

SSP4N55/4N60

SSH4N55/4N60

N-CHANNEL

POWER MOSFETS

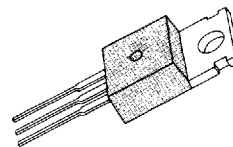
FEATURES

- Lower $R_{DS(on)}$
- Improved inductive ruggedness
- Fast switching times
- Rugged polysilicon gate cell structure
- Lower input capacitance
- Extended safe operating area
- Improved high temperature reliability

PRODUCT SUMMARY

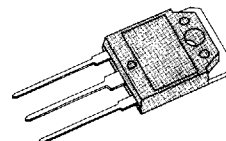
Part Number	V_{DS}	$R_{DS(on)}$		I_D
		A	STD	
SSP4N55/SSH4N55	550V	2.5 Ω	3.0 Ω	4A
SSP4N60/SSH4N60	600V	2.5 Ω	3.0 Ω	4A

TO-220



SSP4N55/4N60

TO-3P



SSH4N55/4N60

MAXIMUM RATINGS

Characteristic	Symbol	SSP4N55 SSH4N55	SSP4N60 SSH4N60	Unit
Drain-Source Voltage (1)	V_{DSS}	550	600	Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$)(1)	V_{DGR}	550	600	Vdc
Gate-Source Voltage	V_{GS}	± 20		Vdc
Continuous Drain Current $T_C=25^\circ C$	I_D	4	4	Adc
Continuous Drain Current $T_C=100^\circ C$	I_D	2.5	2.5	Adc
Drain Current—Pulsed (3)	I_{DM}	16	16	Adc
Gate Current—Pulsed	I_{GM}	± 1.5		Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	358		mJ
Avalanche Current	I_{AS}	4		A
Total Power Dissipation @ $T_C=25^\circ C$	P_D	75		Watts
Derate above $25^\circ C$		0.6		W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ C$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300		$^\circ C$

Notes: (1) $T_J=25^\circ C$ to $150^\circ C$

(2) Pulse test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

(3) Repetitive rating: Pulse with limited by max. junction temperature

(4) $L=42 mH$, $V_{dd}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

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ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage SSP4N60/SSH4N60	600	—	—	V	$V_{GS}=0V$ $I_D=250\mu A$
	SSP4N55/SSH4N55	550	—	—	V	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.5	V	$V_{DS}=V_{GS}$, $I_D=1mA$
I_{GSS}	Gate-Source Leakage Forward	—	—	100	nA	$V_{GS}=20V$
I_{GSS}	Gate-Source Leakage Reverse	—	—	-100	nA	$V_{GS}=-20V$
I_{OSS}	Zero Gate Voltage Drain Current	—	—	250	μA	$V_{DS}=\text{Max. Rating}$, $V_{GS}=0V$
		—	—	1000	μA	$V_{DS}=\text{Max. Rating} \times 0.8$, $V_{GS}=0V$, $T_C=125^\circ\text{C}$
$I_{D(on)}$	On-State Drain-Source Current (2)	4	—	—	A	$V_{DS} \geq 12V$, $V_{GS}=10V$
$R_{DS(on)}$	Static Drain-Source On-State A (4) Resistance (2) STD	—	—	2.5	Ω	$V_{GS}=10V$, $I_D=2.0A$
		—	—	3.0	Ω	
g_{fs}	Forward Transconductance (2)	2.0	3.1	—	Ω	$V_{DS} \geq 50V$, $I_D=2.0A$
C_{iss}	Input Capacitance	—	720	—	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0MHz$
C_{oss}	Output Capacitance	—	40	—	pF	
C_{rss}	Reverse Transfer Capacitance	—	—	40	pF	
$t_{d(on)}$	Turn-On Delay Time	—	—	40	ns	$V_{DD}=0.5BV_{DSS}$, $I_D=2.0A$, $Z_O=15\Omega$ (MOSFET switching times are essentially independent of operating temperature)
t_r	Rise Time	—	—	150	ns	
$t_{d(off)}$	Turn-Off Delay Time	—	—	100	ns	
t_f	Fall Time	—	—	60	ns	
Q_g	Total Gate Charge (Gate-Source Plus Gate-Drain)	—	25	—	nC	$V_{I0}=10V$, $I_D=8.0A$, $V_{DS}=0.8 \text{ Max. Rating}$ (Gate charge is essentially independent of operating temperature.)
Q_{gs}	Gate-Source Charge	—	—	15	nC	
Q_{gd}	Gate-Drain ("Miller") Charge	—	6.0	—	nC	

4

THERMAL RESISTANCE

Symbol	Characteristic		SSP4N50/60	SSH4N55/60		
R_{thJC}	Junction-to-Case	MAX	1.67	1.67	K/W	
R_{thCS}	Case-to-Sink	TYP	0.5	0.24	K/W	Mounting surface flat, smooth, and greased
R_{thJA}	Junction-to-Ambient	MAX	80	40	K/W	Free Air Operation

Notes: (1) $T_J=25^\circ\text{C}$ to 150°C
(2) Pulse test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

(3) Repetitive rating: Pulse width limited by max. junction temperature

(4) For Ultra low "A" $R_{DS(on)}$, device add "A" suffix to part number

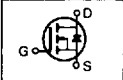
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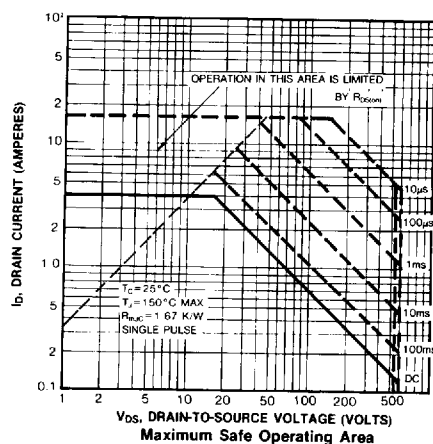
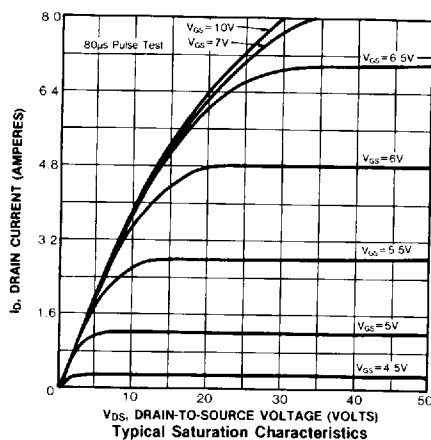
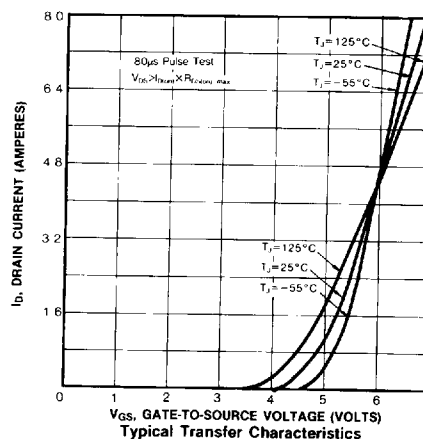
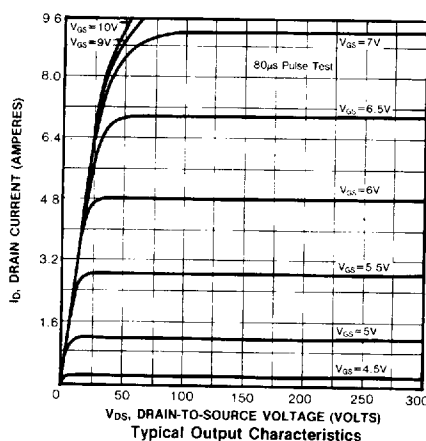
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SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	4.0	A	Modified MOSFET showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current(Body Diode)(3)	—	—	16.0	A	
V_{SD}	Diode Forward Voltage (2)	—	—	1.5	V	$T_C = 25^\circ\text{C}$, $I_S = 4.0\text{A}$, $V_{GS} = 0\text{V}$
t_{rr}	Reverse Recovery Time	—	600	—	μs	$T_I = 150^\circ\text{C}$, $I_F = 8.0\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$

Notes: (1) $T_J = 25^\circ\text{C}$ to 150°C (2) Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating: Pulse with limited by max. junction temperature

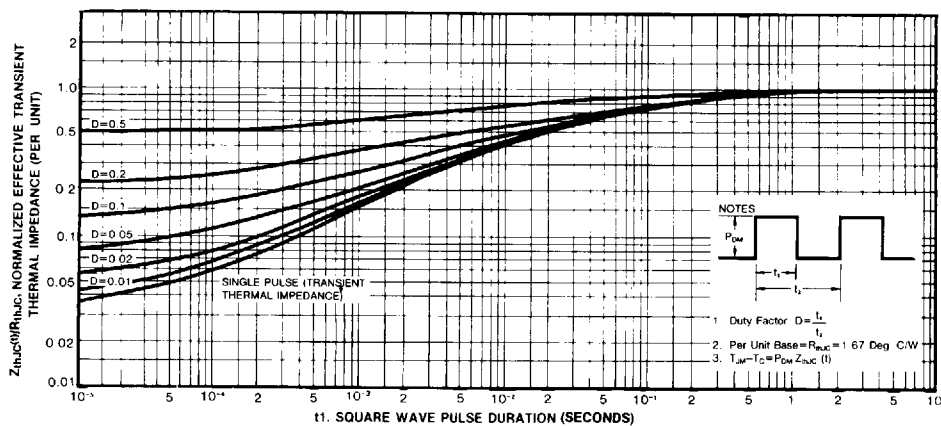


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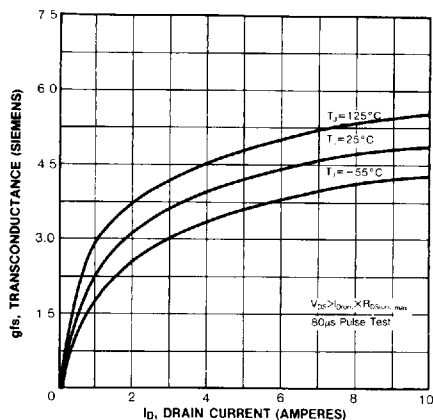
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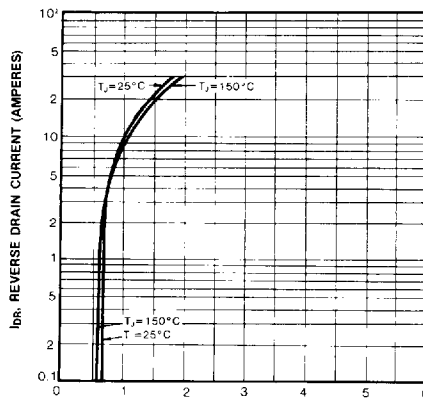
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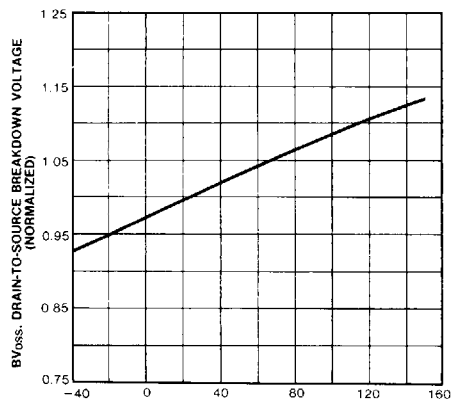
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



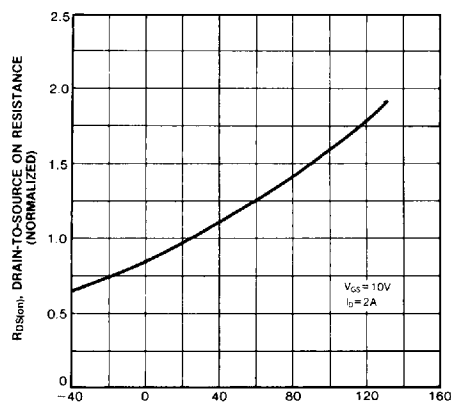
Typical Transconductance Vs. Drain Current



Typical Source-Drain Diode Forward Voltage



Breakdown Voltage Vs. Temperature



Normalized On-Resistance Vs. Temperature

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