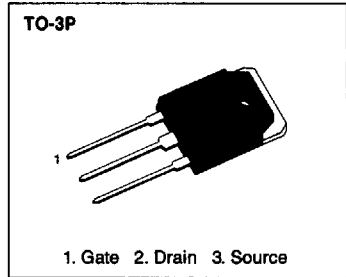


FEATURES

- 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_{DSS}	$R_{DS(on)}$	I_D
SSH20N50	500V	0.3Ω	20A
SSH20N45	450V	0.3Ω	20A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	SSH20N50	SSH20N45	Unit
Drain-Source Voltage (1)	V_{DSS}	500	450	Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$)(1)	V_{DGR}	500	450	Vdc
Gate-Source Voltage	V_{GS}	± 20		Vdc
Continuous Drain Current $T_c=25^\circ C$	I_D	20		Adc
Continuous Drain Current $T_c=100^\circ C$	I_D	14		Adc
Drain Current - Pulsed (3)	I_{DM}	80		Adc
Gate Current - Pulsed	I_{GM}	± 1.5		Adc
Single Pulsed Avalanche Energy (4)	EAS	960		mJ
Avalanche Current	I_{AS}	20		A
Total Power Dissipation at $T_c=25^\circ C$	P_D	230		Watts
Derate above $25^\circ C$		1.82		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 $< 300\mu s$, Duty Cycle $< 2\%$

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

(4) $L=4.3mH$, $V_d=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

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					
	SSH20N50	500	-	-	V	V _{GS} =0V, I _D =250 μ A
	SSH20N45	450	-	-	V	
V _{GS(th)}	Gate Threshold Voltage	2.0	-	4.5	V	V _{DS} =V _{GS} , I _D =250 μ A
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	μ A	V _{DS} =Max. Rating, V _{GS} =0V
		-	-	1000	μ A	V _{DS} =0.8 Max. Rating, V _{GS} =0V, T _C =150 $^\circ$ C
R _{DS(on)}	Static Drain-Source On-Resistance(2)	-	-	0.3	Ω	V _{GS} =10V, I _D =10A
g _{fs}	Forward Transconductance (2)	7.0	-	-	U	V _{DS} \geq 50V, I _D =10A
C _{iss}	Input Capacitance	-	4260	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	Output Capacitance	-	438	-	pF	
C _{rss}	Reverse Transfer Capacitance	-	125	-	pF	
t _{d(on)}	Turn-On Delay Time	-	-	130	ns	V _{DD} =0.5 BV _{DSS} , I _D =20A, Z _O =9.1 Ω (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	
Q _{gs}	Gate-Source Charge	-	27	-	nC	V _{GS} =10V, I _D =20A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q _{gd}	Gate-Drain ("Miller") Charge	-	66	-	nC	

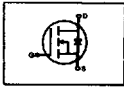
THERMAL RESISTANCE

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

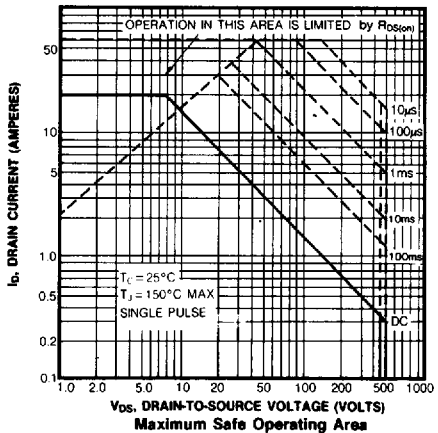
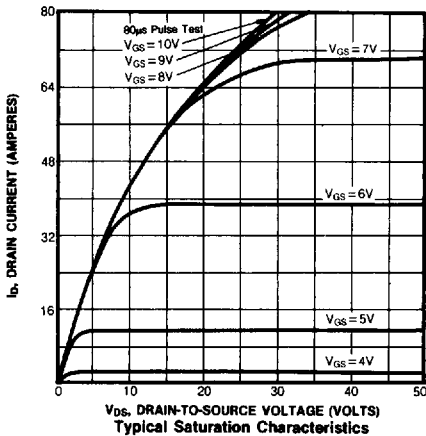
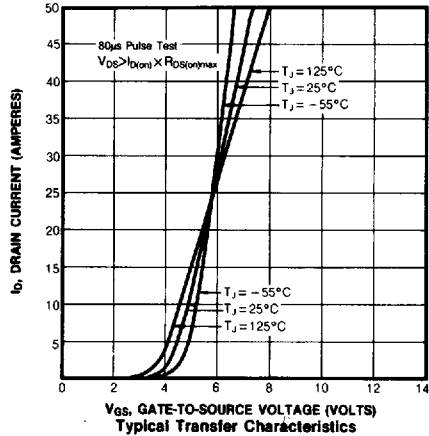
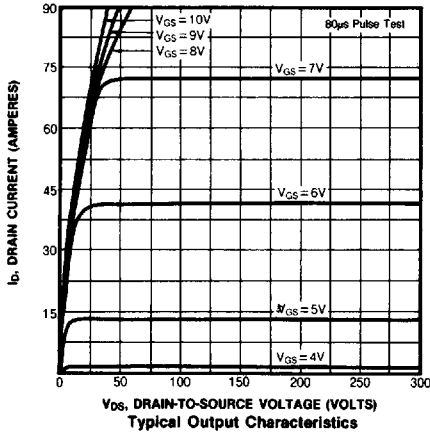
Notes : (1) T_J=25 $^\circ$ C to 150 $^\circ$ C(2) Pulse test : Pulse width < 300 μ s, Duty Cycle < 2%

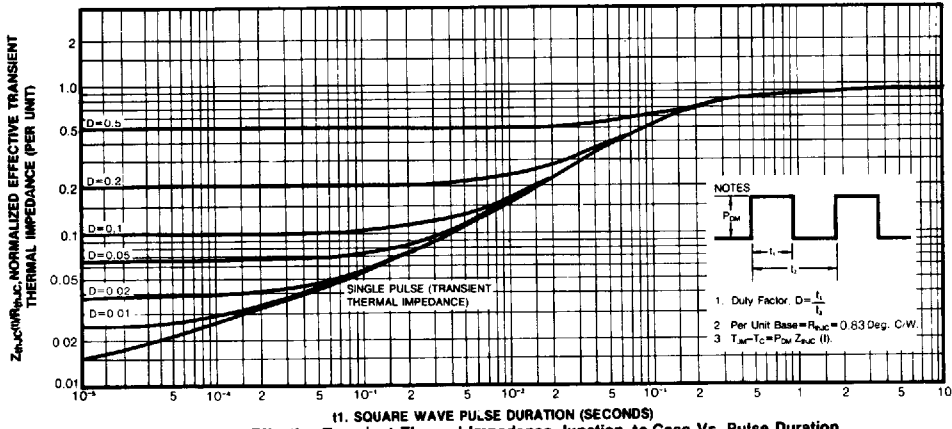
(3) Repetitive rating : Pulse width limited by junction temperature

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

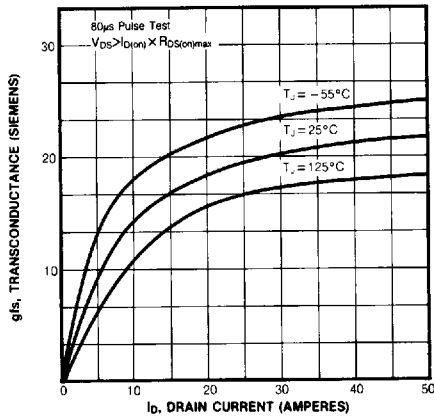
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	20	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	-	-	80	A	
V_{SD}	Diode Forward Voltage (2)	-	-	2.5	V	$T_J=25^\circ\text{C}$, $I_S=20\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	-	900	-	ns	$T_J=25^\circ\text{C}$, $I_F=20\text{A}$, $dI_F/dt=100\text{A}/\mu\text{S}$

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

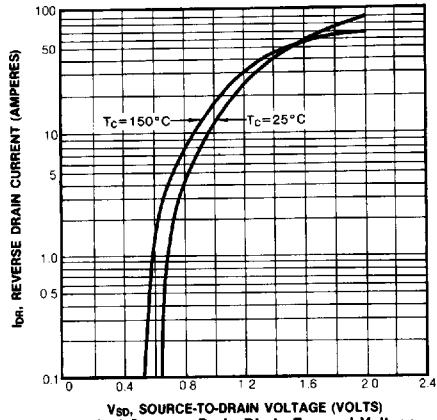




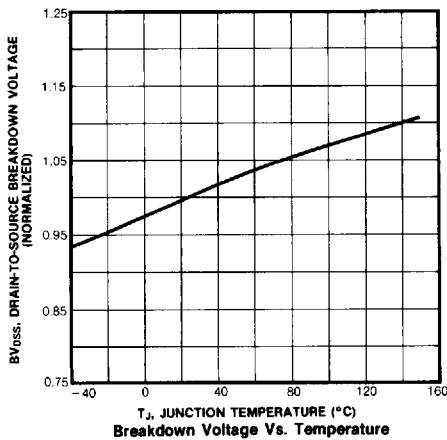
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



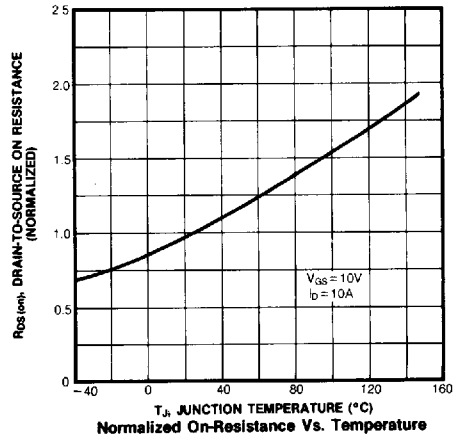
Typical Transconductance Vs. Drain Current



Typical Source-Drain Diode Forward Voltage



Breakdown Voltage Vs. Temperature



Normalized On-Resistance Vs. Temperature

