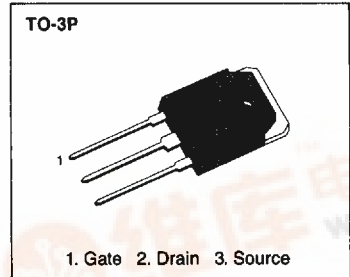


SSH40N20/15

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	BV _{DSS}	R _{DS(on)}	I _D
SSH40N20	200V	0.080Ω	40A
SSH40N15	150V	0.080Ω	40A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	SSH40N20	SSH40N15	Unit
Drain-Source Voltage (1)	V _{DSS}	200	150	V _{dc}
Drain-Gate Voltage (R _{GS} =1.0MΩ)(1)	V _{DGR}	200	150	V _{dc}
Gate-Source Voltage	V _{GS}	±20		V _{dc}
Continuous Drain Current T _c =25 °C	I _D	40		A _{dc}
Continuous Drain Current T _c =100 °C	I _D	28		A _{dc}
Drain Current - Pulsed (3)	I _{DM}	160		A _{dc}
Gate Current - Pulsed	I _{GM}	±1.5		A _{dc}
Single Pulsed Avalanche Energy (4)	E _{AS}	840		mJ
Avalanche Current	I _{AS}	40		A
Total Power Dissipation at T _c =25 °C	P _D	230		Watts
Derate above 25 °C		1.82		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=1mH, V_{GS}= 50V, R_G=25Ω, Starting T_J=25°C



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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage					
	SSH40N20	100	-	-	V	V _{GS} =0V, I _D =250μA
	SSH40N15	150	-	-	V	
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)	-	-	0.080	Ω	V _{GS} =10V, I _D =20A
g _{fs}	Forward Transconductance (2)	10	-	-	Ω	V _{DS} ≥50V, I _D =20A
C _{iss}	Input Capacitance	-	4440	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	Output Capacitance	-	770	-	pF	
C _{rss}	Reverse Transfer Capacitance	-	300	-	pF	
t _{d(on)}	Turn-On Delay Time	-	-	130	ns	V _{DD} =0.5 BV _{DSS} , I _D =40A, Z _θ =9.1Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	-	-	280	ns	
t _{d(off)}	Turn-Off Delay Time	-	-	630	ns	
t _f	Fall Time	-	-	210	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	160	nC	V _{GS} =10V, I _D =40A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q _{gs}	Gate-Source Charge	-	27	-	nC	
Q _{gd}	Gate-Drain ("Miller") Charge	-	66	-	nC	

THERMAL RESISTANCE

Symbol	Characteristics		All	Units	Remark
R _{thJC}	Junction-to-Case	MAX	0.55	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

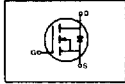
(2) Pulse test : Pulse width < 300μs, Duty Cycle < 2%

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

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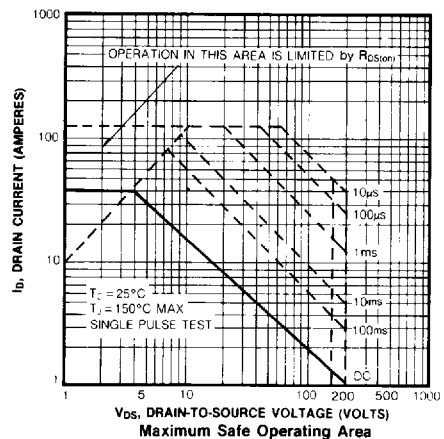
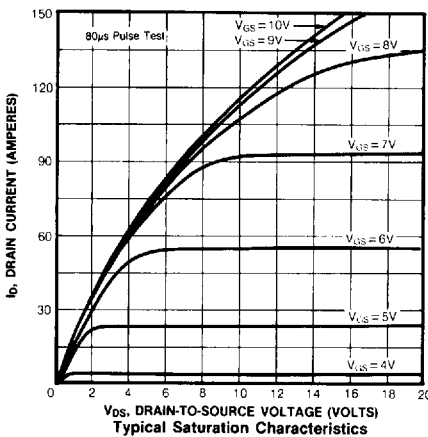
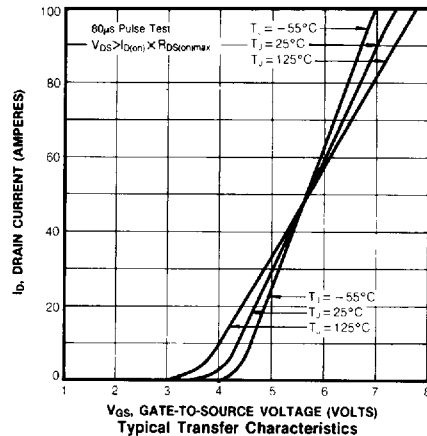
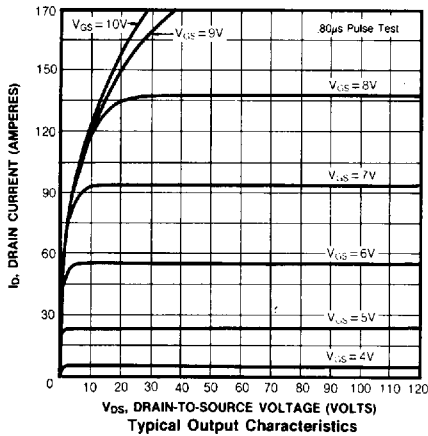
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

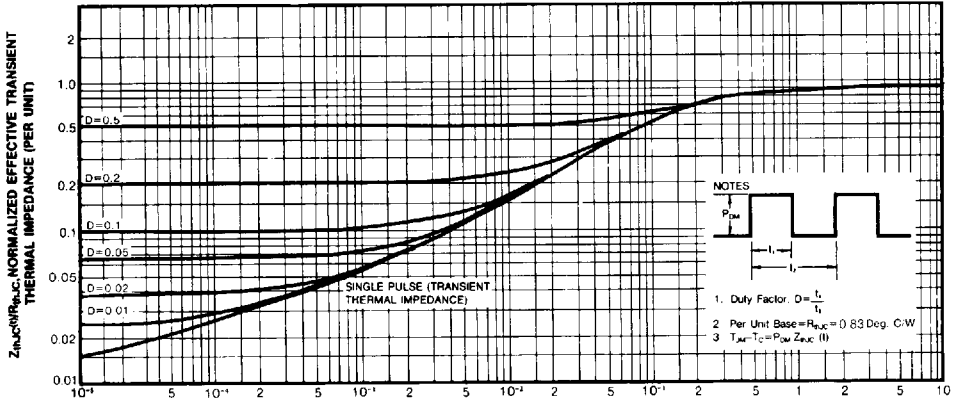
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	-	-	40	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I _{SM}	Pulse Source Current (Body Diode) (3)	-	-	160	A	
V _{SD}	Diode Forward Voltage (2)	-	-	2.5	V	T _J =25°C, I _S =40A, V _{GS} =0V
t _{rr}	Reverse Recovery Time	-	900	-	ns	T _J =25°C, I _F =40A, dI _F /dt=100A/μS

Notes : (1) T_J=25°C to 150°C

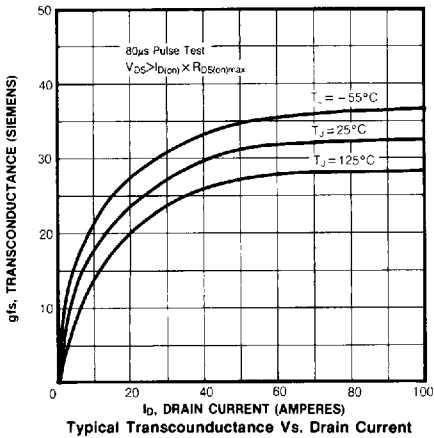
(2) Pulse test : Pulse width < 300μs, Duty Cycle < 2%

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

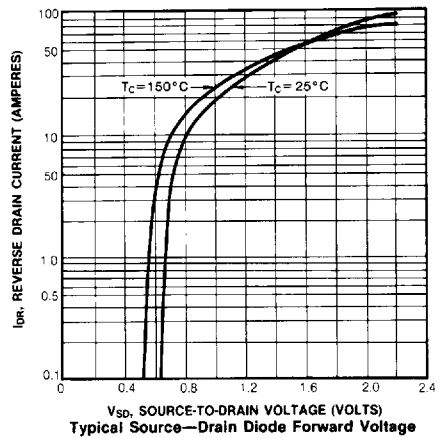




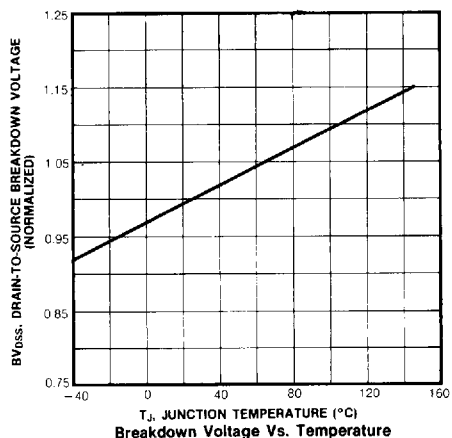
11. SQUARE WAVE PULSE DURATION (SECONDS)
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



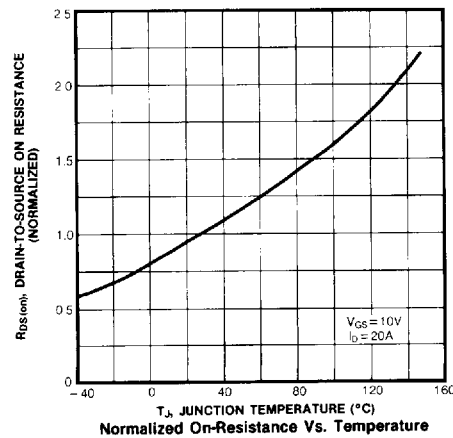
Typical Transconductance Vs. Drain Current



Typical Source-Drain Diode Forward Voltage



Breakdown Voltage Vs. Temperature



Normalized On-Resistance Vs. Temperature

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