SamHop Microelectronics Corp.

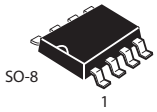
STM8309

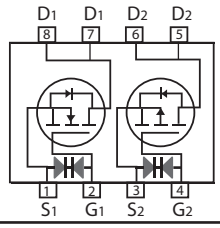
Oct.13, 2006

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

PRODUCT SUMMARY (N-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω) Max
30V	7A	23 @ V_{GS} = 10V
		30 @ V_{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω) Max
-30V	-6A	35 @ V_{GS} = -10V
		52 @ 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 @T_J=25 C °	I_D	7	- 6	A
-Pulsed [b]	I_{DM}	28	-24	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}=±20V, V_{DS}=0V			±10	uA
ON CHARACTERISTICS [b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.0	1.9	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=7A		17	23	m ohm
		V_{GS}=4.5V, I_D=5A		23	30	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS}=15V, V_{GS}=10V	20			A
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=7A		14		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS}=15V, V_{GS}=0V f=1.0MHz		680		pF
Output Capacitance	C_{OSS}			190		pF
Reverse Transfer Capacitance	C_{RSS}			115		pF
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD}=15V, I_D=7A, RL=2.1 ohm, V_{GS}=10V, R_{GEN}=6 ohm		12		ns
Rise Time	t_r			17.5		ns
Turn-Off Delay Time	$t_{D(OFF)}$			41		ns
Fall Time	t_f			15		ns
Total Gate Charge	Q_g	V_{DS}=15V, I_D=7A, V_{GS}=10V		11		nC
		V_{DS}=15V, I_D=7A, V_{GS}=4.5V		5.5		nC
Gate-Source Charge	Q_{gs}	V_{DS}=15V, I_D=7A, V_{GS}=10V		1.7		nC
Gate-Drain Charge	Q_{gd}			3.3		nC

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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	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±10	uA
ON CHARACTERISTICS [b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-1	-1.9	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-5A		29	35	m ohm
		V_{GS}=-4.5V, I_D=-4A		44	52	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS}=-15V, V_{GS}=-10V	-20			A
Forward Transconductance	g_{FS}	V_{DS}=-15V, I_D=-5A		8.5		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS}=-15V, V_{GS}=0V f=1.0MHz		870		pF
Output Capacitance	C_{OSS}			225		pF
Reverse Transfer Capacitance	C_{RSS}			125		pF
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_D=-15V, R_L=15 ohm, I_D=-1A, V_{GEN}=-10V, R_{GEN}=6 ohm		12		ns
Rise Time	t_r			18		ns
Turn-Off Delay Time	$t_{D(OFF)}$			70		ns
Fall Time	t_f			40		ns
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-5A,V_{GS}=-10V		15		nC
		V_{DS}=-15V,I_D=-5A,V_{GS}=-4.5V		7.5		nC
Gate-Source Charge	Q_{gs}	V_{DS}=-15V, I_D=-5A, V_{GS}=-10V		1.7		nC
Gate-Drain Charge	Q_{gd}			4.5		nC

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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		0.8	1.2	V
		V_{GS} = 0V, Is =-1.7A	P-Ch		-0.8	-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

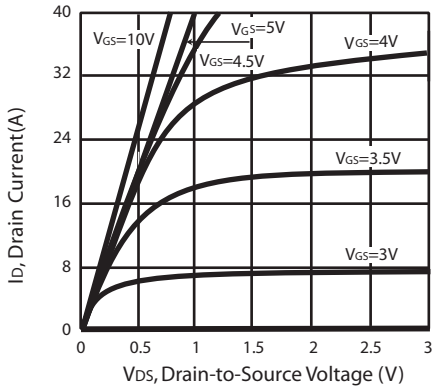

Figure 1. Output Characteristics

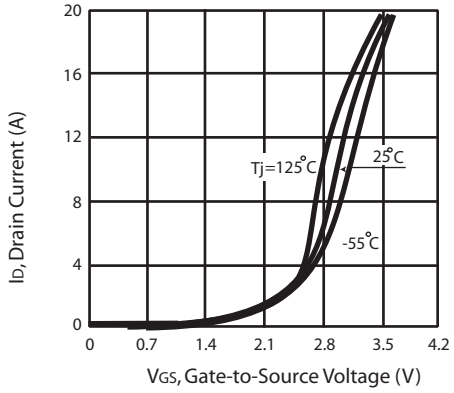

Figure 2. Transfer Characteristics

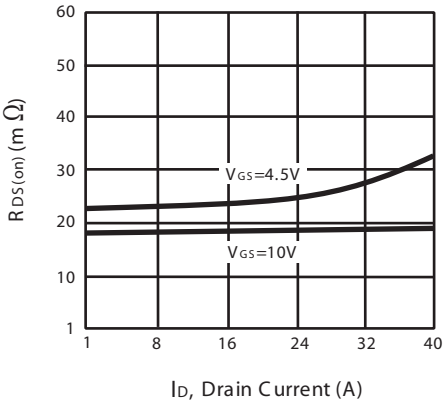

Figure 3. On-Resistance vs. Drain Current and Gate Voltage

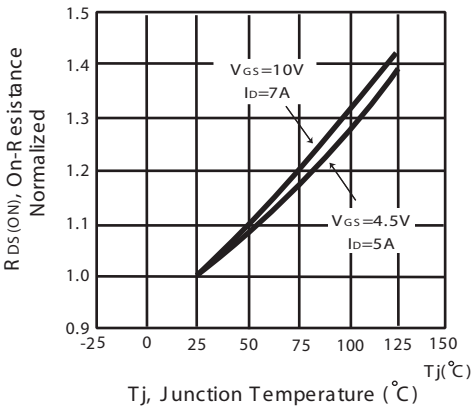

Figure 4. On-Resistance Variation with Drain Current and Temperature

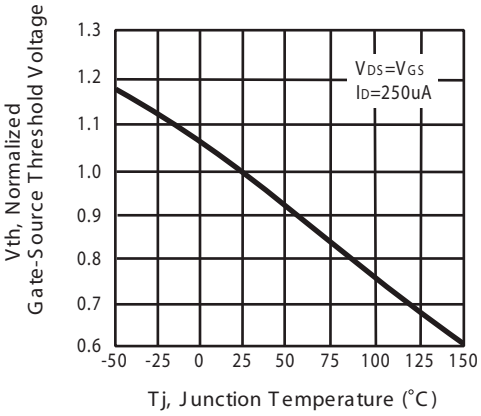

Figure 5. Gate Threshold Variation with Temperature

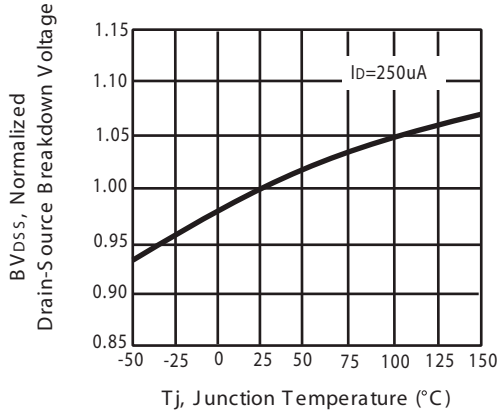

Figure 6. Breakdown Voltage Variation with Temperature

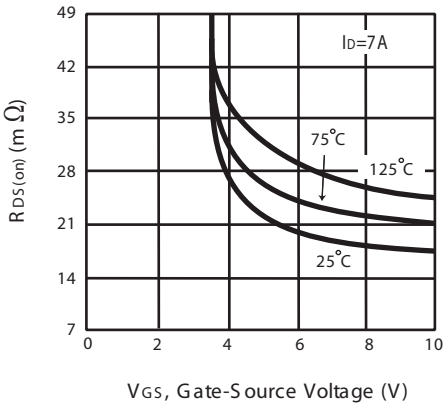

Figure 7. On-Resistance vs. Gate-Source Voltage

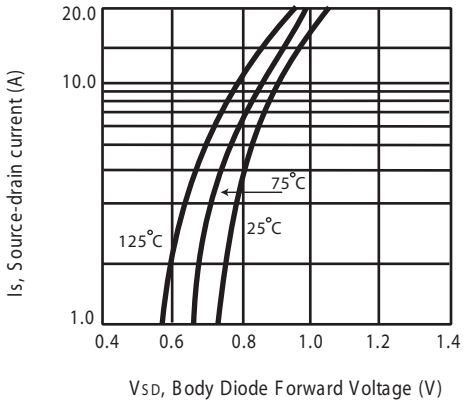

Figure 8. Body Diode Forward Voltage Variation with Source Current

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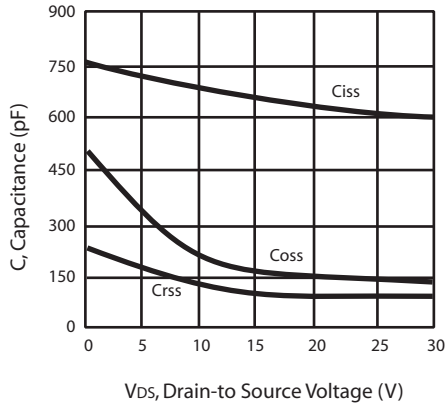

Figure 8. Capacitance

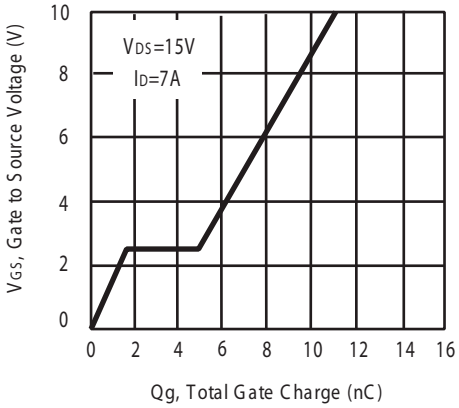

Figure 9. Gate Charge

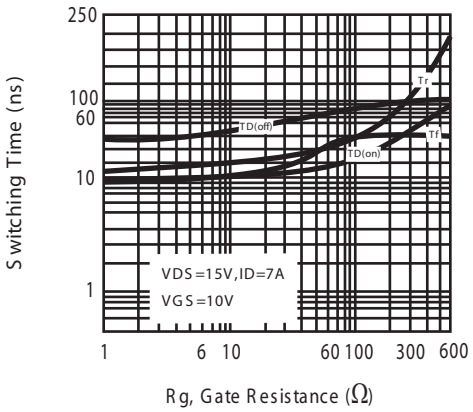

Figure 11.switching characteristics

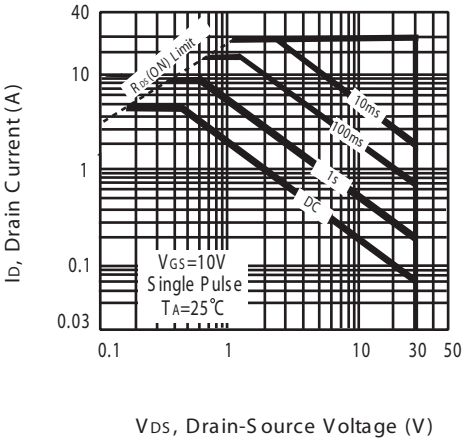

Figure 10. Maximum Safe Operating Area

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P-Channel

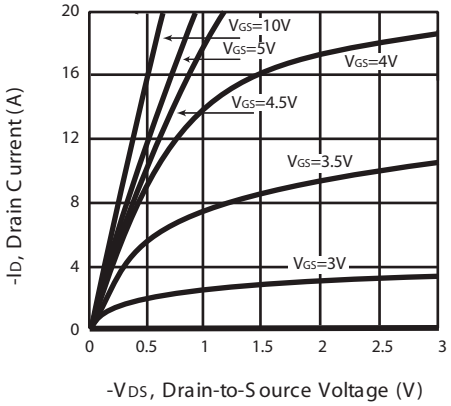


Figure 1. Output Characteristics

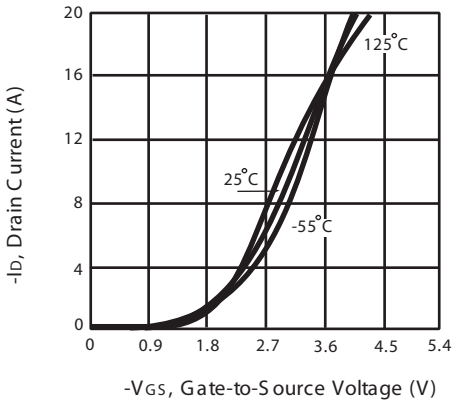


Figure 2. Transfer Characteristics

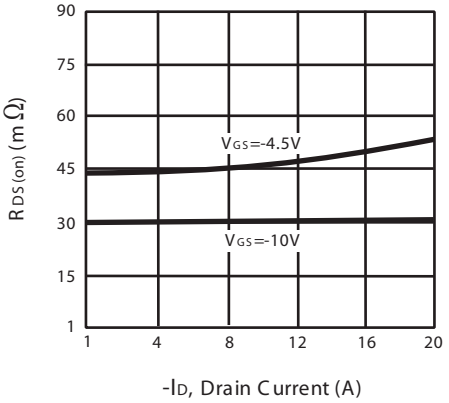


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

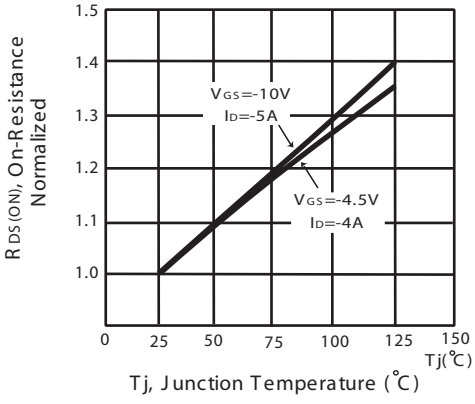


Figure 4. On-Resistance Variation with Drain Current and Temperature

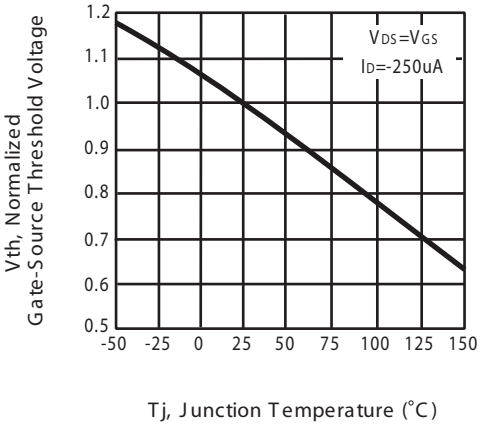


Figure 5. Gate Threshold Variation with Temperature

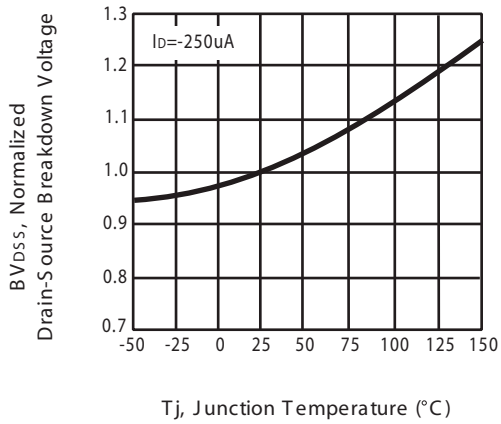


Figure 6. Breakdown Voltage Variation with Temperature

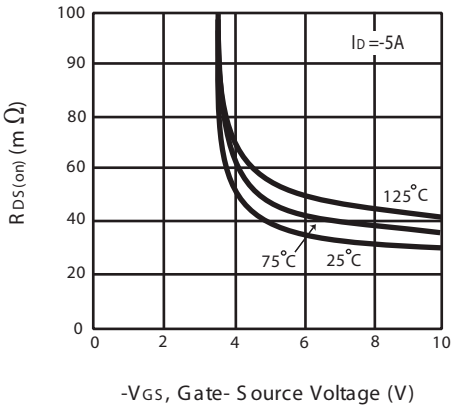


Figure 7. On-Resistance vs. Gate-Source Voltage

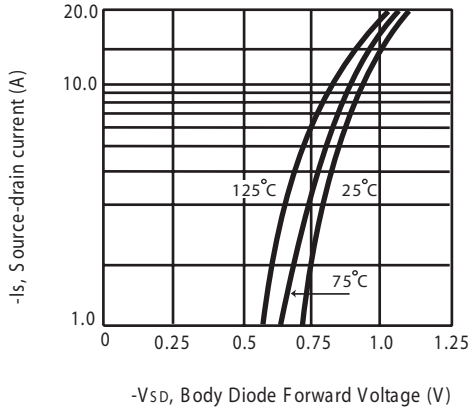


Figure 8. Body Diode Forward Voltage Variation with Source Current

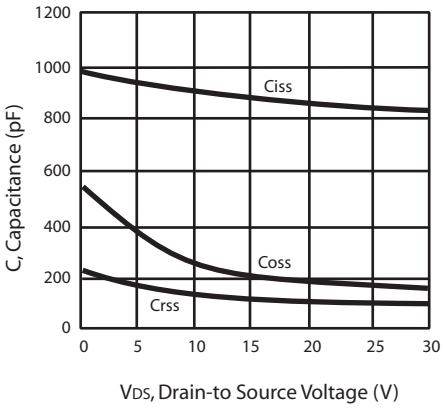


Figure 8. Capacitance

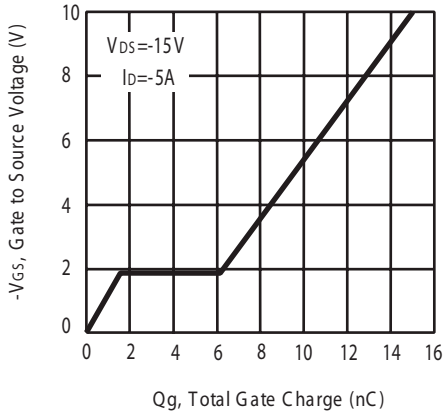


Figure 9. Gate Charge

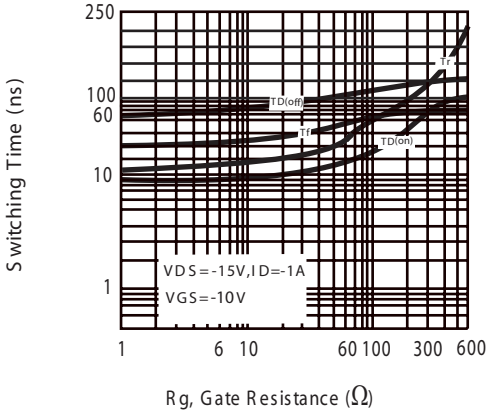


Figure 11.switching characteristics

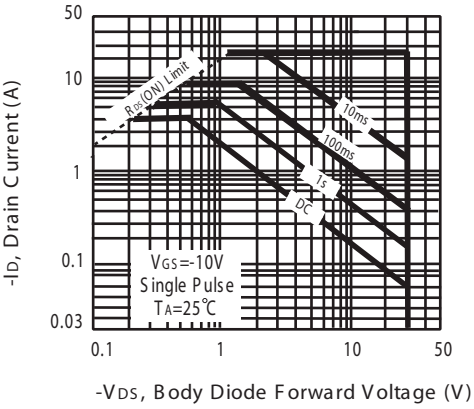


Figure 10. Maximum Safe Operating Area

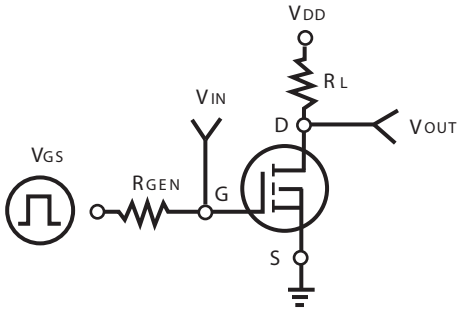


Figure 13. Switching Test Circuit

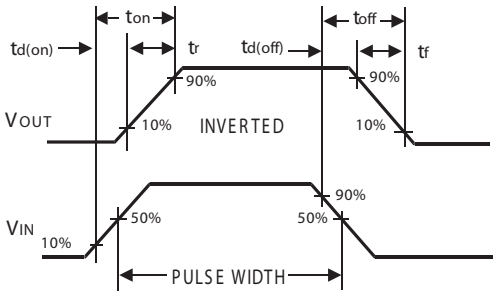
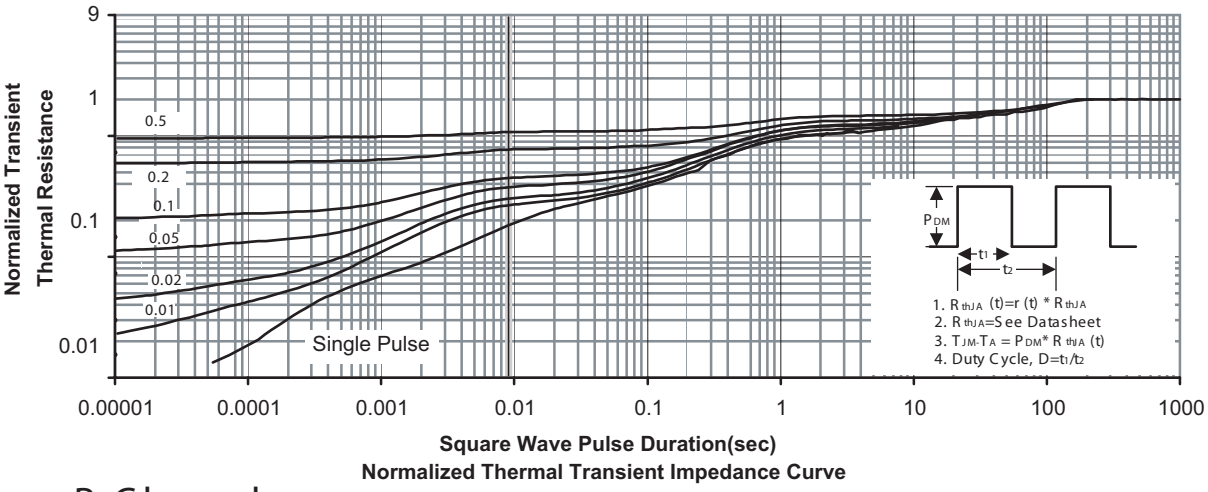


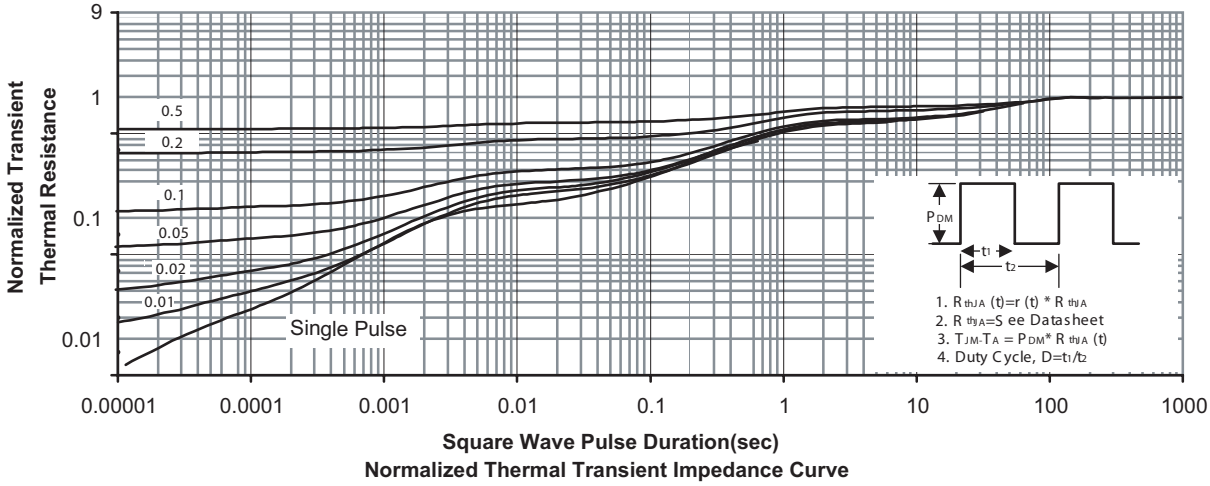
Figure 14. Switching Waveforms

N-Channel



Normalized Thermal Transient Impedance Curve

P-Channel



Normalized Thermal Transient Impedance Curve

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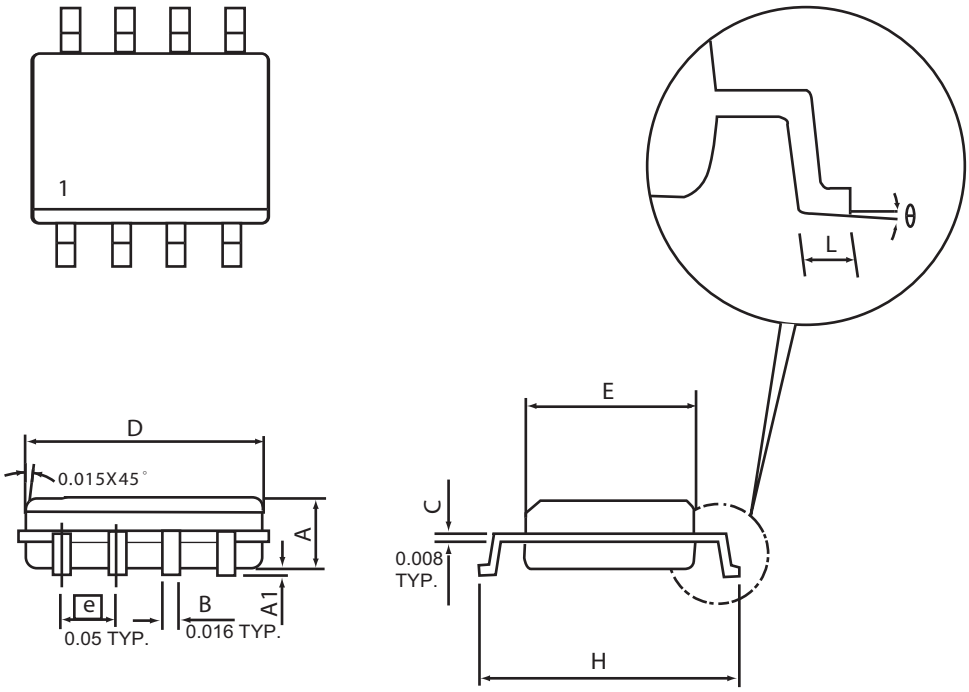
PACKAGE OUTLINE DIMENSIONS

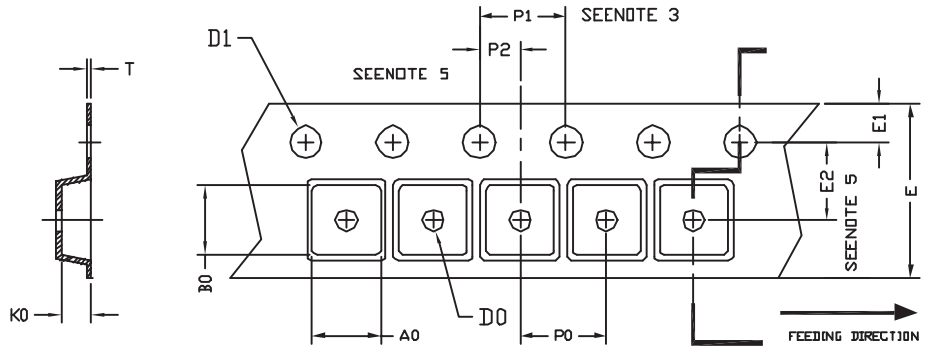
SO-8



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

SO-8 Tape and Reel Data

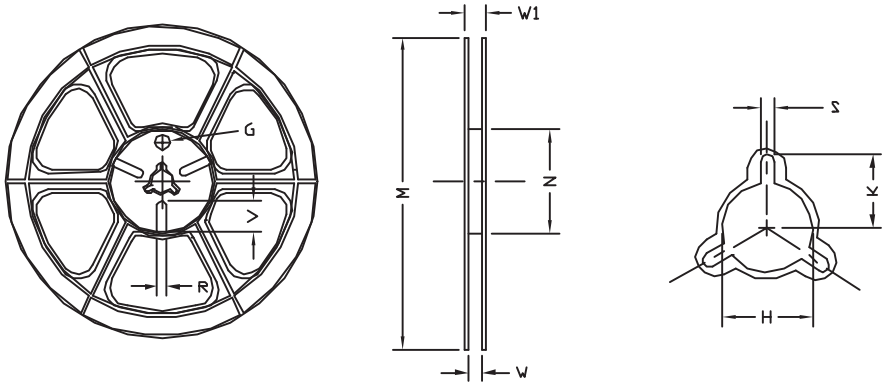
SO-8 Carrier Tape



unit:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N 150mil	6.40	5.20	2.10	ϕ1.5 (MIN)	ϕ1.5 +0.1 - 0.0	12.0 ±0.3	1.75	5.5±0.05	8.0	4.0	2.0±0.05	0.3±0.05

SO-8 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	ϕ330	330 ± 1	62 ±1.5	12.4+ 0.2	16.8- 0.4	ϕ12.75 + 0.15	---	2.0±0.15	---	---	---