

# Advanced Power MOSFET

# SSF80N06A

## FEATURES

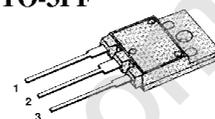
- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current : 10  $\mu$ A (Max.) @  $V_{DS} = 60V$
- Lower  $R_{DS(ON)}$  : 0.008  $\Omega$  (Typ.)

$$BV_{DSS} = 60 V$$

$$R_{DS(on)} = 0.01 \Omega$$

$$I_D = 55 A$$

### TO-3PF



1. Gate 2. Drain 3. Source

## Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	60	V
$I_D$	Continuous Drain Current ( $T_C=25^\circ C$ )	55	A
	Continuous Drain Current ( $T_C=100^\circ C$ )	39	
$I_{DM}$	Drain Current-Pulsed	192	A
$V_{GS}$	Gate-to-Source Voltage	$\leq 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy	3370	mJ
$I_{AR}$	Avalanche Current	55	A
$E_{AR}$	Repetitive Avalanche Energy	7.6	mJ
dv/dt	Peak Diode Recovery dv/dt	5.5	V/ns
$P_D$	Total Power Dissipation ( $T_C=25^\circ C$ )	76	W
	Linear Derating Factor	0.5	
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	- 55 to +175	$^\circ C$
$T_L$	Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds	300	

## Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	1.98	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient	--	40	



## Electrical Characteristics ( $T_C=25^\circ\text{C}$ ; unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
$BV_{DSS}$	Drain-Source Breakdown Voltage	60	--	--	V	$V_{GS}=0V, I_D=250\mu\text{A}$
$\mu\text{BV}/\mu\text{T}_J$	Breakdown Voltage Temp. Coeff.	--	0.046	--	V/ $^\circ\text{C}$	$I_D=250\mu\text{A}$ <b>See Fig 7</b>
$V_{GS(th)}$	Gate Threshold Voltage	2.0	--	4.0	V	$V_{DS}=5V, I_D=250\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage, Forward	--	--	100	nA	$V_{GS}=20V$
	Gate-Source Leakage, Reverse	--	--	-100	nA	$V_{GS}=-20V$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	10	$\mu\text{A}$	$V_{DS}=60V$
		--	--	100		$V_{DS}=48V, T_C=150^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance	--	--	0.01	$\Omega$	$V_{GS}=10V, I_D=27.5A$ $\text{②}$ $\text{③}$
$g_{fs}$	Forward Transconductance	--	40	--	$\text{S}$	$V_{DS}=30V, I_D=27.5A$ $\text{②}$ $\text{③}$
$C_{iss}$	Input Capacitance	--	4630	6020	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$ <b>See Fig 5</b>
$C_{oss}$	Output Capacitance	--	1220	1400		
$C_{rss}$	Reverse Transfer Capacitance	--	375	440		
$t_{d(on)}$	Turn-On Delay Time	--	22	55	ns	$V_{DD}=30V, I_D=85A,$ $R_G=4.8\Omega$ <b>See Fig 13</b> $\text{②}$ $\text{③}$ $\text{④}$
$t_r$	Rise Time	--	15	40		
$t_{d(off)}$	Turn-Off Delay Time	--	163	335		
$t_f$	Fall Time	--	64	140		
$Q_g$	Total Gate Charge	--	153	200	nC	$V_{DS}=48V, V_{GS}=10V,$ $I_D=85A$ <b>See Fig 6 &amp; Fig 12</b> $\text{②}$ $\text{③}$ $\text{④}$
$Q_{gs}$	Gate-Source Charge	--	33	--		
$Q_{gd}$	Gate-Drain(£ Miller£) Charge	--	61	--		

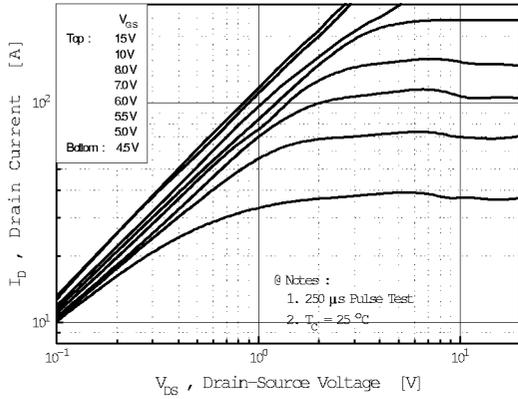
## Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
$I_S$	Continuous Source Current	--	--	55	A	Integral reverse pn-diode in the MOSFET
$I_{SM}$	Pulsed-Source Current $\text{②}$	--	--	192		
$V_{SD}$	Diode Forward Voltage $\text{②}$ $\text{③}$	--	--	1.5	V	$T_J=25^\circ\text{C}, I_S=55A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	--	92	--	ns	$T_J=25^\circ\text{C}, I_F=85A$
$Q_{rr}$	Reverse Recovery Charge	--	0.3	--	$\mu\text{C}$	$di_F/dt=100A/\mu\text{s}$ $\text{②}$ $\text{③}$

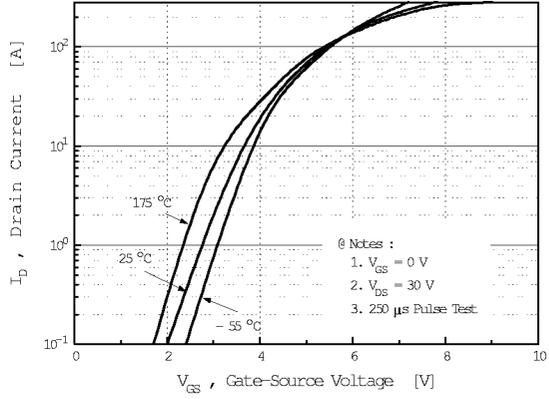
### Notes ;

- $\text{②}$  Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- $\text{③}$   $L=1.3\text{mH}, I_{AS}=55A, V_{DD}=25V, R_G=27\Omega$ , Starting  $T_J=25^\circ\text{C}$
- $\text{④}$   $I_{SD}$  : 85A,  $di/dt$  : 400A/ $\mu\text{s}$ ,  $V_{DD}$  :  $BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$
- $\text{⑤}$  Pulse Test : Pulse Width = 250 $\mu\text{s}$ , Duty Cycle ; 2%
- $\text{⑥}$  Essentially Independent of Operating Temperature

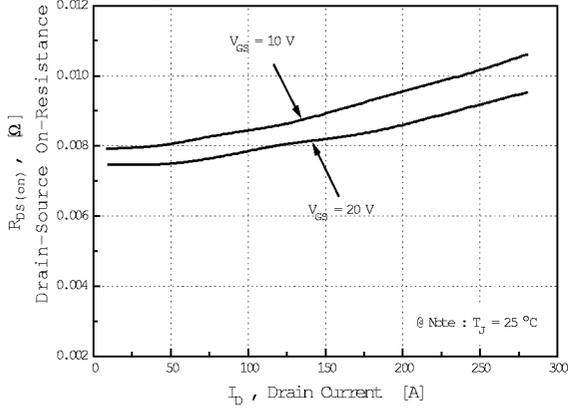
**Fig 1. Output Characteristics**



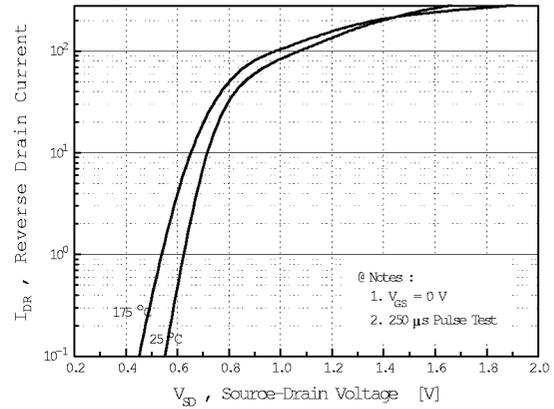
**Fig 2. Transfer Characteristics**



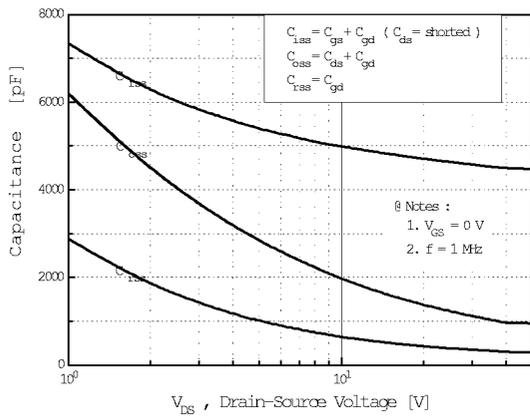
**Fig 3. On-Resistance vs. Drain Current**



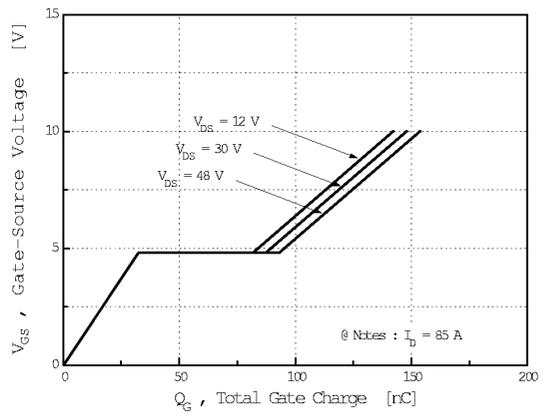
**Fig 4. Source-Drain Diode Forward Voltage**

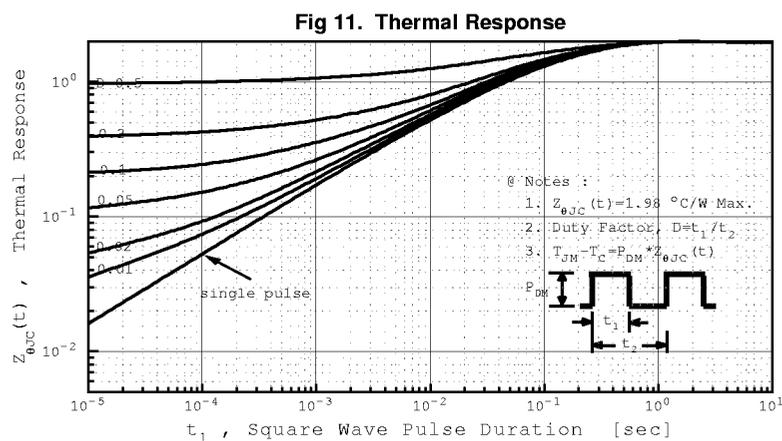
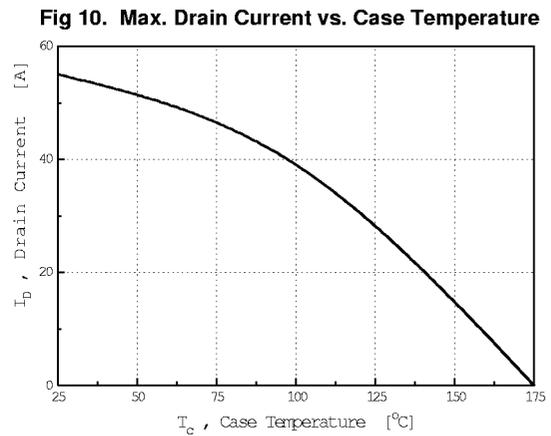
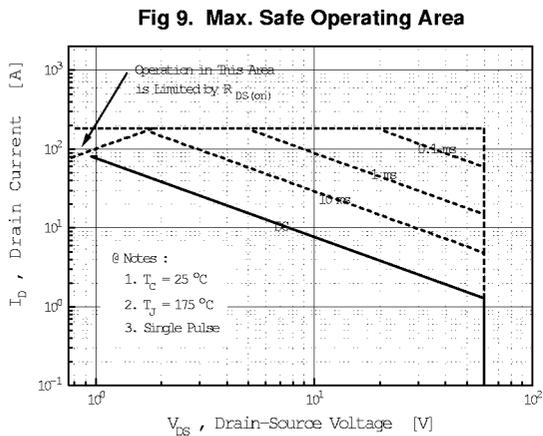
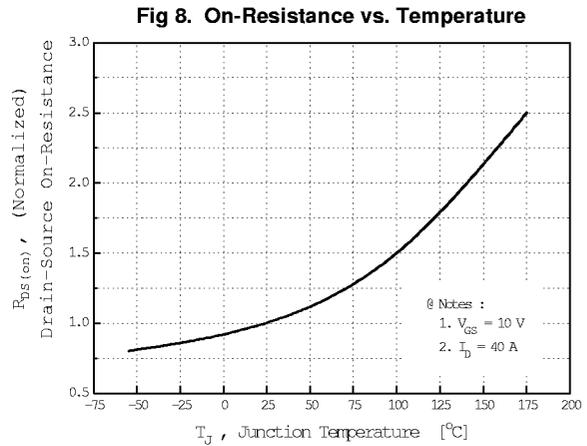
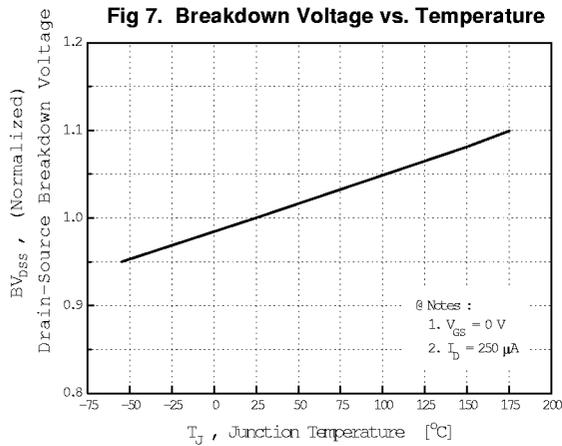


**Fig 5. Capacitance vs. Drain-Source Voltage**

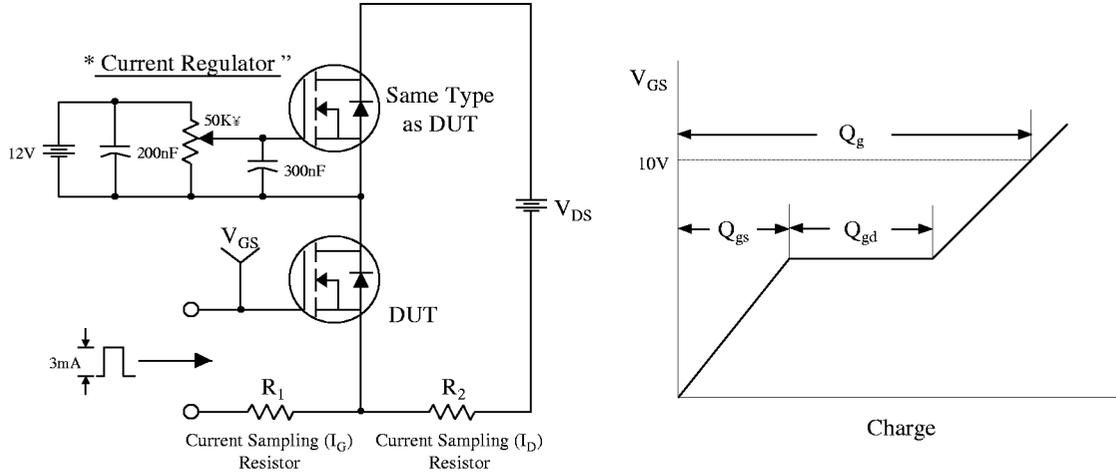


**Fig 6. Gate Charge vs. Gate-Source Voltage**

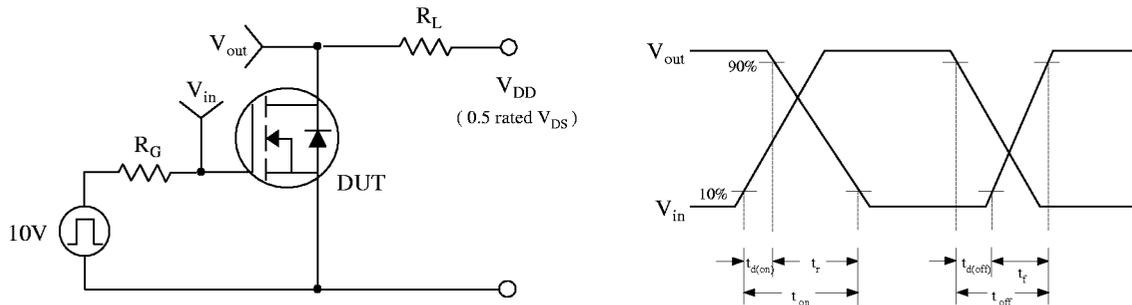




**Fig 12. Gate Charge Test Circuit & Waveform**



**Fig 13. Resistive Switching Test Circuit & Waveforms**



**Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms**

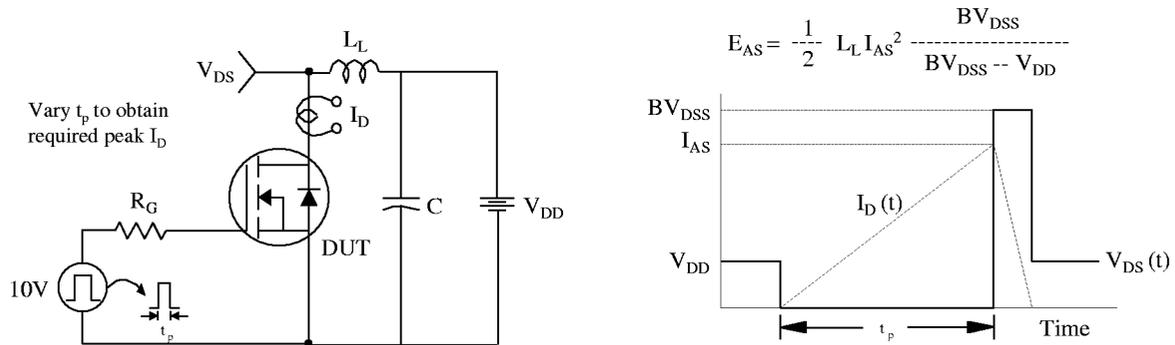


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

