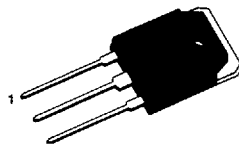


FEATURES

- 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
SSH20N50	500V	0.3Ω	20A
SSH20N45	450V	0.3Ω	20A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	SSH20N50	SSH20N45	Unit
Drain-Source Voltage (1)	V_{DS}	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	IAS	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) $L=4.3mH$, $V_{dd}=50V$, $R_G=25\Omega$, 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 _{DS}	Drain-Source Breakdown Voltage					
	SSH20N50	500	-	-	V	$V_{GS}=0V, I_D=250\mu A$
	SSH20N45	450	-	-	V	
V _{GS(th)}	Gate Threshold Voltage	2.0	-	4.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
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	μA	$V_{DS}=\text{Max. Rating}, V_{GS}=0V$
		-	-	1000	μA	$V_{DS}=0.8 \text{ Max. Rating}, V_{GS}=0V, T_c=150^\circ\text{C}$
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	-	-	Ω	$V_{DS}\geq 50V, I_D=10A$
C _{iss}	Input Capacitance	-	4260	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$
C _{oss}	Output Capacitance	-	438	-	pF	
C _{rss}	Reverse Transfer Capacitance	-	125	-	pF	
t _{d(on)}	Turn-On Delay Time	-	-	130	ns	$V_{DD}=0.5 BV_{DS}, I_D=20A, Z_{\theta}=9.1\Omega$ (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	$V_{GS}=10V, I_D=20A, V_{DS}=0.8 \text{ Max. Rating}$ (Gate charge is essentially independent of operating temperature)
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	160	nC	
Q _{gs}	Gate-Source Charge	-	27	-	nC	
Q _{gd}	Gate-Drain ("Miller") Charge	-	66	-	nC	

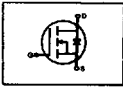
THERMAL RESISTANCE

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) $T_J=25^\circ\text{C}$ to 150°C (2) Pulse test : Pulse width $< 300\mu s$, 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

