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SamHop Microelectronics Corp.

STU/D420S

July 05, 2006

N-Channel Logic Level Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V _{DSS}	ID	R _{DS(ON)} (mΩ) Max
40V	24A	24 @ V _{GS} = 10V
		30 @ V _{GS} = 4.5V

FEATURES

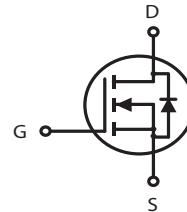
- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- TO-252 and TO-251 Package.



STU SERIES
TO-252AA(D-PAK)



STD SERIES
TO-251(I-PAK)



ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous ^a @ T _c =25°C -Pulsed ^b	I _D	24	A
	I _{DM}	75	A
Drain-Source Diode Forward Current	I _S	8	A
Maximum Power Dissipation @ T _c =25°C	P _D	50	W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to 175	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	R _{θJC}	3	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	50	°C/W

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ELECTRICAL CHARACTERISTICS ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	$I_{DS(0)}$	$V_{DS}=32V, V_{GS}=0V$		1		μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 10	μA
ON CHARACTERISTICS ^a						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.9	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$		17	24	$m\Omega$
		$V_{GS}=4.5V, I_D=8A$		23.5	30	$m\Omega$
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=10V, V_{GS}=10V$	30			A
Forward Transconductance	g_F	$V_{DS}=10V, I_D=10A$		16		S
DYNAMIC CHARACTERISTICS ^b						
Input Capacitance	C_{ISS}	$V_{DS}=15V, V_{GS}=0V$ $f=1.0MHz$		750		pF
Output Capacitance	C_{OSS}			110		pF
Reverse Transfer Capacitance	C_{RSS}			65		pF
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1.0MHz$		3		ohm
SWITCHING CHARACTERISTICS ^b						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=15V$ $I_D=1A$ $V_{GS}=10V$ $R_{GEN}=3 ohm$		13		ns
Rise Time	t_r			10		ns
Turn-Off Delay Time	$t_{D(OFF)}$			37		ns
Fall Time	t_f			12		ns
Total Gate Charge	Q_g	$V_{DS}=20V, I_D=10A, V_{GS}=10V$		15		nC
		$V_{DS}=20V, I_D=10A, V_{GS}=4.5V$		7		nC
Gate-Source Charge	Q_{gs}	$V_{DS}=20V, I_D=10A$ $V_{GS}=10V$		2.5		nC
Gate-Drain Charge	Q_{gd}			4		nC

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS ^a						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 8A$		0.84	1.3	V

Notes

a.Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

b.Guaranteed by design, not subject to production testing.

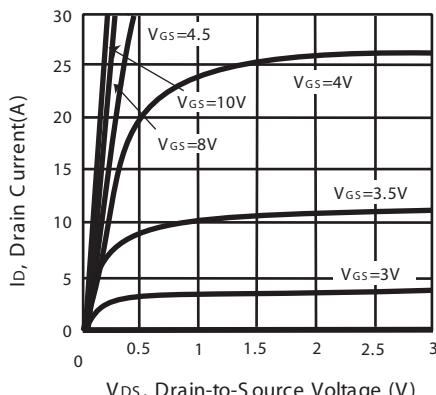


Figure 1. Output Characteristics

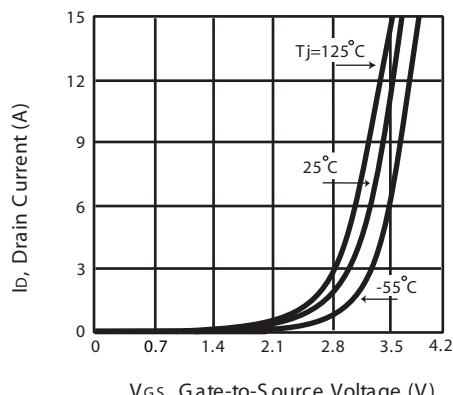


Figure 2. Transfer Characteristics

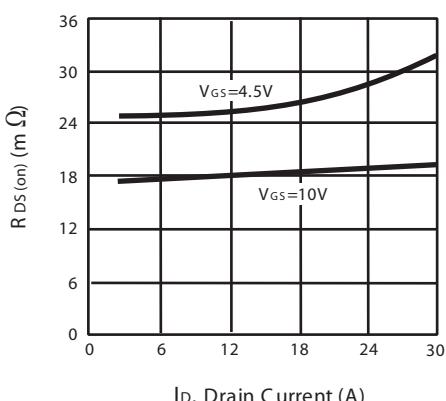


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

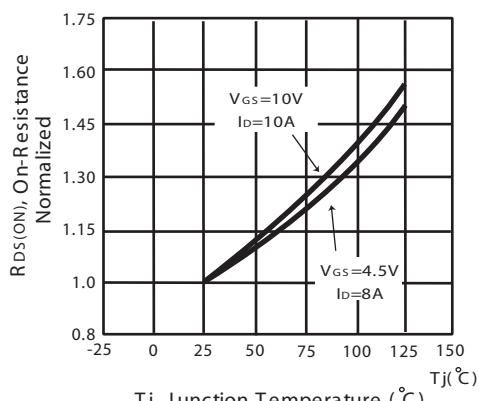


Figure 4. On-Resistance Variation with Drain Current and Temperature

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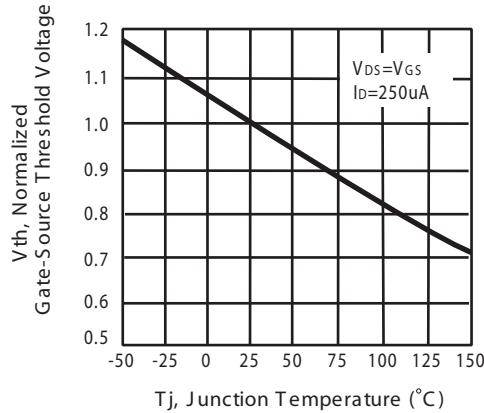


Figure 5. Gate Threshold Variation with Temperature

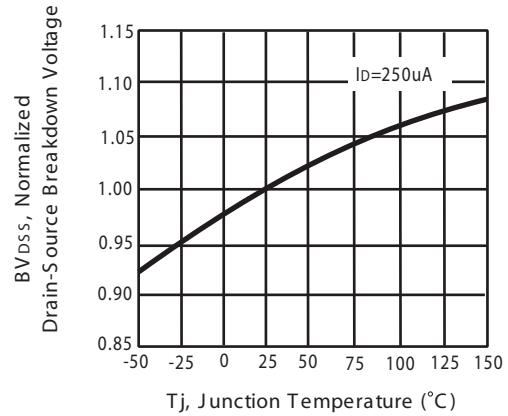


Figure 6. Breakdown Voltage Variation with Temperature

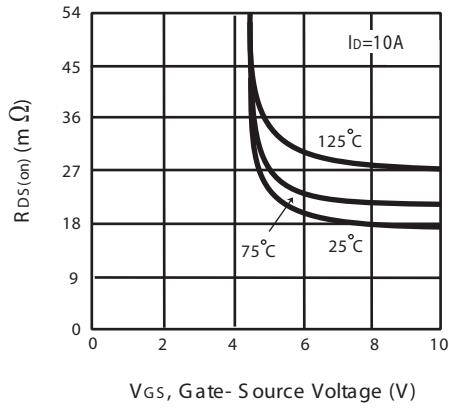


Figure 7. On-Resistance vs. Gate-Source Voltage

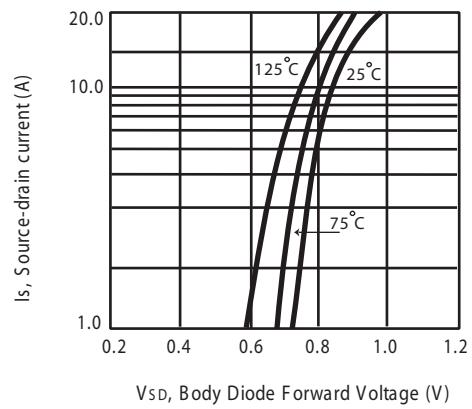


Figure 8. Body Diode Forward Voltage Variation with Source Current

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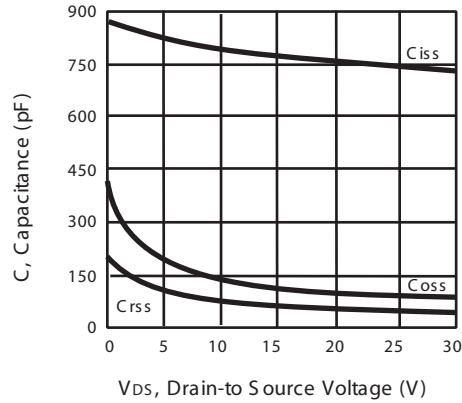


Figure 9. Capacitance

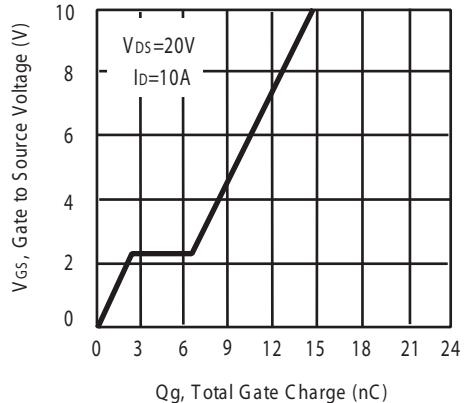


Figure 10. Gate Charge

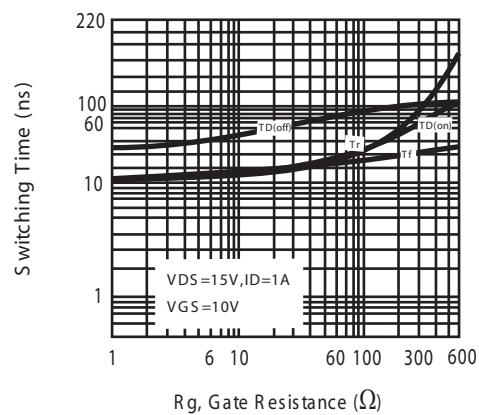


Figure 11. switching characteristics

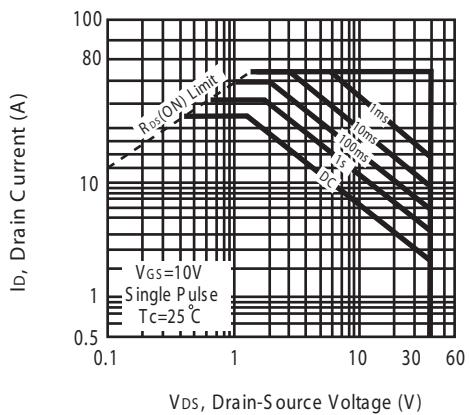


Figure 12. Maximum Safe Operating Area

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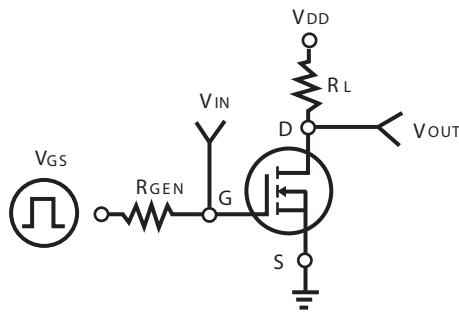


Figure 11. S switching Test Circuit

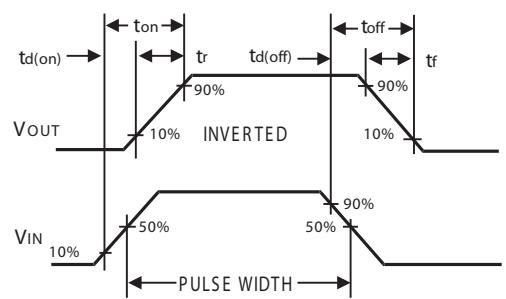


Figure 12. S switching Waveforms

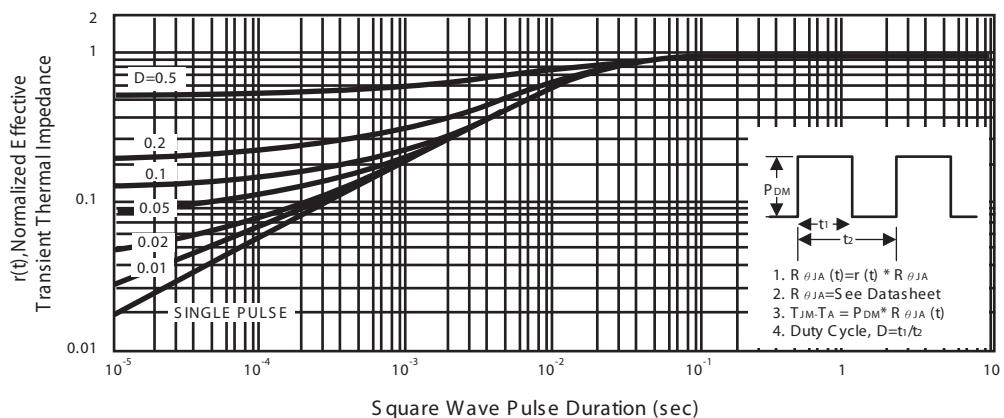


Figure 13. Normalized Thermal Transient Impedance Curve