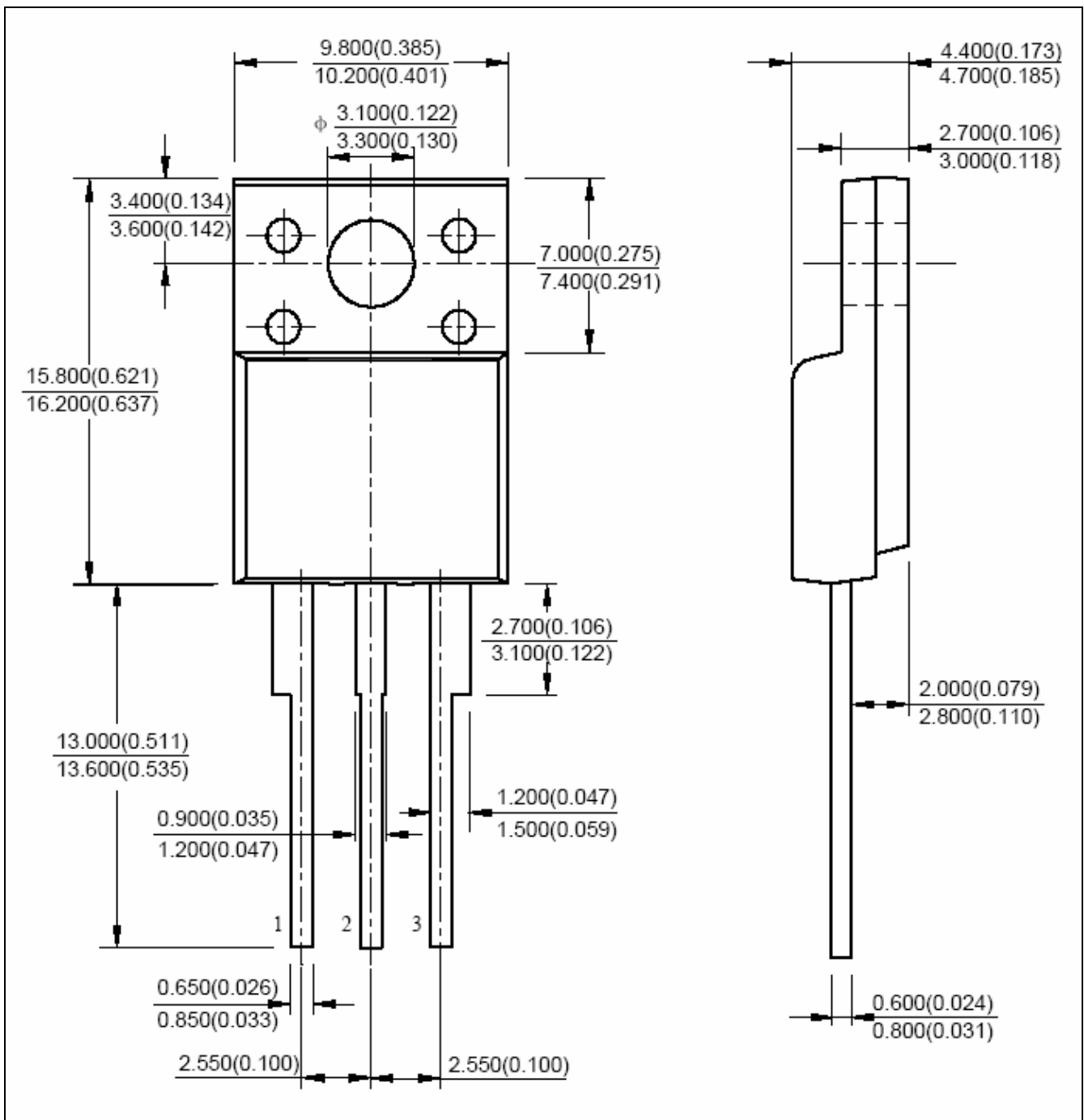
Dimensions in mm (Inch)



TO-220

200V/9A POWER MOSFET (N-Channel)

IRF630/IRFS630



TO-220F

200V/9A POWER MOSFET (N-Channel)

IRF630/IRFS630

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