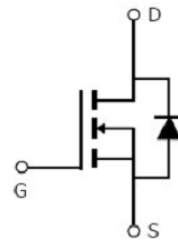


Main Product Characteristics:

V_{DS}	600V
$R_{DS(on)}$	0.059ohm(typ.)
I_D	47A


TO247

Schematic diagram
Features and Benefits:

- High dv/dt and avalanche capabilities
- 100% avalanche tested
- Low input capacitance and gate charge
- Low gate input resistance


Description:

The SSF47NS60H series MOSFETs is a new technology, which combines an innovative super junction technology and advance process. This new technology achieves low Rdson, energy saving, high reliability and uniformity, superior power density and space saving.

Absolute max Rating:

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V①	47	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V①	29.7	
I_{DM}	Pulsed Drain Current②	142	
P_D @TC = 25°C	Power Dissipation③	208	W
	Linear Derating Factor	3.12	W/°C
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=40.2mH	1267.4	mJ
I_{AS}	Avalanche Current @ L=20.6mH	9.5	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

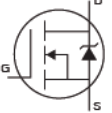
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ^③	—	0.32	°C/W
$R_{\theta JA}$	Junction-to-ambient ($t \leq 10s$) ^④	—	50	°C/W

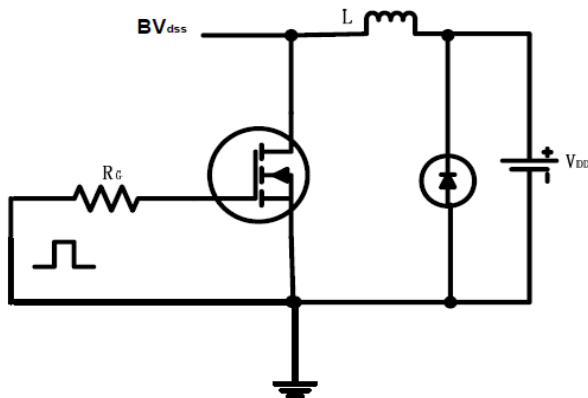
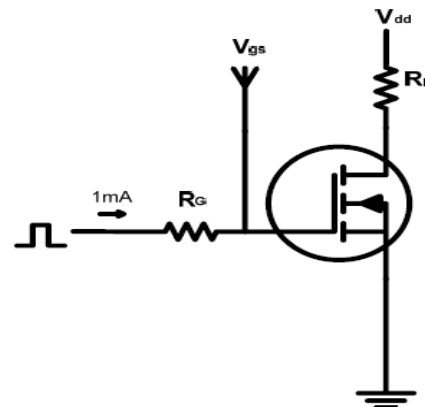
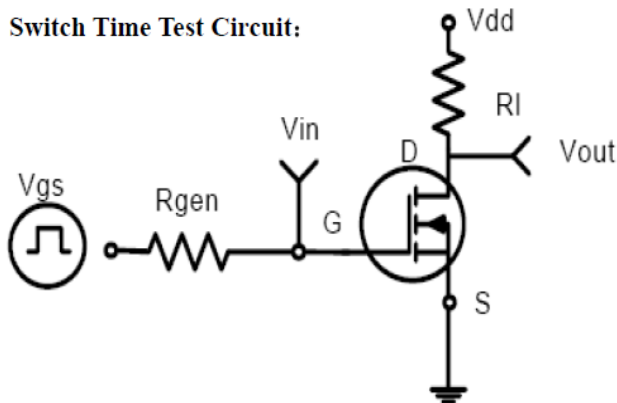
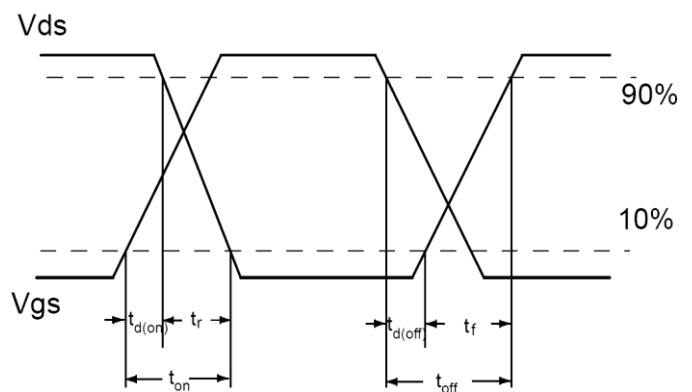
Electrical Characterizes @ $T_A=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	600	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	0.059	0.07	Ω	$V_{GS}=10V, I_D = 23A$
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	2.4	—		$T_J = 125^\circ\text{C}$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS}=600V, V_{GS} = 0V$
		—	—	50		$T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 30V$
		-100	—	—		$V_{GS} = -30V$
Q_g	Total gate charge	—	125	—	nC	$I_D = 47A,$ $V_{DS}=480V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source charge	—	29	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	46	—		
Q_{sw}	Gate-to-Source crossover charge	—	18	—		
$t_{d(on)}$	Turn-on delay time	—	36	—	ns	$V_{GS}=10V, V_{DS}=400V,$ $R_{GEN}=8.2\Omega$ $I_D=23A$
t_r	Rise time	—	83	—		
$t_{d(off)}$	Turn-Off delay time	—	135	—		
t_f	Fall time	—	17	—		
C_{iss}	Input capacitance	—	4000	—	pF	$V_{GS} = 0V$
C_{oss}	Output capacitance	—	8400	—		$V_{DS} = 10V$
C_{rss}	Reverse transfer capacitance	—	770	—		$f = 1\text{MHz}$

Source-Drain Ratings and Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	47	A	MOSFET symb showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	141	A	
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$I_S=20A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	470	—	ns	$T_J = 25^\circ\text{C}, I_F = 23.5A, di/dt = 80A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	8.7	—	uC	

Test circuits and Waveforms

EAS test circuits:

Gate charge test circuit:

Switch Time Test Circuit:

Switch Waveforms:


Notes:

- ①The maximum current rating is limited by bond-wires.
- ②Repetitive rating; pulse width limited by max. junction temperature.
- ③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Typical electrical and thermal characteristics

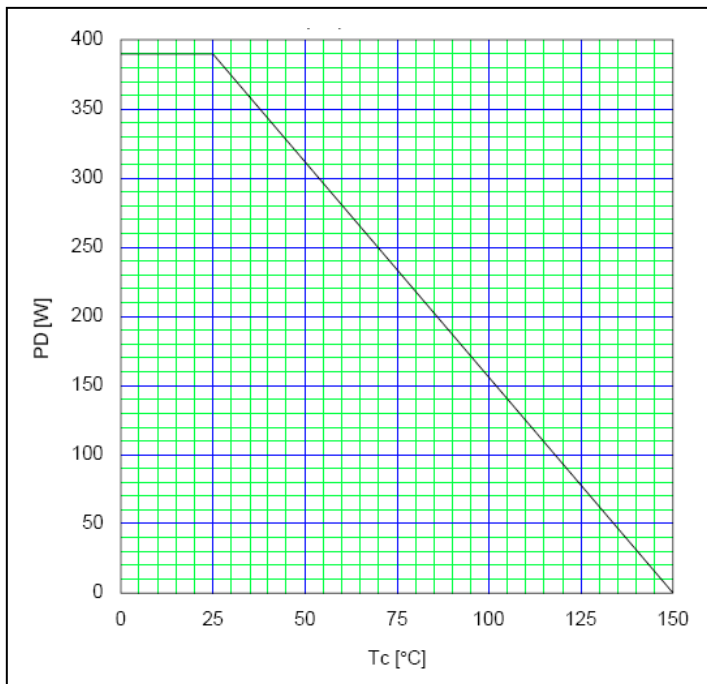


Figure 1: Power dissipation

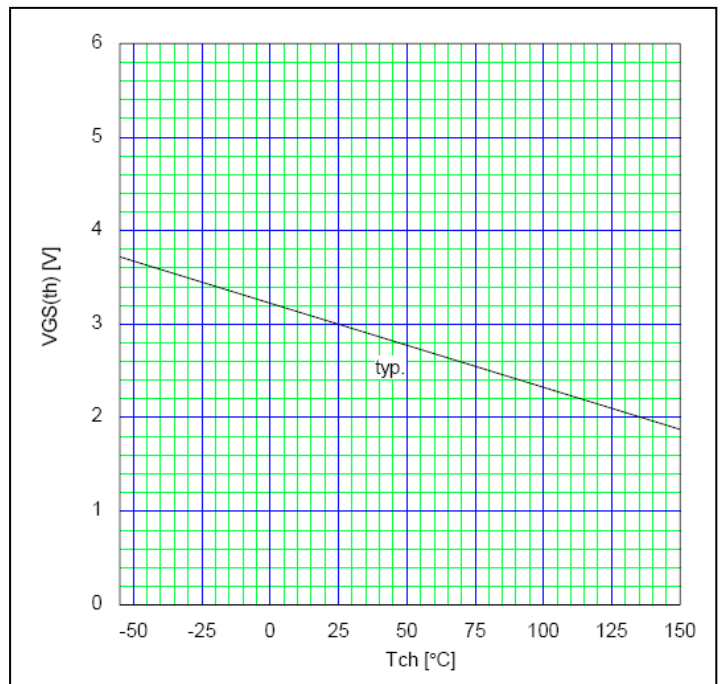


Figure 2: Typ. Gate to source cut-off voltage

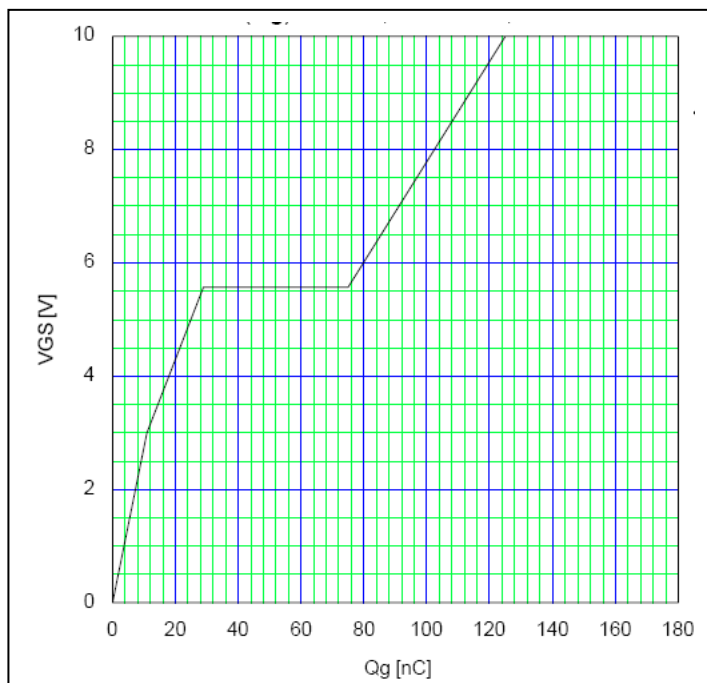


Figure 3: Typ. Gate charge

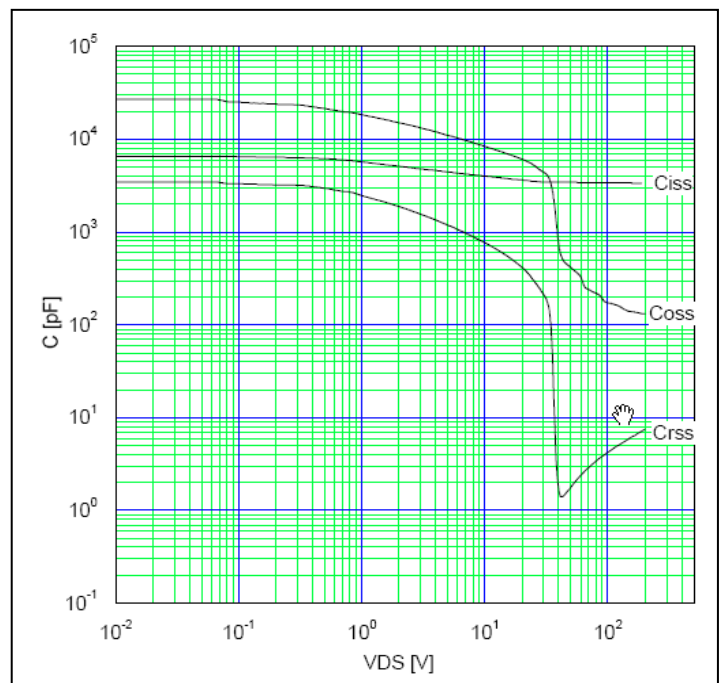


Figure 4: Typ. Capacitances

Typical electrical and thermal characteristics

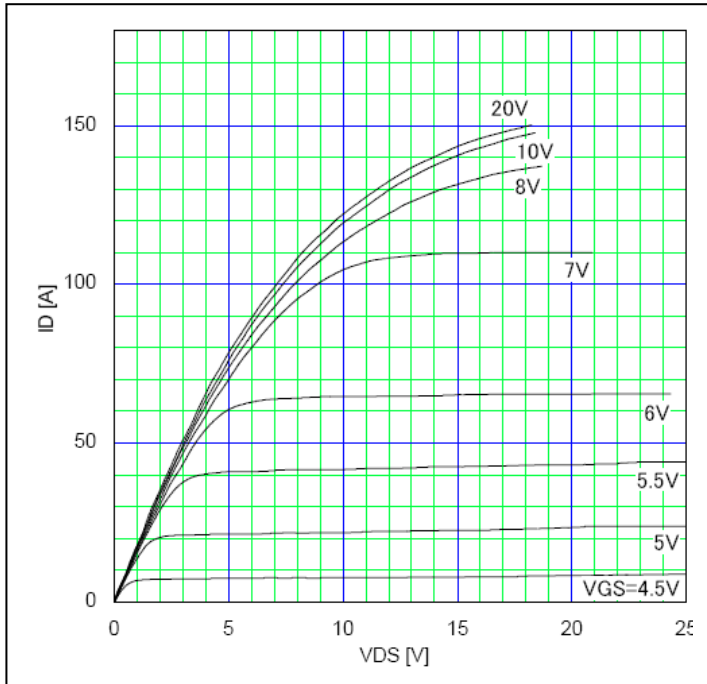


Figure 5. Typ. Output Characteristics

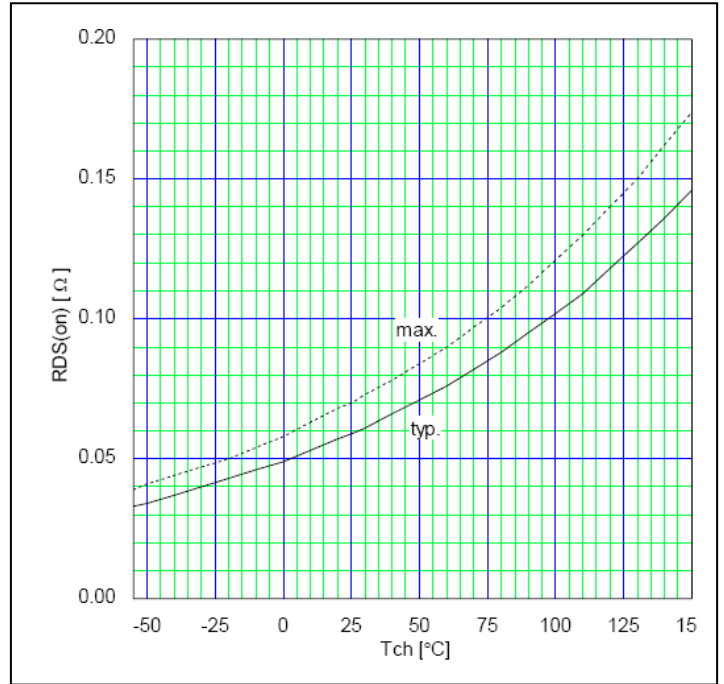


Figure 6. Drain-source on-state resistance

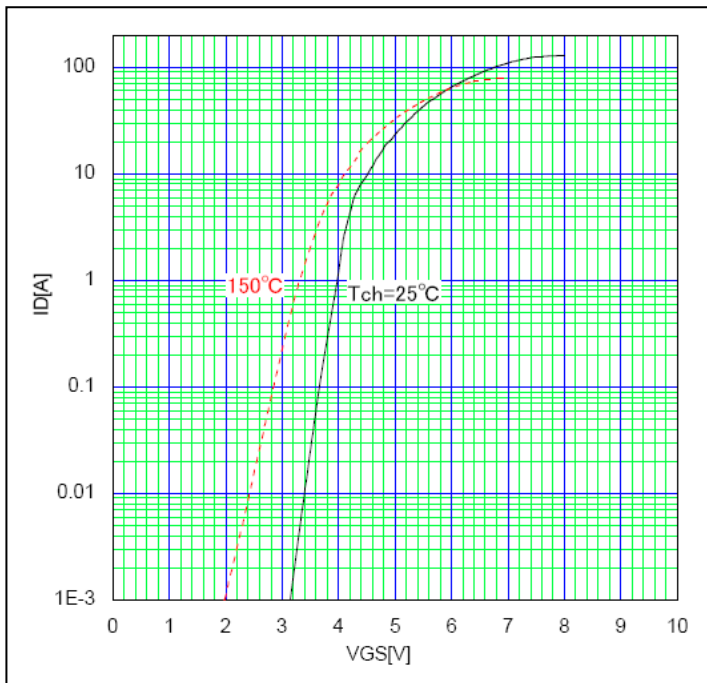


Figure 7. Typ. Transfer Characteristics

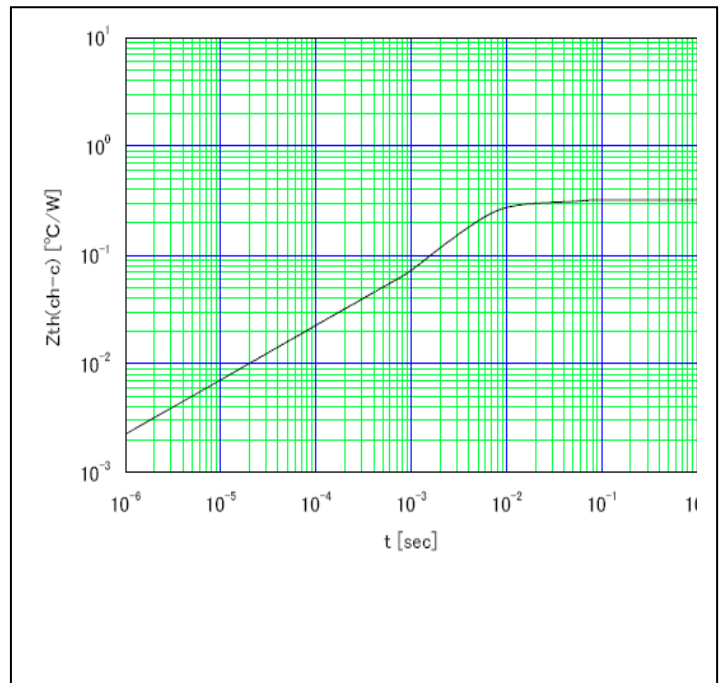
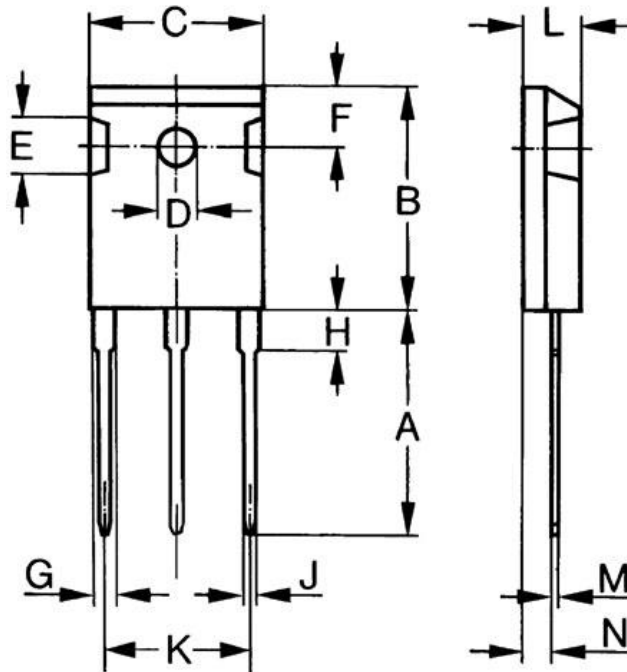


Figure 8. Drain-source on-state resistance

Mechanical Data:
TO247 PACKAGE OUTLINE DIMENSION


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.81	0.78	0.819
B	20.8	21.46	0.819	0.845
C	15.57	16.26	0.61	0.64
D	3.55	3.65	0.14	0.144
E	4.32	5.49	0.17	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	—	4.5	—	0.177
J	1	1.4	0.04	0.055
K	10.8	11	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

Ordering and Marking Information**Device Marking: SSF47NS60H**

Package (Available)

TO247

Operating Temperature Range

C : -55 to 150 °C

Devices per Unit

Package Type	Units/ Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO247	30	8	240	5	1200

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to 175°C @ 80% of Max $V_{\text{DSS}}/V_{\text{CES}}/V_{\text{R}}$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_j=150^{\circ}\text{C}$ or 175°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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