

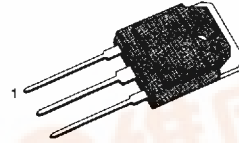
SSH4N90

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

TO-3P



1. Gate 2. Drain 3. Source

PRODUCT SUMMARY

Part Number	V _{DS}	R _{DS(on)}	I _D
SSH4N90	900V	4.0 Ω	4A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	SSH4N90	Unit
Drain-Source Voltage (1)	V _{DS}	900	V _{dc}
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$)(1)	V _{DGR}	900	V _{dc}
Gate-Source Voltage	V _{GS}	±30	V _{dc}
Continuous Drain Current T _c =25 °C	I _D	4.0	A _{dc}
Continuous Drain Current T _c =100 °C	I _D	2.8	A _{dc}
Drain Current - Pulsed (3)	I _{DM}	16.0	A _{dc}
Single Pulsed Avalanche Energy (4)	E _{AS}	280	mJ
Avalanche Current	I _{AS}	4.0	A
Total Power Dissipation at T _c =25 °C	P _D	125	Watts
Derate Above 25 °C		1.00	W/ °C
Operating and Storage Junction Temperature Range	T _J , T _{STG}	-55 to +150	°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T _L	300	°C

Notes : (1) T_J=25°C to 150°C

(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%

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

(4) L=33mH, V_{dd}=50V, R_G=25Ω, Starting T_J=25°C



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ELECTRICAL CHARACTERISTICS (T_c=25°C unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage	900	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	Gate Threshold Voltage	2.0	-	4.5	V	V _{DS} =V _{GS} , I _D =250μA
I _{GSS}	Gate-Source Leakage Forward	-	-	100	nA	V _{GS} =20V
I _{GSS}	Gate-Source Leakage Reverse	-	-	-100	nA	V _{GS} =-20V
I _{DSS}	Zero Gate Voltage Drain Current	-	-	250	μA	V _{DS} =Max. Rating, V _{GS} =0V
		-	-	1000	μA	V _{DS} =0.8 Max. Rating, V _{GS} =0V, T _c =150°C
R _{DS(on)}	Static Drain-Source On-Resistance(2)	-	2.1	3.0	Ω	V _{GS} =10V, I _D =2.0A
g _{fs}	Forward Transconductance (2)	3.5	-	-	∅	V _{DS} =15V, I _D =2.0A
C _{iss}	Input Capacitance	-	1470	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	Output Capacitance	-	105	-	pF	
C _{rss}	Reverse Transfer Capacitance	-	35	-	pF	
t _{d(on)}	Turn-On Delay Time	-	30	-	ns	V _{DD} =0.5 BV _{DSS} , I _D =4.0A, Z _θ =9.1Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	-	50	-	ns	
t _{d(off)}	Turn-Off Delay Time	-	180	-	ns	
t _f	Fall Time	-	50	-	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	70	nC	V _{GS} =10V, I _D =4A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q _{gs}	Gate-Source Charge	-	11	-	nC	
Q _{gd}	Gate-Drain ("Miller") Charge	-	28	-	nC	

THERMAL RESISTANCE

Symbol	Characteristics		SSH4N90	Units	Remark
R _{thJC}	Junction-to-Case	MAX	1.00	K/W	
R _{thCS}	Case-to-Sink	TYP	0.24	K/W	Mounting surface flat
R _{thJA}	Junction-to-Ambient	MAX	40	K/W	Free Air Operation

Notes : (1) T_J=25°C to 150°C

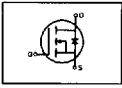
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%

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

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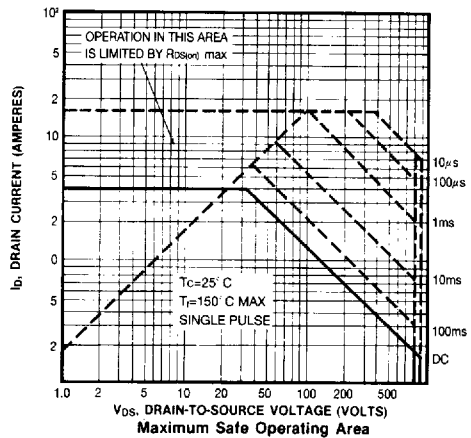
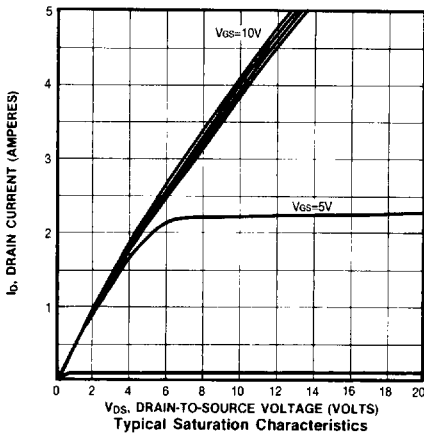
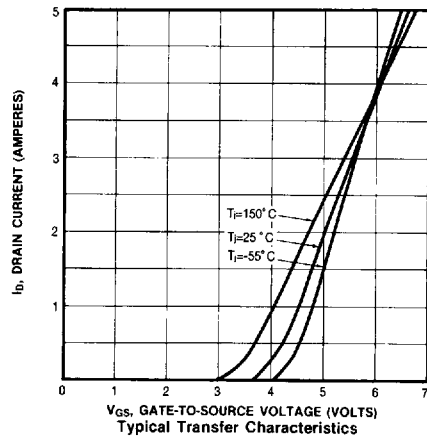
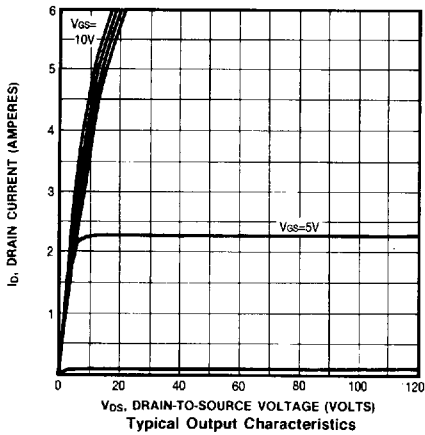
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	4	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	-	-	16	A	
V_{SD}	Diode Forward Voltage (2)	-	-	1.5	V	$T_J=25^\circ\text{C}$, $I_S=4\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	-	500	-	ns	$T_J=25^\circ\text{C}$, $I_F=4\text{A}$, $dI_F/dt=100\text{A}/\mu\text{S}$

Notes : (1) $T_J=25^\circ\text{C}$ to 150°C

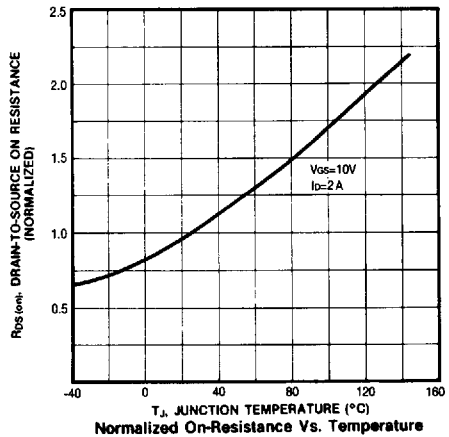
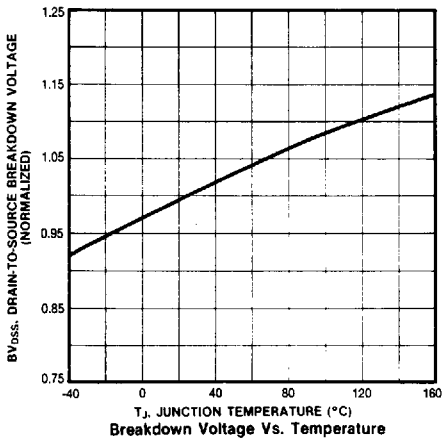
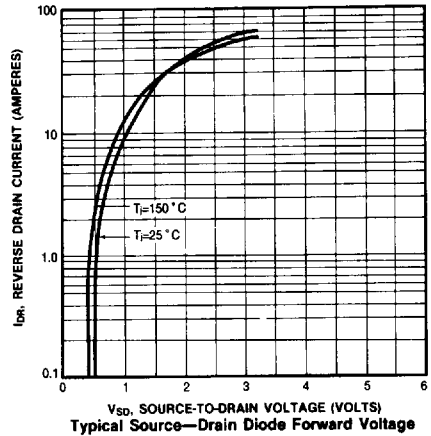
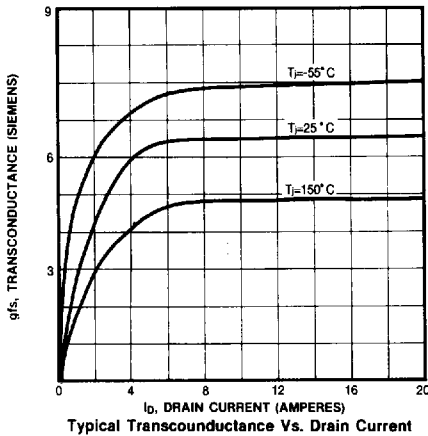
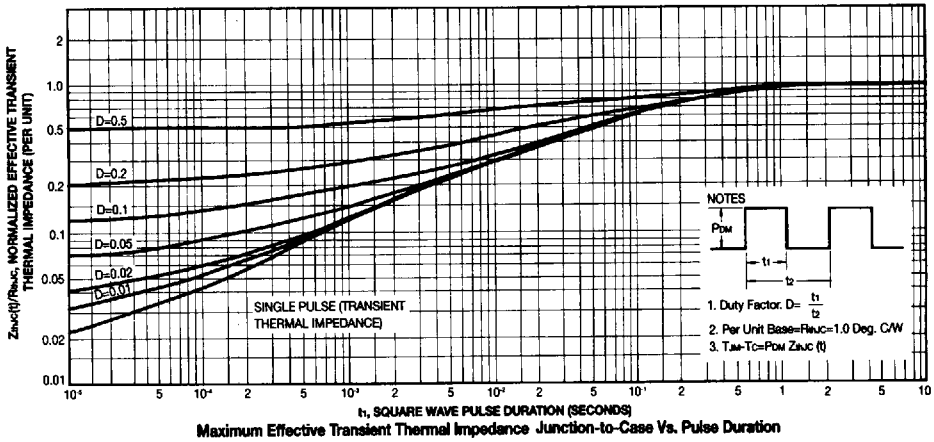
(2) Pulse test : Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

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



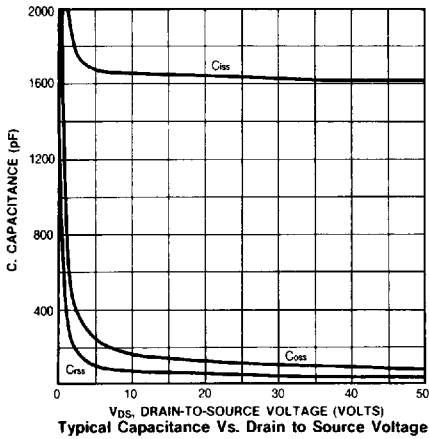
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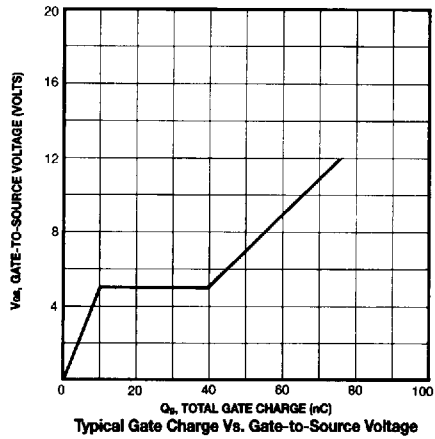


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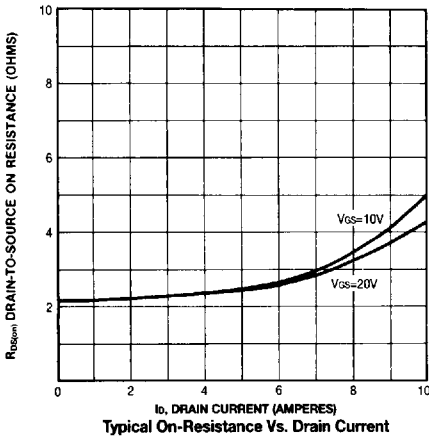
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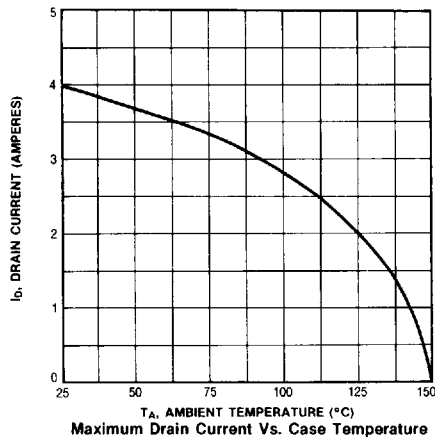
Typical Capacitance Vs. Drain to Source Voltage



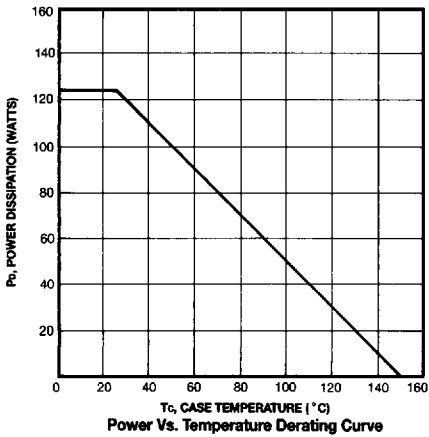
Typical Gate Charge Vs. Gate-to-Source Voltage



Typical On-Resistance Vs. Drain Current



Maximum Drain Current Vs. Case Temperature



Power Vs. Temperature Derating Curve