SamHop Microelectronics Corp.

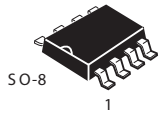
SDM8401

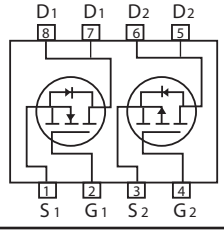
August, 2002

Dual Enhancement Mode Field Effect Transistor (N and P Channel)

PRODUCT SUMMARY (N-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) TYP
30V	6A	18.5 @ V_{GS} = 10V
		25 @ V_{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) TYP
-30V	-4.5A	38.5 @ V_{GS} = -10V
		57.5 @ V_{GS} = -4.5V





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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Drain Current-Continuous [a] @ T_J=125°C	I_D	±6.0	±4.5	A
-Pulsed [b]	I_{DM}	±18.0	±15	A
Drain-Source Diode Forward Current [a]	I_S	1.7	-1.7	A
Maximum Power Dissipation [a]	P_D	2.0		W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150		°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient [a]	$R_{\theta JA}$	62.5	°C/W

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N-Channel ELECTRICAL CHARACTERISTICS (T_A = 25 °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=250uA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS [b]						
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=9A		18.5	21	m ohm
		V_{GS}=4.5V, I_D=7A		25	32	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		16		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS}=15V, V_{GS}=0V f=1.0MHz		950		pF
Output Capacitance	C_{OSS}			420		pF
Reverse Transfer Capacitance	C_{RSS}			110		pF
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD}=15V, I_D=1A, V_{GS}=10V, R_{GEN}=6		7		ns
Rise Time	t_r			30		ns
Turn-Off Delay Time	$t_{D(OFF)}$			14		ns
Fall Time	t_f			54		ns
Total Gate Charge	Q_g	V_{DS}=15V, I_D=9A, V_{GS}=10V		25.2	35	nC
		V_{DS}=15V, I_D=9A, V_{GS}=4.5V		12.1	14.6	nC
Gate-Source Charge	Q_{gs}	V_{DS}=15V, I_D=9A, V_{GS}=10V		5.12		nC
Gate-Drain Charge	Q_{gd}			4.8		nC

P-Channel ELECTRICAL CHARACTERISTICS (T_A=25°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=-250uA	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	μA
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS [b]						
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=-4.5A		38.5	53	m ohm
		V_{GS}=-4.5V, I_D=-3.6A		57.5	95	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS}=-5V, V_{GS}=-10V	-20			A
Forward Transconductance	g_{FS}	V_{DS}=-15V, I_D=-4.5A	5	10		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS}=-15V, V_{GS}=0V f=1.0MHz		860		pF
Output Capacitance	C_{OSS}			457		pF
Reverse Transfer Capacitance	C_{RSS}			140		pF
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_D=-15V, R_L=15 I_D=-1A, V_{GEN}=-10V, R_{GEN}=6		9	20	ns
Rise Time	t_r			10	40	ns
Turn-Off Delay Time	$t_{D(OFF)}$			37	90	ns
Fall Time	t_f			23	110	ns
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-4.9A,V_{GS}=-10V		15	20	nC
		V_{DS}=-15V,I_D=-4.9A,V_{GS}=-4.5V		8	10	nC
Gate-Source Charge	Q_{gs}	V_{DS}=-15V, I_D=-4.9A, V_{GS}=-10V		3		nC
Gate-Drain Charge	Q_{gd}			4		nC

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

Parameter	Symbol	Condition		Min	Typ[c]	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS [b]							
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, Is =1.7A	N-Ch		0.77	1.2	V
		V_{GS} = 0V, Is =-1.7A	P-Ch		-0.80	-1.2	

Notes

a.Surface Mounted on FR4 Board, t≤10sec.
b.Pulse Test:Pulse Width≤300 μs, Duty Cycle ≤ 2%.
c.Guaranteed by design, not subject to production testing.
N-Channel

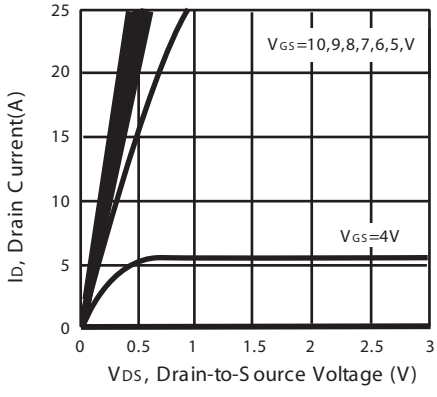


Figure 1. Output Characteristics

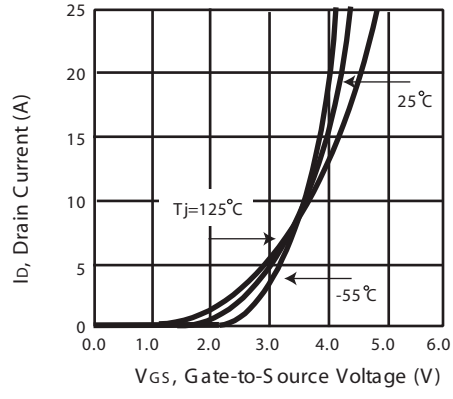


Figure 2. Transfer Characteristics

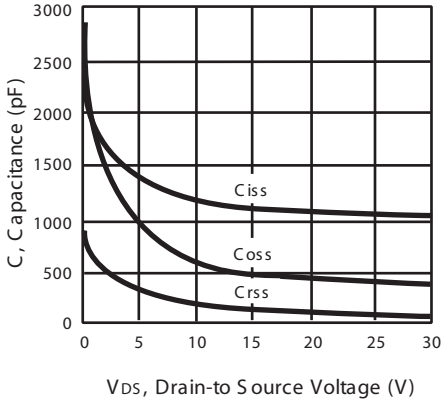


Figure 3. Capacitance

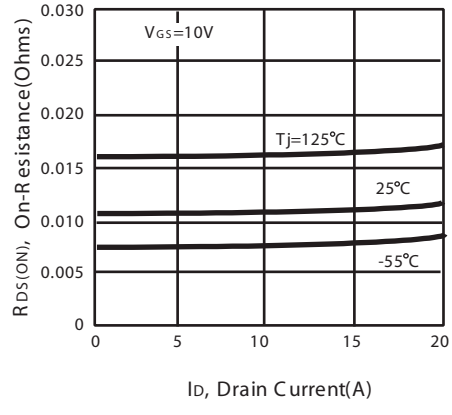


Figure 4. On-Resistance Variation with Drain Current and Temperature

N-Channel

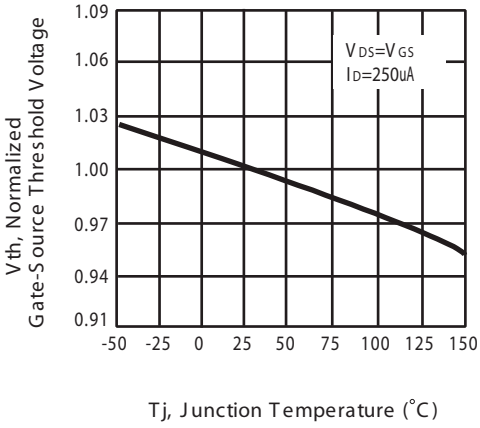


Figure 5. Gate Threshold Variation with Temperature

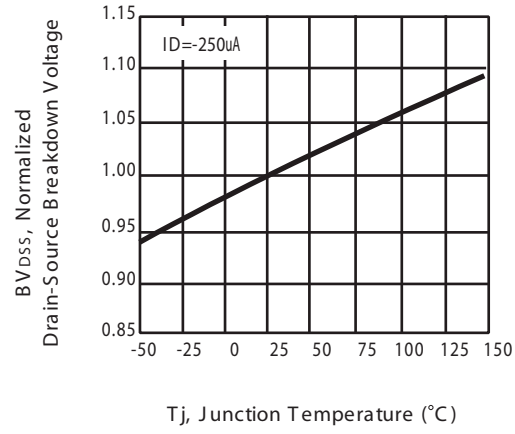
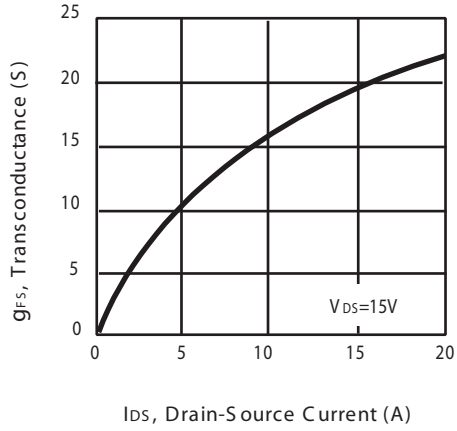


Figure 6. Breakdown Voltage Variation with Temperature



with Drain Current

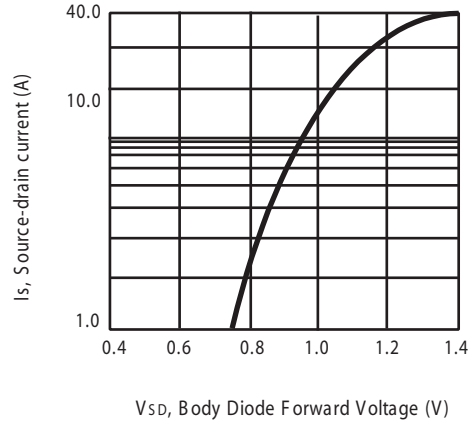


Figure 8. Body Diode Forward Voltage Variation with Source Current

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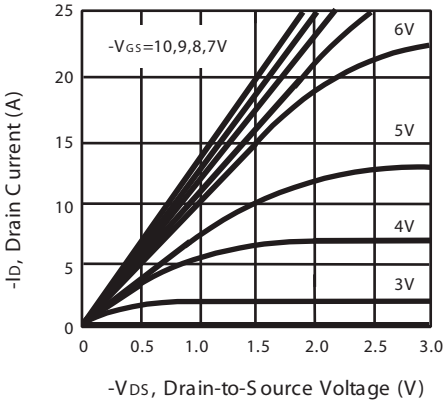

Figure 1. Output Characteristics

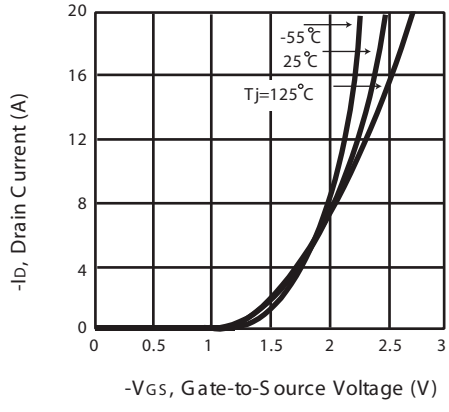

Figure 2. Transfer Characteristics

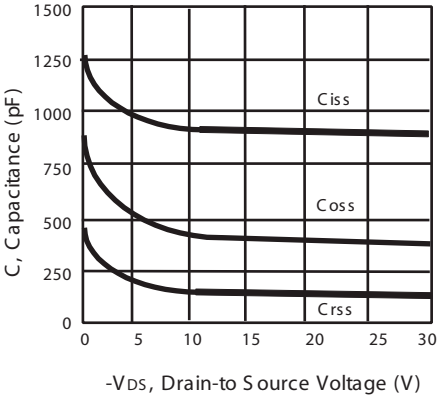

Figure 3. Capacitance

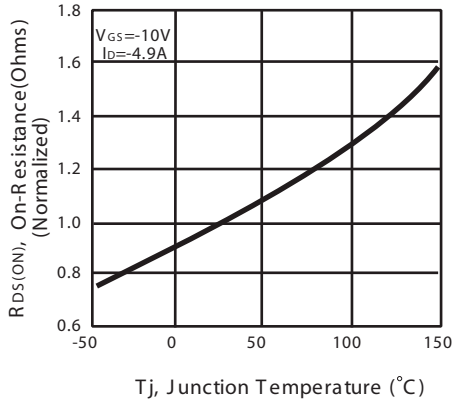

Figure 4. On-Resistance Variation with Temperature

P-Channel

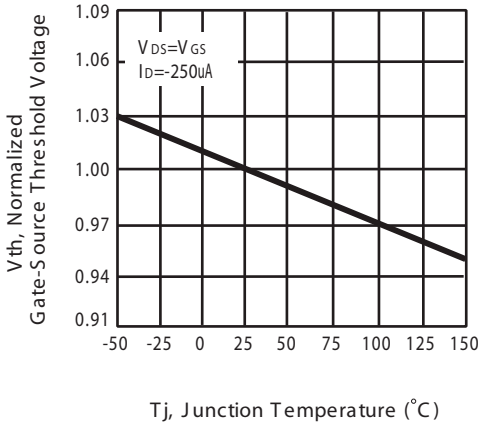

Figure 5. Gate Threshold Variation with Temperature

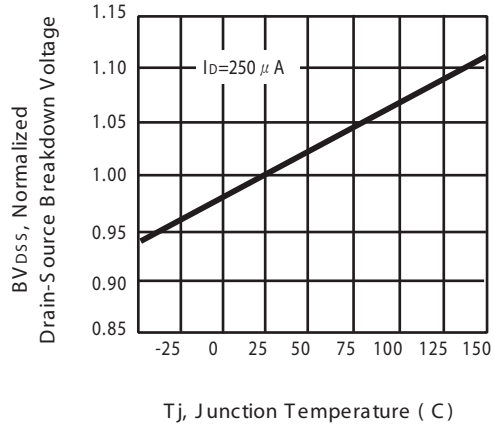

Figure 6. Breakdown Voltage Variation with Temperature

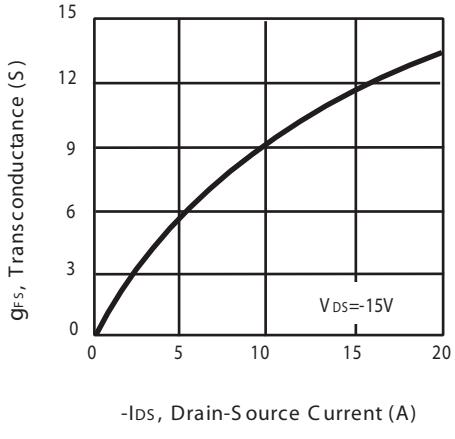

Figure 7. Transconductance Variation with Drain Current

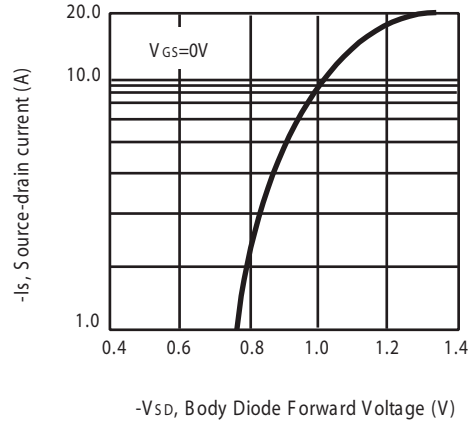

Figure 8. Body Diode Forward Voltage Variation with Source Current

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N-Channel

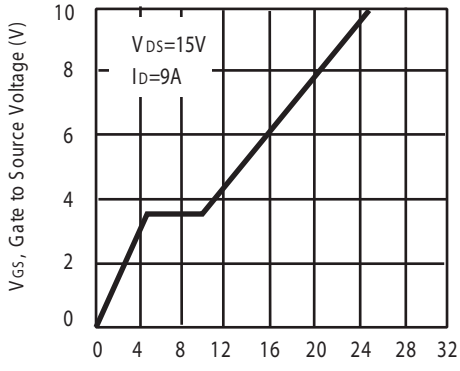


Figure 9. Gate Charge

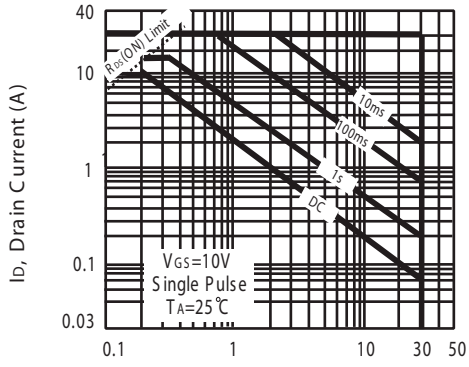


Figure 10. Maximum Safe Operating Area

P-Channel

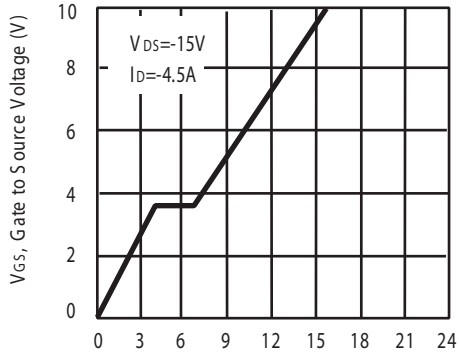
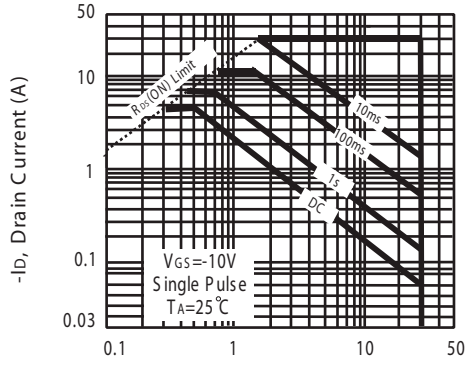


Figure 9. Gate Charge



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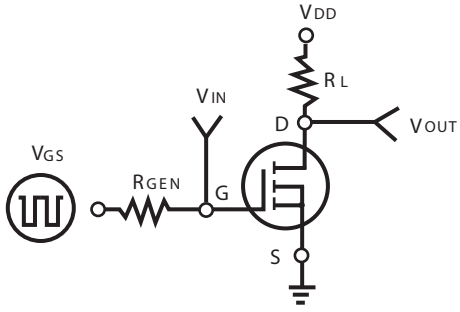

Figure 11. Switching Test Circuit

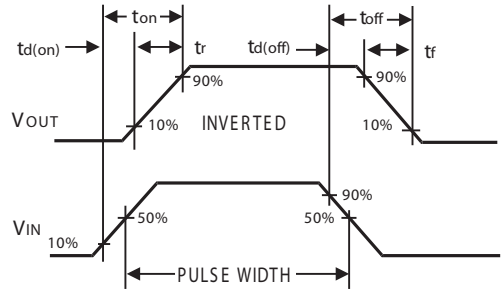

Figure 12. Switching Waveforms

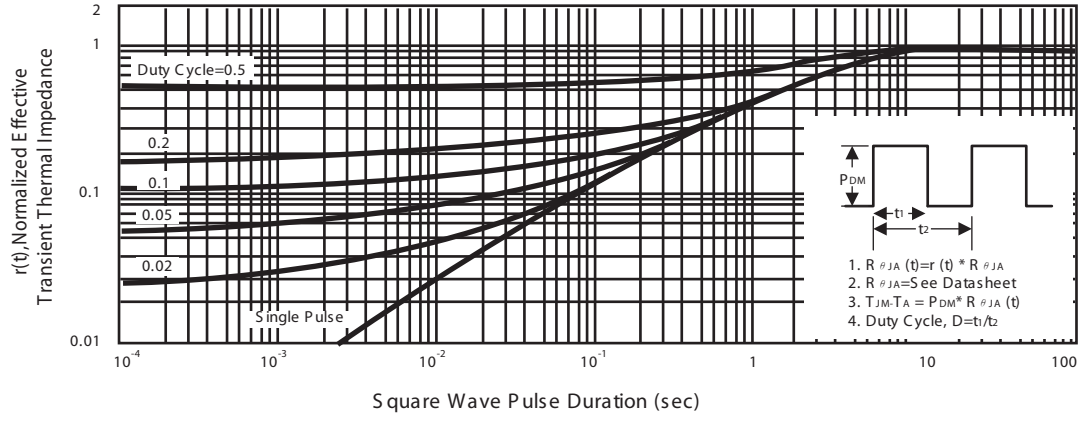

Figure 13. Normalized Thermal Transient Impedance Curve