MOSFETs Silicon 430V N-Channel MOS

■ Applications

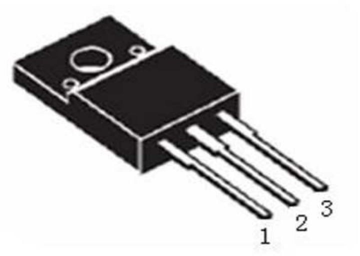
- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）

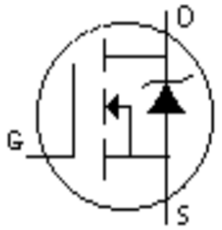
■ Features

- Low $R_{DS(ON)}$
- Ultra Low Gate Charge
- RoHS Compliant
- 100% UIS and RG Tested

■ Product Summary

V_{DS}	430	V
I_D	11	A
$R_{DS(ON)\ ,Typ}$@10V	0.47	Ω
Q_g	20	nC





Gate： 1
Drain： 2
Source： 3

TO-220F

Marking	Package	Packaging	Min. package quantity
MFIRF11N45	TO-220F	Tube	1000

■ Absolute Maximum Ratings（Tc=25℃ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	430	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current Tc=25℃ (Note 1)	I_D	11	A
Continuous Drain Current Tc=100℃ (Note 1)		6.8	
Drain Current-Pulsed (Note 1)	I_{DM}	44	A
Total Dissipation	P_D	50	W
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-55-150	℃
Single Pulse Avalanche Energy (Note 2)	E_{AS}	450	mJ

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

■ Thermal Characteristics

Parameter	Symbol	Max	Unit
Maximum Junction-to-Case	$R_{\theta JC}$	2.5	℃/W
Maximum Junction-to-Ambient	$R_{\theta JA}$	80	℃/W

Note 1：Ensure that the channel temperature does not exceed 150℃.

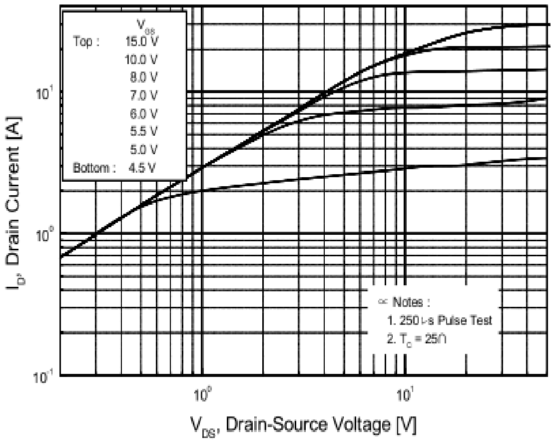
Note 2：V_{DD}=50V, T_{ch}= 25℃(initial), I_{AS}=11A, R_g=25Ω.

Note：This transistor is sensitive to electrostatic discharge and should be handled with care.

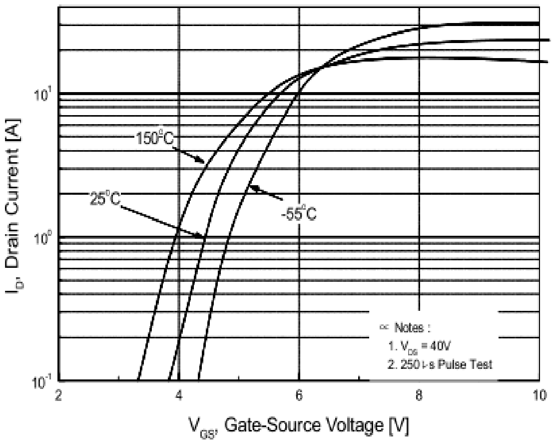
■ Electrical Characteristics（Tc=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	430	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=430V,V_{GS}=0V	-	-	1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS},I_D=250uA	2	3	4	V
Drain-Source On Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=5.5A	-	0.47	0.5	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz	-	1120	-	pF
Output Capacitance	C_{oss}		-	118	-	pF
Reverse Transfer Capacitance	C_{rss}		-	10	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V, f=1.0MHz	-	2	-	Ω
Switching Paramters						
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=250V,I_D=11A, V_{GS}=10V,R_G=25Ω	-	32	-	ns
Turn-On Rise Time	t_r		-	28	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	90	-	ns
Turn-Off Rise Time	t_f		-	50	-	ns
Total Gate Charge	Q_g	V_{DS}=320V,I_D=11A, V_{GS}=10V	-	20	-	nC
Gate-Source Charge	Q_{gs}		-	6.5	-	nC
Gate-Drain Charge	Q_{gd}		-	4.5	-	nC
Source-Drain Characteristics						
Max. Diode Forward Cuurent	I_S		-	-	11	A
Max. Pulsed Forward Cuurent	I_{SM}		-	-	44	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=11A	-	0.86	1.5	V
Reverse Recovery Time	t_{rr}	V_R=320V,I_F=11A, di/dt=100A/us	-	320	-	ns
Reverse Recovery Charge	Q_{rr}		-	3.2	-	μC

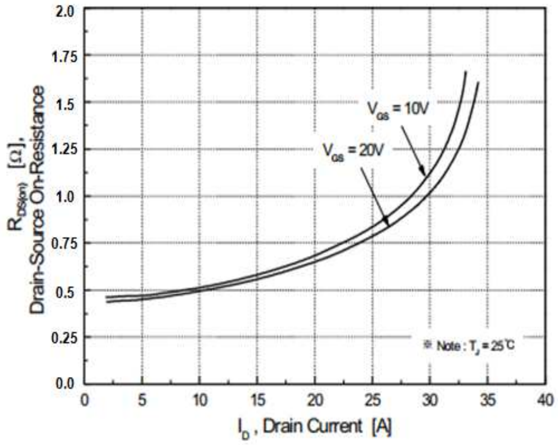
■ Characteristics Curves



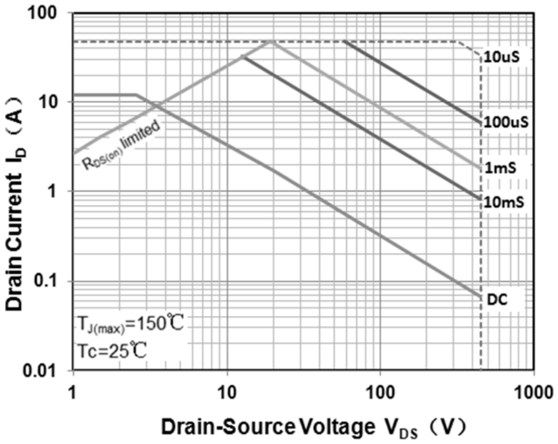
Output Characteritsics



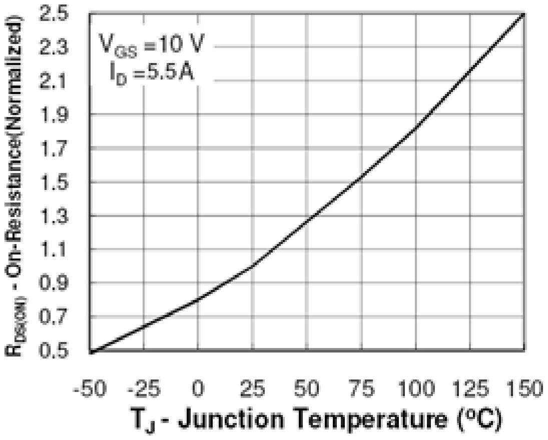
Transfer Characteritsics



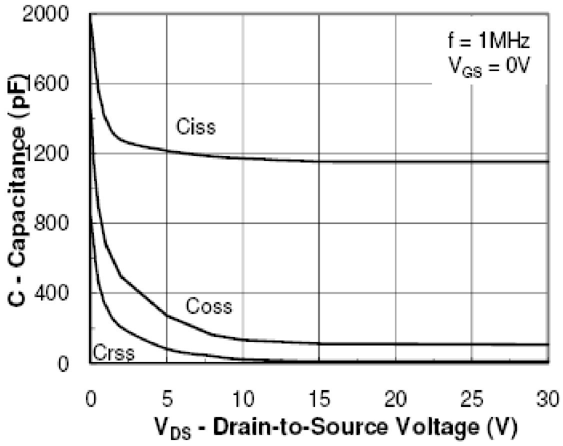
On Resistance Vs Drain Current



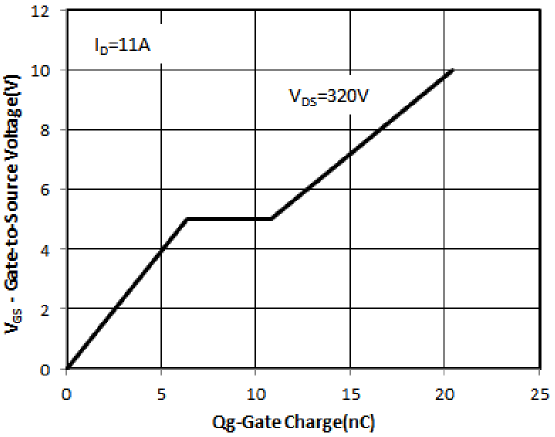
Safe Operating Area



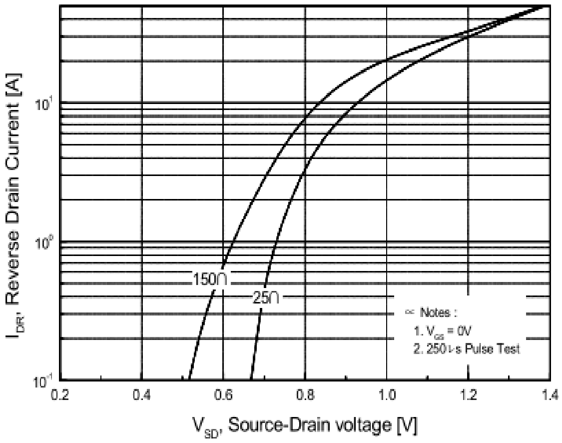
Rdson-JunctionTemperature



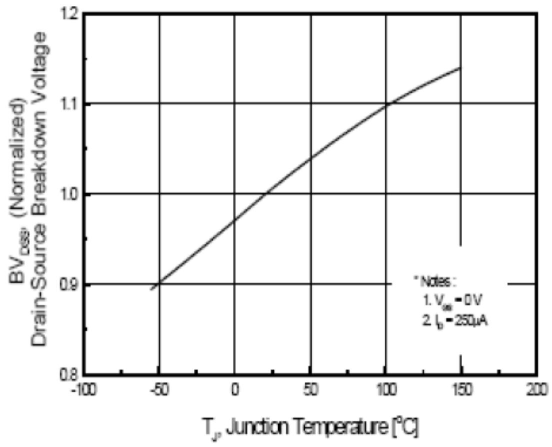
Capacitance



Gate Charge Waveform



Source-Drain Diode Forward Voltage

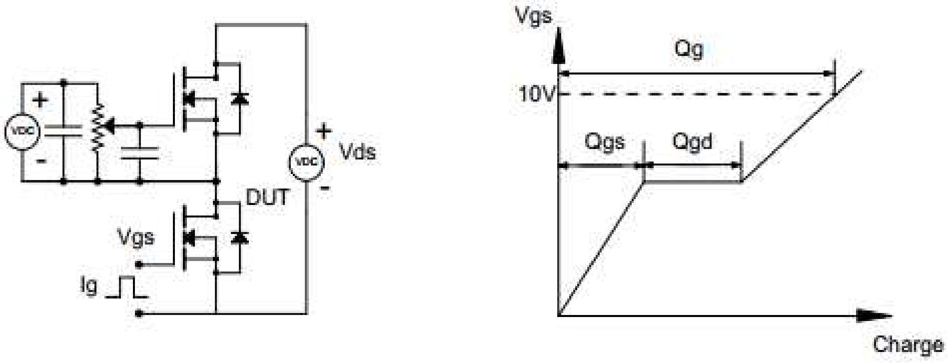


Breakdown Voltage Vs Junction Temperature

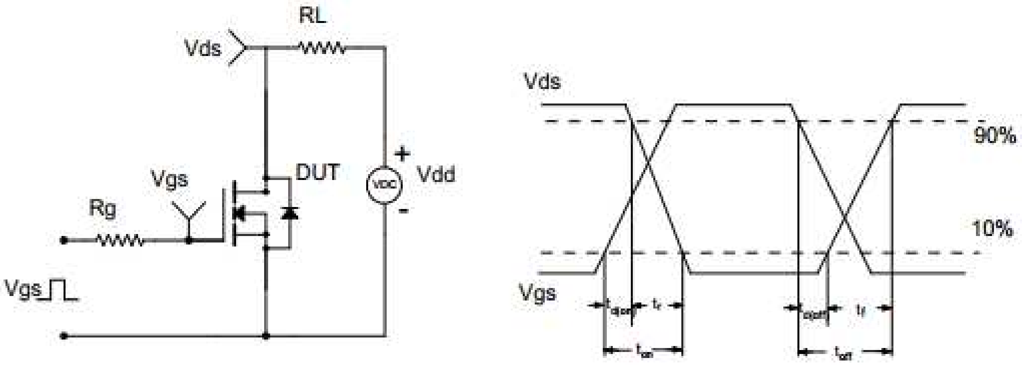
Note： The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

■ Test Circuit & Waveform

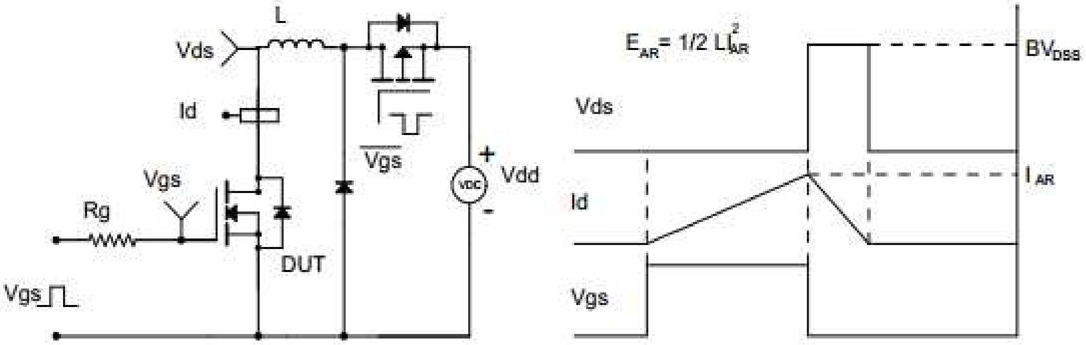
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



■ TO-220F Package Dimensions

Unit：mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	4.5		4.9	E1	6.5	7	7.5
A1	2.3		2.9	e	2.44	2.54	2.64
b	0.65		0.9	L	12.5		14.3
b1	1.1		1.7	L1	9.45		10.05
b2	1.2		1.4	L2	15		16
c	0.35		0.65	L3	3.2		4.4
D	14.5		16.5	ΦP	3		3.3
D1	6.1		6.9	Q	2.5		2.9
E	9.6		10.3