SamHop Microelectronics Corp.

SDU/D40N03L

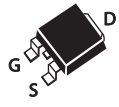
August, 2002

N-Channel Logic Level Enhancement Mode Field Effect Transistor

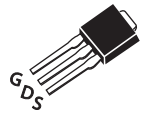
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) TYP
30V	40A	9 @ V_{GS} = 10V
		13 @ V_{GS} = 4.5V

FEATURES

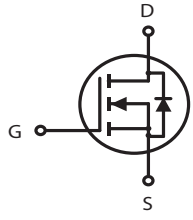
- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- TO-252 and TO-251 Package.



SDU SERIES
TO-252AA(D-PAK)



SDD SERIES
TO-251(I-PAK)



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous @ TJ=125°C	I_D	40	A
-Pulsed [a]	I_{DM}	120	A
Drain-Source Diode Forward Current	I_S	40	A
Maximum Power Dissipation @ Tc=25°C	P_D	50	W
Derate above 25°C		0.3	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
THERMAL CHARACTERISTICS			
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	°C/W

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ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V			10	uA
Gate-Body Leakage	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
ON CHARACTERISTICS [a]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250uA	1	1.5	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D =20A		9	10	m ohm
		V_{GS} = 4.5V, I_D = 10A		13	16	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	40			A
Forward Transconductance	g_{FS}	V_{DS} = 10V, I_D = 20A		30		S
DYNAMIC CHARACTERISTICS [b]						
Input Capacitance	C_{ISS}	V_{DD} =15V, V_{GS} = 0V f = 1.0MHz		1375		pF
Output Capacitance	C_{OSS}			670		pF
Reverse Transfer Capacitance	C_{RSS}			200		pF
SWITCHING CHARACTERISTICS [b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 15V, I_D =1A, V_{GS} = 10V, R_{GEN} = 6 ohm		30		ns
Rise Time	t_r			32		ns
Turn-Off Delay Time	$t_{D(OFF)}$			132		ns
Fall time	t_f			30		ns
Total Gate Charge	Q_g	V_{DS} = 10V,I_D = 40A,V_{GS} =10V		40	50	nC
		V_{DS} = 10V,I_D = 40A,V_{GS} =4.5V		19.5	23.5	nC
Gate-Source Charge	Q_{gs}	V_{DS} = 10V, I_D = 40A, V_{GS} =10V		8.2		nC
Gate-Drain Charge	Q_{gd}			5.3		nC

ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS [a]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, Is = 25A			1.3	V

Notes

a.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.

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

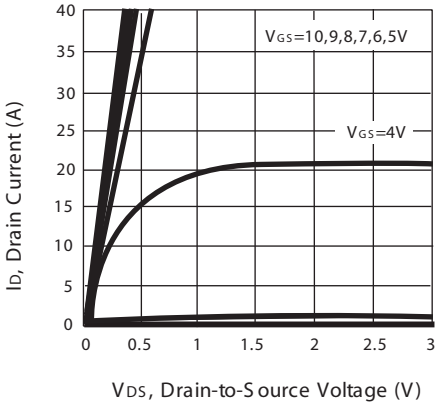

Figure 1. Output Characteristics

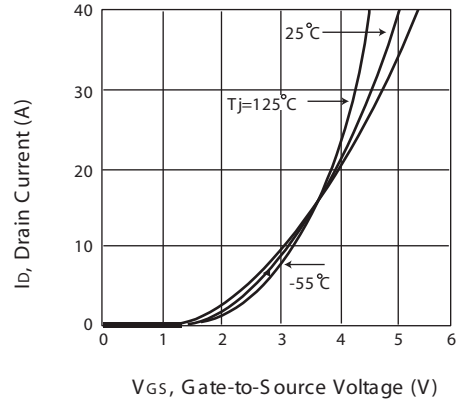

Figure 2. Transfer Characteristics

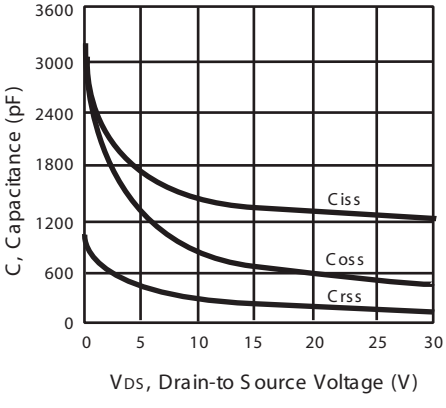

Figure 3. Capacitance

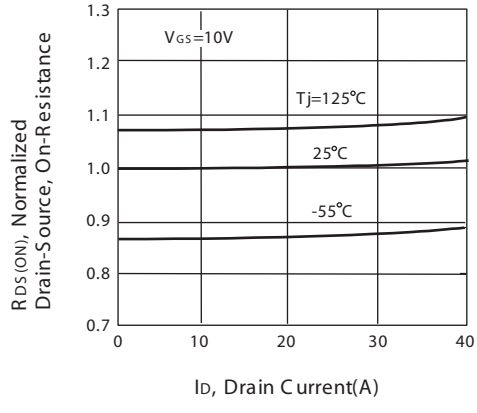

Figure 4. On-Resistance Variation with Drain Current and Temperature

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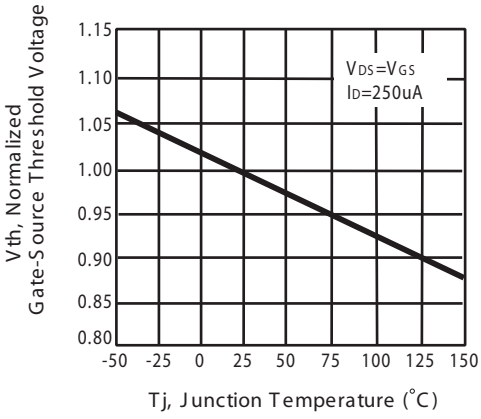

Figure 5. Gate Threshold Variation with Temperature

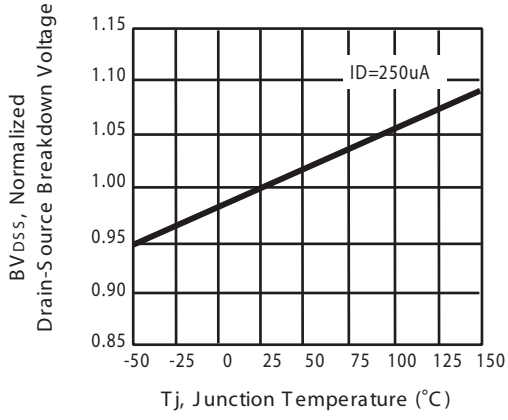

Figure 6. Breakdown Voltage Variation with Temperature

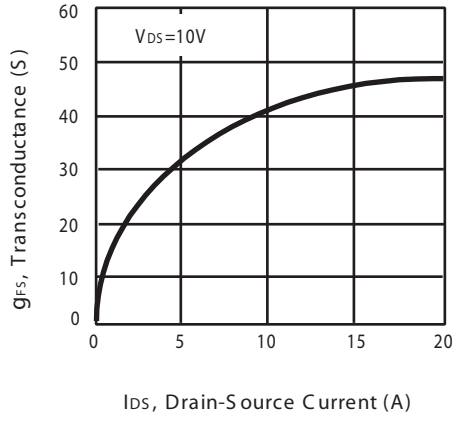

Figure 7. Transconductance Variation with Drain Current

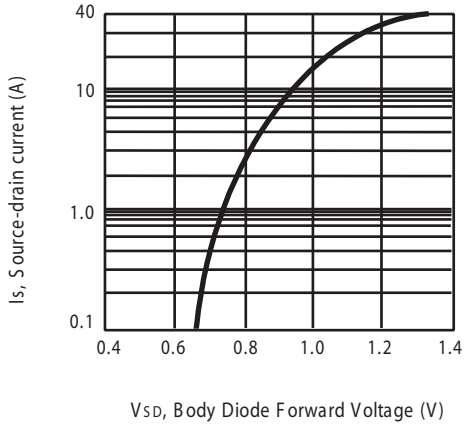

Figure 8. Body Diode Forward Voltage Variation with Source Current

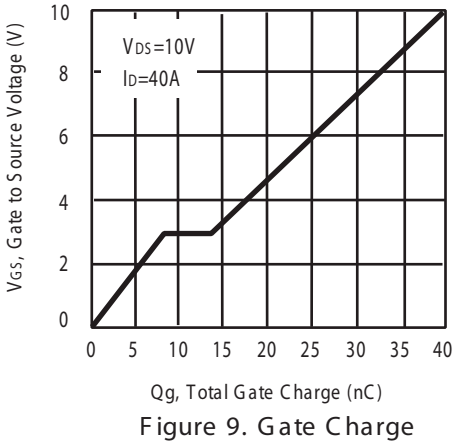

Figure 9. Gate Charge

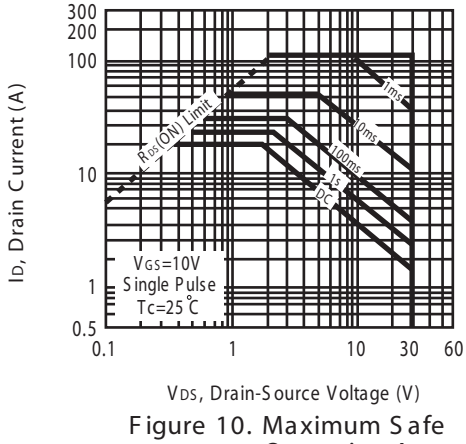

Figure 10. Maximum Safe Operating Area

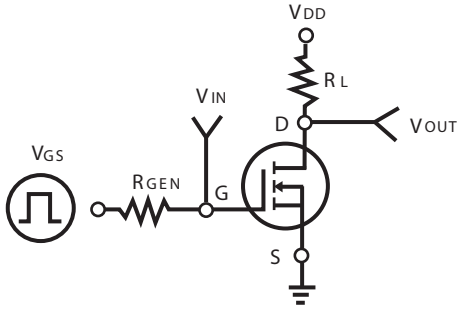

Figure 11. Switching Test Circuit

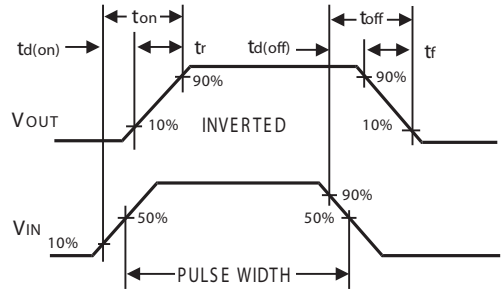

Figure 12. Switching Waveforms

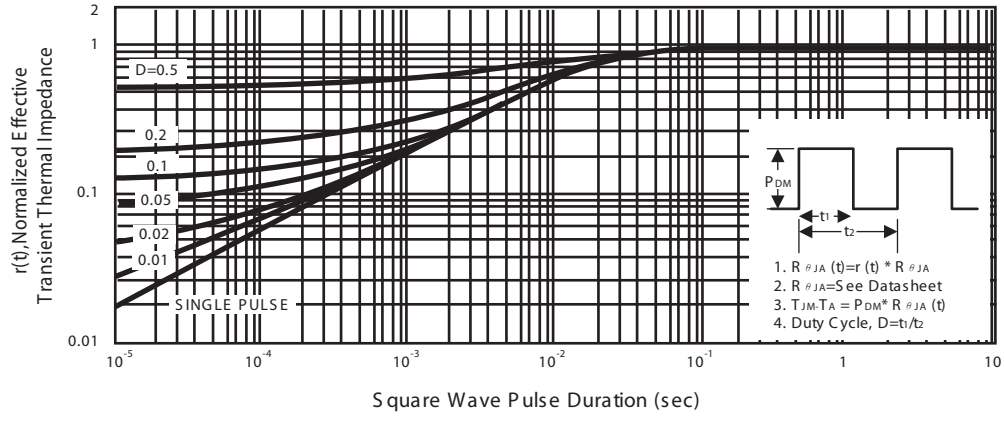

Figure 13. Normalized Thermal Transient Impedance Curve