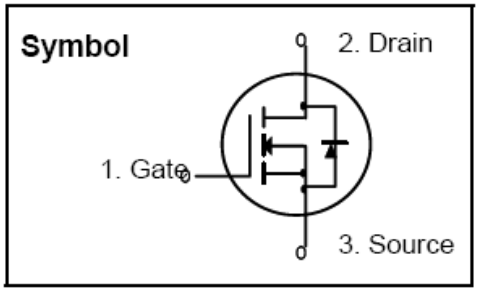
N-Channel MOSFET

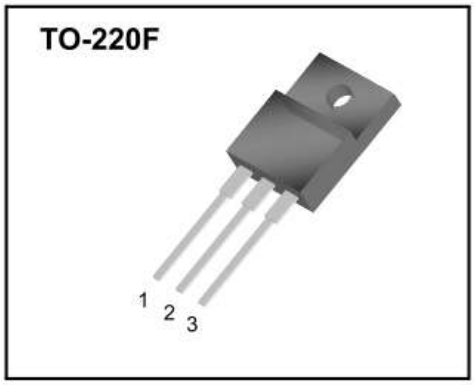
Features

- $R_{DS(ON)}$ Max 2.5 ohm at V_{GS} = 10V
- Gate Charge (Typical 16.0nC)
- Improve dv/dt capability, Fast switching
- 100% avalanche Tested



General Description

This MOSFET is produced using advanced planar strip DMOS technology. This latest technology has been especially designed to minimize on-state resistance have a high rugged avalanche characteristics. These devices are well suited for high efficiency switch mode power supply active power factor correction. Electronic lamp based on half bridge topology



Absolute Maximum Ratings (T_J = 25℃ **unless otherwise specified)**

Symbol	Parameter		Ratings	Units
V_{DSS}	Drain-Source Voltage		600	V
I_D	Drain Current T_C=25℃ T_C=100℃		4 2.4	A
V_{GSS}	Gate-Source Voltage		± 30	V
I_{DM}	Drain Current pulse	(Note 1)	8	A
E_{AS}	Single Pulse Avalanche Energy	(Note 2)	180	mJ
E_{AR}	Repetitive Avalanche Energy	(Note 1)	10.4	mJ
dv/dt	Peak diode Recovery dv/dt	(Note 3)	4.5	V/ns
P_D	Power Dissipation T_C=25℃		104	W
T_j, T_{STG}	Operation and Storage Temperature range		-45 ~ 150	℃

SFF4N60

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{\Theta JC}$	Thermal Resistance Junction to Case	1.2	℃/W
$R_{\Theta CS}$	Thermal Resistance Case to Sink Typ.	0.5	℃/W
$R_{\Theta JA}$	Thermal Resistance Junction to Ambient	62.5	℃/W

Electrical Characteristics (TC = 25℃ Unless otherwise noted)

Symbol	Items	Conditions	Ratings			Unit
			Min	Typ.	Max	
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250uA	600			V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature coefficient	I_D =250uA, Reference to 25℃		0.6		V/℃
I_{DSS}	Zero gate voltage Drain Current	V_{DS} = 600V, V_{GS} = 0V V_{DS} = 480V, T_S = 125℃			1 10	uA
I_{GSSF}	Gate body leakage current Forward	V_{GS} = 30V, V_{DS} = 0V			100	nA
I_{GSSR}	Gate body leakage current Reverse	V_{GS} = -30V, V_{DS} = 0V			-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250uA	2.5		4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 2.0A		2.0	2.5	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0V f = 1.0MHz		560		pF
C_{oss}	output Capacitance			55		pF
C_{rss}	Reverse Transfer Capacitance			7		pF

Switching Characteristics

Symbol	Items	Conditions	Min	Typ.	Max	Units
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = 300V, I_D = 4.0A R_G = 25 Ω (note 4,5)		10		ns
t_r	Turn-on Rise Time			40		ns
$t_{d(off)}$	Turn-off Delay Time			40		ns
t_f	Turn-off Fall Time			50		ns
Q_g	Total Gate Charge	V_{DS} = 480V, I_D = 4.0A V_{GS} = 10V (note 4,5)		16		nC
Q_{gs}	Gate-Source Charge			2.5		nC
Q_{gd}	Gate-Drain Charge			6.5		nC

Drain-Source Diode Characteristics

I_S	Maximum Continuous Drain-Source diode Forward Current				4.0	A
I_{SM}	Maximum Pulse Drain-Source diode Forward Current				16.0	A
V_{SD}	Drain-Source diode Forward voltage	V_{GS} = 0V, I_s = 4.0A			1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_s = 4.0A dI_F/dt =100 A/us (note 4)		300		nS
Q_{rr}	Reverse Recovery Charge			2.0		uC

Notes

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 20mH, I_{AS} = 4.0A, V_{DD} = 50V, R_G = 25 Ω, starting T_J = 25℃
3. I_{SD} ≤ 4.0A, di/dt ≤ 200A/us, V_{DD} ≤ BV_{DSS} , starting T_J = 25℃
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operation temperture

Fig. 1 On-Region Characteristics

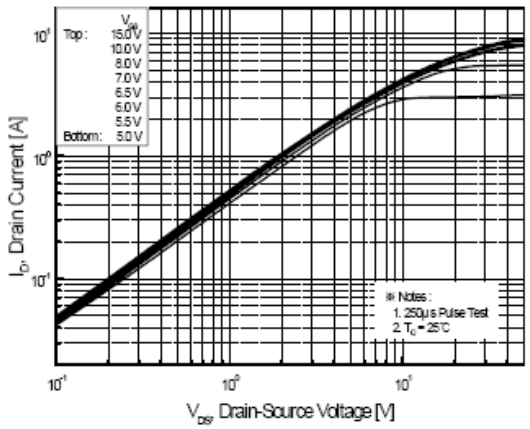


Fig. 2 On-Resistance variation vs Drain Current And gate Voltage

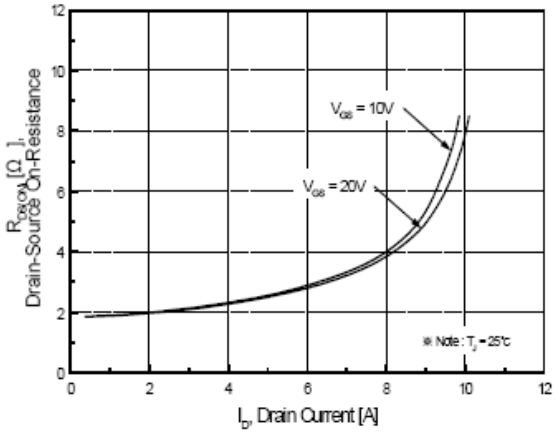


Fig. 3 Breakdown Voltage Variation vs Temperature

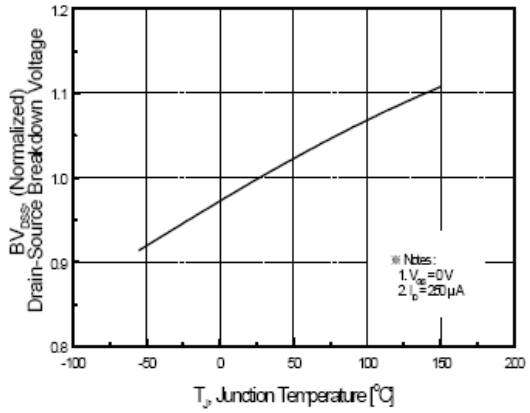


Fig 4. On-Resistance Variation vs Temperature

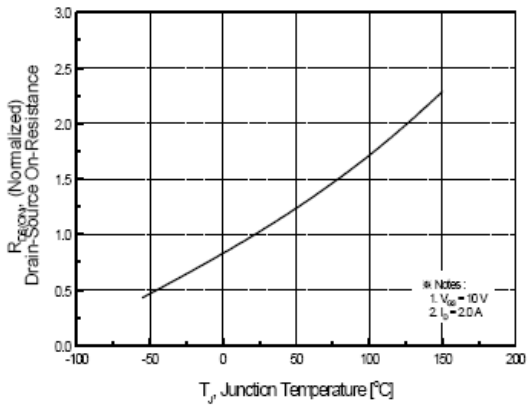


Fig. 5 Maximum Safe Operation Area

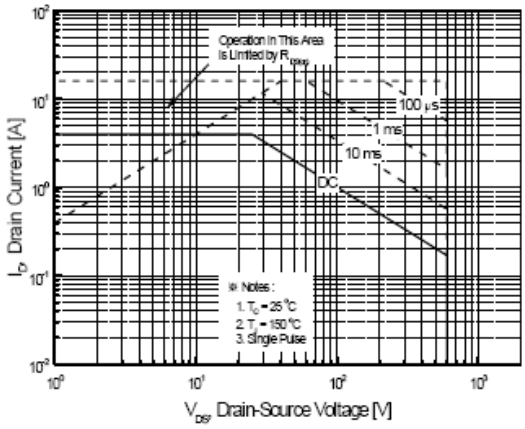
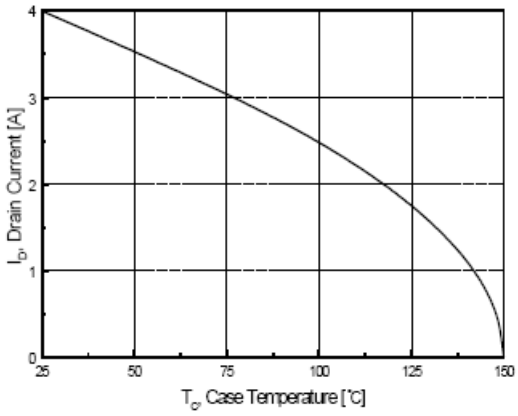


Fig. 6 Maximum Drain Current vs Case Temp.



TO-220F Package Dimension

Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	10.4		10.6	0.409		0.417
B	6.18		6.44	0.243		0.254
C	9.55		9.81	0.376		0.386
D	13.47		13.73	0.530		0.540
E	6.05		6.15	0.238		0.242
F	1.26		1.36	0.050		0.054
G	3.17		3.43	0.125		0.135
H	1.87		2.13	0.074		0.084
I	2.57		2.83	0.101		0.111
J		2.54			0.100	
K		5.08			0.200	
L	2.51		2.62	0.099		0.103
M	1.23		1.36	0.048		0.054
N	0.45		0.63	0.018		0.025
O	0.65		0.78	0.0025		0.031
ϕ		3.7			0.146	
ϕ 1		3.2			0.126	
ϕ 2		1.5			0.059