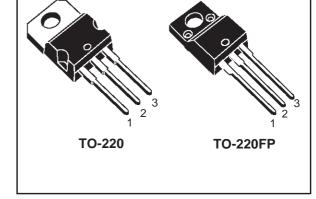


IRF630FP

N-CHANNEL 200V - 0.35Ω - 9A TO-220/TO-220FP MESH OVERLAY™ MOSFET

TYPE	V _{DSS} R _{DS(on)}		I _D
IRF630	200 V	< 0.40 Ω	9 A
IRF630FP	200 V	< 0.40 Ω	9 A

- TYPICAL $R_{DS}(on) = 0.35 \Omega$
- EXTREMELY HIGH dv/dt CAPABILITY
- VERY LOW INTRINSIC CAPACITANCES
- GATE CHARGE MINIMIZED

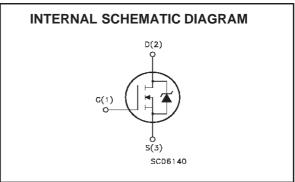


DESCRIPTION

This power MOSFET is designed using the company's consolidated strip layout-based MESH OVER-LAYTM process. This technology matches and improves the performances compared with standard parts from various sources.

.APPLICATIONS

- HIGH CURRENT SWITCHING
- UNINTERRUPTIBLE POWER SUPPLY (UPS)
- DC-AC CONVERTERS FOR TELECOM INDUSTRIAL, AND LIGHTING EQUIPMENT



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Va	lue	Unit
		IRF630	IRF630FP	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	20	00	V
V_{DGR}	Drain-gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)	20	00	V
V_{GS}	Gate- source Voltage	±:	20	V
I _D	Drain Current (continuos) at T _C = 25°C	9	9 (**)	А
I _D	Drain Current (continuos) at T _C = 100°C	5.7	5.7 (**)	А
I _{DM} (•)	Drain Current (pulsed)	36	36	А
P _{TOT}	Total Dissipation at T _C = 25°C	75	30	W
	Derating Factor	0.6	0.24	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	5	5	V/ns
V _{ISO}	Insulation Winthstand Voltage (DC)		2000	V
T _{stg}	Storage Temperature	-65 t	-65 to 150	
Tj	Max. Operating Junction Temperature	15	150	

 $(\bullet) \mbox{Pulse}$ width limited by safe operating area

 $(1)I_{SD} \leq 9A, \; di/dt \leq 300A/\mu s, \; V_{DD} \leq V_{(BR)DSS}, \; T_{j} \leq T_{JMAX}.$

(**) Limited only by Maximum Temperature Allowed

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THERMAL DATA

		TO-220	TO-220FP	
Rthj-case	Thermal Resistance Junction-case Max	1.67	4.17	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	62.5		°C/W
Rthc-sink	Thermal Resistance Case-sink Typ	0.5		°C/W
T _I	Maximum Lead Temperature For Soldering Purpose	300	0	°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max)	9	А
E _{AS}	Single Pulse Avalanche Energy (starting $T_j = 25$ °C, $I_D = I_{AR}$, $V_{DD} = 50$ V)	160	mJ

ELECTRICAL CHARACTERISTICS (TCASE = 25 $^{\circ}$ C UNLESS OTHERWISE SPECIFIED) OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0$	200			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	$V_{DS} = Max Rating$ $V_{DS} = Max Rating, T_C = 125 °C$			1 50	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	$V_{GS} = \pm 20V$			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	2	3	4	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V, I _D = 4.5 A		0.35	0.40	Ω
I _{D(on)}	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max},$ $V_{GS} = 10V$	9			А

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
g _{fs} (1)	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max},$ $I_{D} = 4.5 \text{ A}$	3	4		S
C _{iss}	Input Capacitance	$V_{DS} = 25V, f = 1 \text{ MHz}, V_{GS} = 0$		540	700	pF
Coss	Output Capacitance			90	120	pF
C _{rss}	Reverse Transfer Capacitance			35	50	pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
t _{d(on)}	Turn-on Delay Time	V _{DD} = 100 V, I _D = 4.5 A		10	14	ns
t _r	Rise Time	$R_G = 4.7\Omega V_{GS} = 10 V$ (see test circuit, Figure 3)		15	20	ns
Qg	Total Gate Charge	$V_{DD} = 160V, I_D = 9 A,$		31	45	nC
Q _{gs}	Gate-Source Charge	$V_{GS} = 10V$		7.5		nC
Q _{gd}	Gate-Drain Charge			9		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 160V, I_D = 9 A,$		12	17	ns
t _f	Fall Time	$R_G = 4.7\Omega$, $V_{GS} = 10V$ (see test circuit, Figure 5)		12	17	ns
t _c	Cross-over Time	(222 222 2222, 1.194.00)		25	35	ns

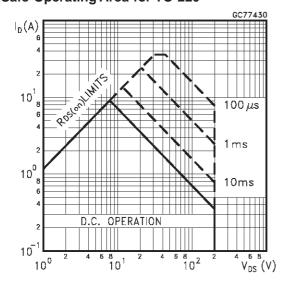
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
IsD	Source-drain Current				9	Α
I _{SDM} (2)	Source-drain Current (pulsed)				36	Α
V _{SD} (1)	Forward On Voltage	$I_{SD} = 9 A, V_{GS} = 0$			1.5	V
t _{rr}	Reverse Recovery Time	$I_{SD} = 9 \text{ A}, \text{ di/dt} = 100 \text{A/} \mu \text{s}$		170		ns
Q _{rr}	Reverse Recovery Charge	V _{DD} = 50 V, T _j = 150°C (see test circuit, Figure 5)		0.95		μС
I _{RRM}	Reverse Recovery Current	(occ toot on oan, 1 igare o)		11		A

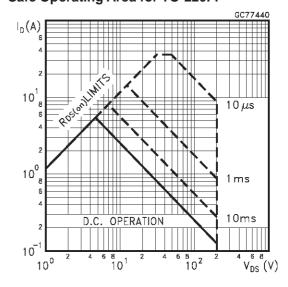
Note: 1. Pulsed: Pulse duration = 300 $\mu s,$ duty cycle 1.5 %.

2. Pulse width limited by safe operating area.

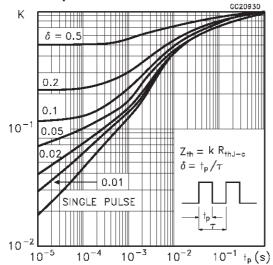
Safe Operating Area for TO-220



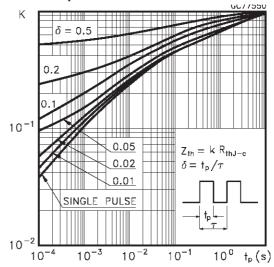
Safe Operating Area for TO-220FP



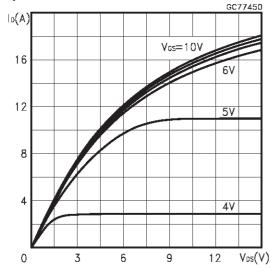
Thermal Impedence for TO-220



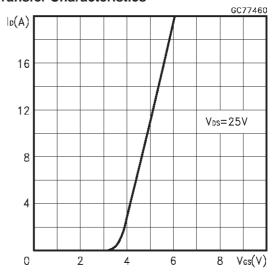
Thermal Impedence for TO-220FP



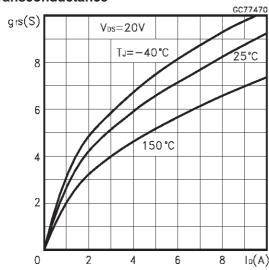
Output Characteristics



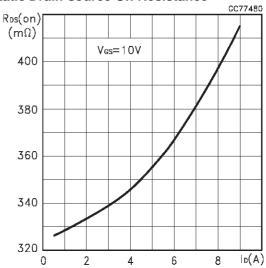
Transfer Characteristics



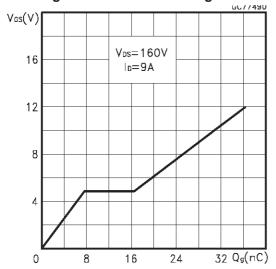
Transconductance



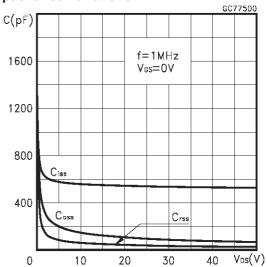
Static Drain-source On Resistance



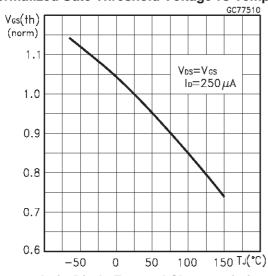
Gate Charge vs Gate-source Voltage



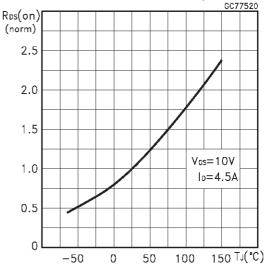
Capacitance Variations



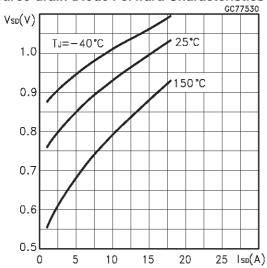
Normalized Gate Threshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics



57.

Fig. 1: Unclamped Inductive Load Test Circuit

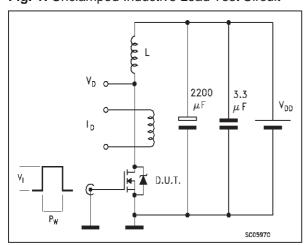


Fig. 3: Switching Times Test Circuit For Resistive Load

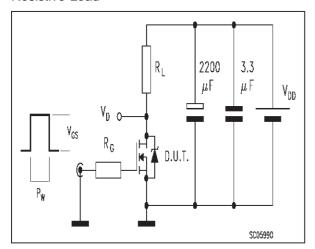


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times

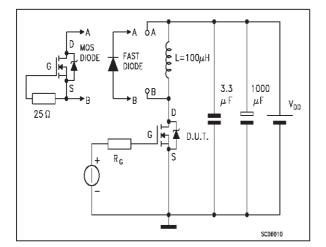


Fig. 2: Unclamped Inductive Waveform

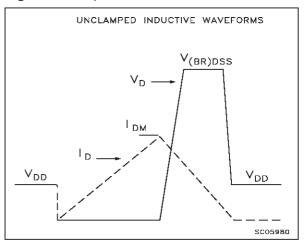
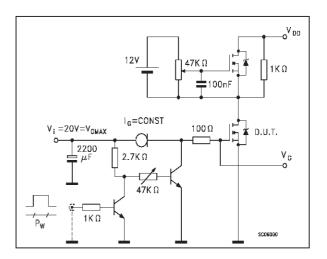
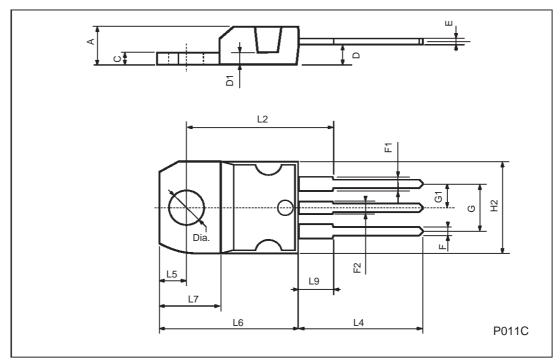


Fig. 4: Gate Charge test Circuit



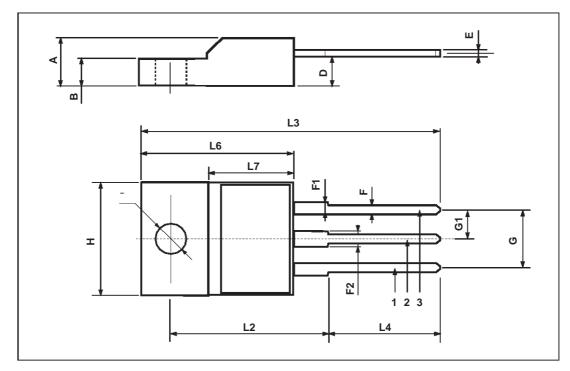
TO-220 MECHANICAL DATA

DIM.		mm			inch	
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
Α	4.40		4.60	0.173		0.181
С	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
Е	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



TO-220FP MECHANICAL DATA

DIM.		mm			inch	
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А	4.4		4.6	0.173		0.181
В	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.7	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
Н	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Ø	3		3.2	0.118		0.126



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