

STM8301

SamHop Microelectronics Corp.

Apr.28 2005 ver1.1

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

PRODUCT (N-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
30V	7A	25 @ V _{GS} = 10V
		42 @ V _{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
-30V	-4.5A	60 @ V _{GS} = -10V
		80 @ 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 _a	25°C	I _D	7	-4.5	A
	70°C		6	-3.8	A
-Pulsed ^b		I _{DM}	29	-18	A
Drain-Source Diode Forward Current ^a		I _S	1.7	-1.7	A
Maximum Power Dissipation ^a	T _a =25°C	P _D	2		W
	T _a =70°C		1.44		
Operating Junction and Storage Temperature Range		T _J , T _{STG}	-55 to 150		°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R _{θJA}	62.5	°C/W
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N-Channel ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$			1	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS^b						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=7A$		20	25	m ohm
		$V_{GS}=4.5V, I_D=5A$		34	42	m ohm
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=10V, V_{GS}=10V$	29			A
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=7A$		10		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C_{ISS}	$V_{DS}=15V, V_{GS}=0V$ $f=1.0MHz$		792		pF
Output Capacitance	C_{OSS}			133		pF
Reverse Transfer Capacitance	C_{RSS}			87		pF
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=15V$ $I_D=1A$ $V_{GS}=10V$ $R_{GEN}=6\text{ ohm}$		6.5		ns
Rise Time	t_r			12.9		ns
Turn-Off Delay Time	$t_{D(OFF)}$			17.9		ns
Fall Time	t_f			5.2		ns
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=7A, V_{GS}=10V$		13.6		nC
		$V_{DS}=15V, I_D=7A, V_{GS}=4.5V$		6.8		nC
Gate-Source Charge	Q_{gs}	$V_{DS}=15V, I_D=7A,$ $V_{GS}=10V$		2.0		nC
Gate-Drain Charge	Q_{gd}			3.5		nC

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P-Channel ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DS}	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-24V, V_{GS}=0V$			-1	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS^b						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4.5A$		50	60	m ohm
		$V_{GS}=-4.5V, I_D=-3A$		70	80	m ohm
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=-10V, V_{GS}=-10V$	-18			A
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-4.5A$		9		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C_{ISS}	$V_{DS}=-15V, V_{GS}=0V$ $f=1.0MHz$		586		pF
Output Capacitance	C_{OSS}			122		pF
Reverse Transfer Capacitance	C_{RSS}			78		pF
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=-15V$ $I_D=-1A$ $V_{GEN}=-10V$ $R_{GEN}=6\text{ ohm}$		5.6		ns
Rise Time	t_r			4.7		ns
Turn-Off Delay Time	$t_{D(OFF)}$			51.8		ns
Fall Time	t_f			33.5		ns
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-4.5A, V_{GS}=-10V$		11.2		nC
		$V_{DS}=-15V, I_D=-4.5A, V_{GS}=-4.5V$		5.4		nC
Gate-Source Charge	Q_{gs}	$V_{DS}=-15V, I_D=-4.5A,$ $V_{GS}=-10V$		1.4		nC
Gate-Drain Charge	Q_{gd}			2.7		nC

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

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS^b						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{V}, I_s = 1.7\text{A}$	N-Ch	0.79	1.2	V
		$V_{GS} = 0\text{V}, I_s = -1.7\text{A}$	P-Ch	-0.8	-1.2	

Notes

a. Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.

* $R_{\theta JA}$ is 62.5°C/W when mounted on 1in^2 FR-4 board with 2oz Copper

* $R_{\theta JA}$ is 125°C/W when mounted on 0.02in^2 FR-4 board with 2oz Copper

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

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

N-Channel

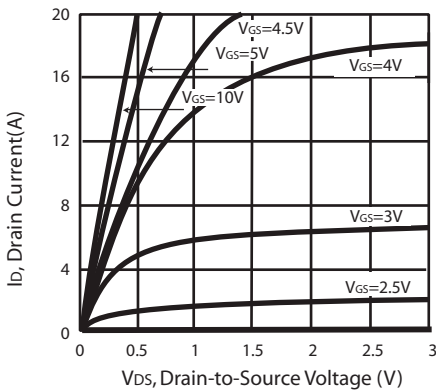


Figure 1. Output Characteristics

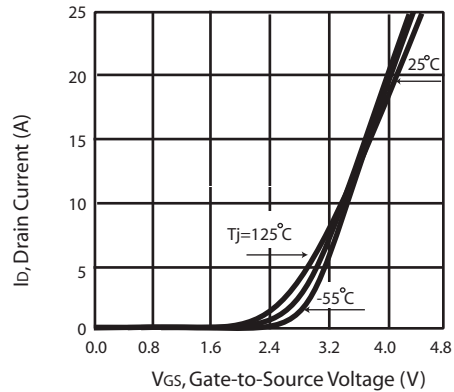


Figure 2. Transfer Characteristics

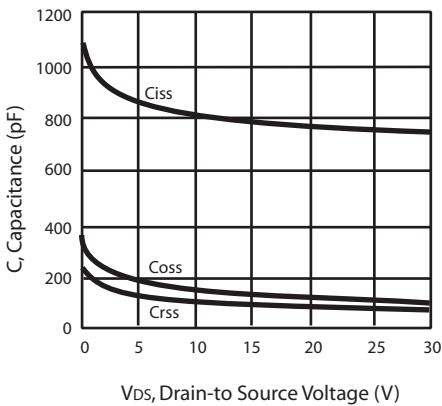


Figure 3. Capacitance

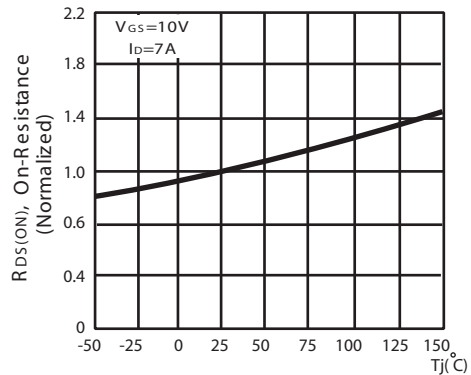


Figure 4. On-Resistance Variation with Drain Current and Temperature

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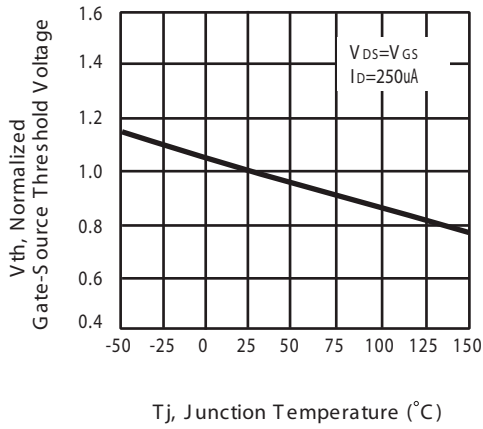


Figure 5. Gate Threshold Variation with Temperature

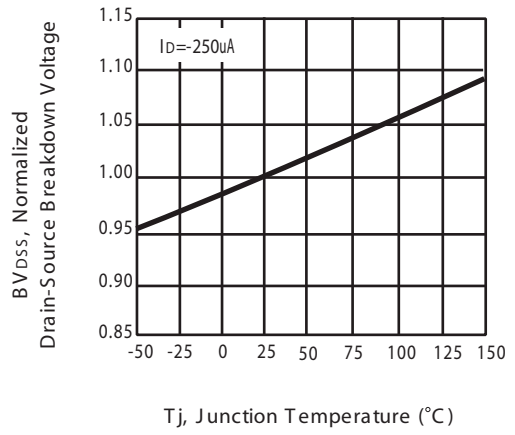


Figure 6. Breakdown Voltage Variation with Temperature

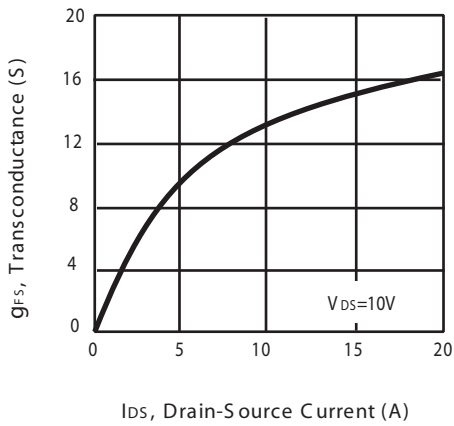


Figure 7. Transconductance Variation with Drain Current

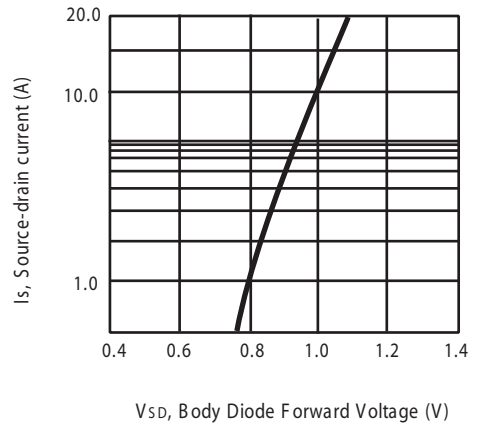


Figure 8. Body Diode Forward Voltage Variation with Source Current

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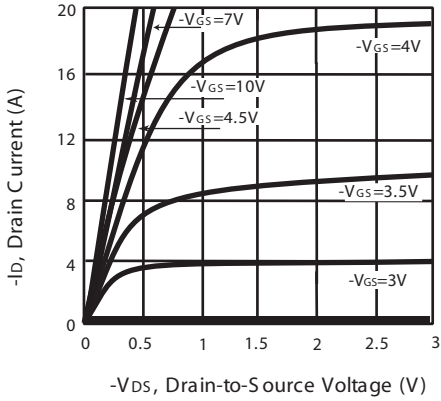


Figure 1. Output Characteristics

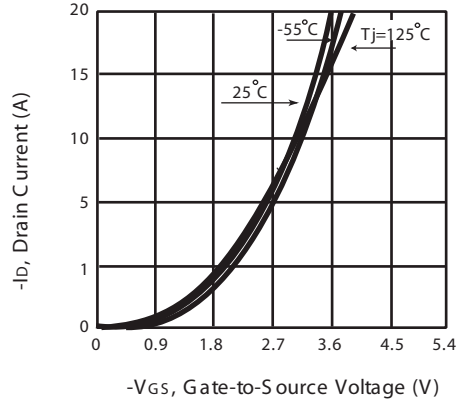


Figure 2. Transfer Characteristics

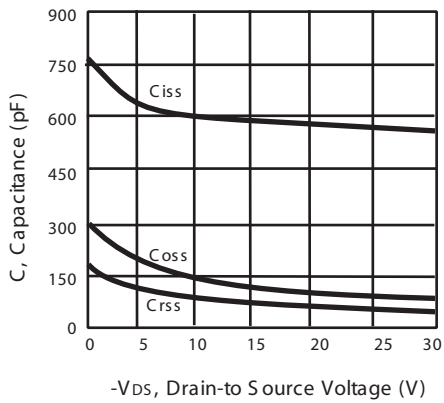


Figure 3. Capacitance

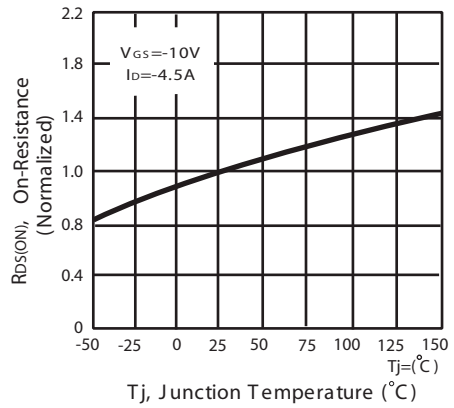


Figure 4. On-Resistance Variation with Temperature

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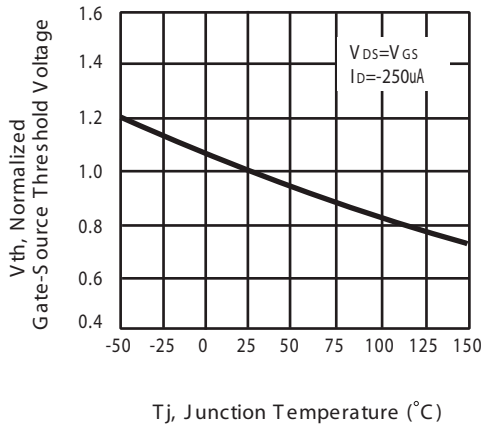


Figure 5. Gate Threshold Variation with Temperature

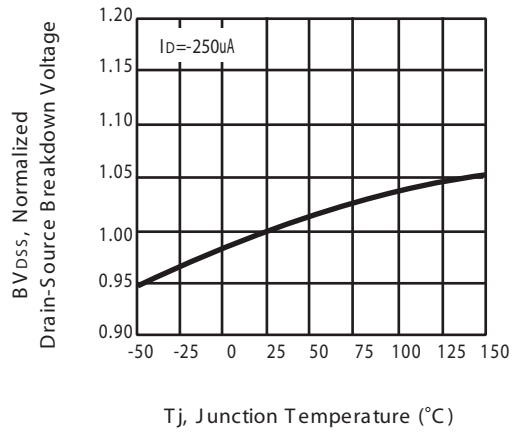


Figure 6. Breakdown Voltage Variation with Temperature

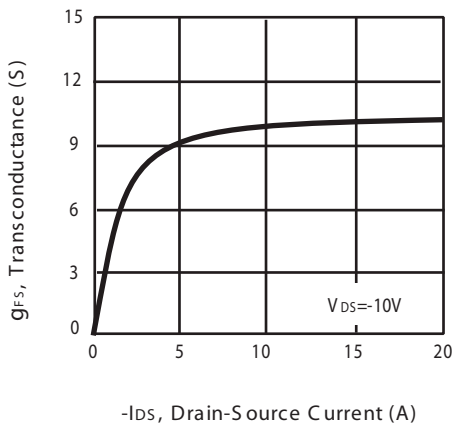


Figure 7. Transconductance Variation with Drain Current

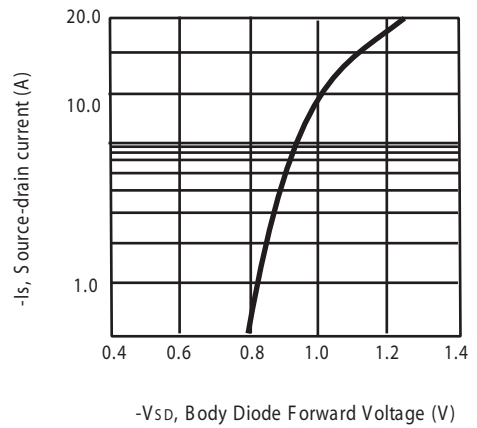
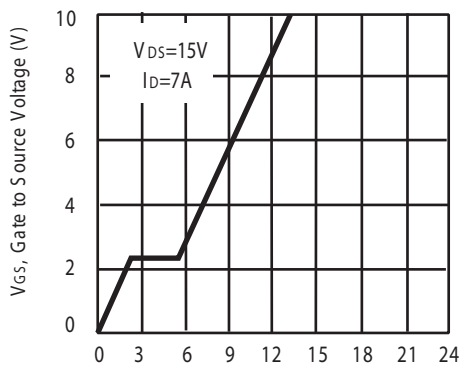


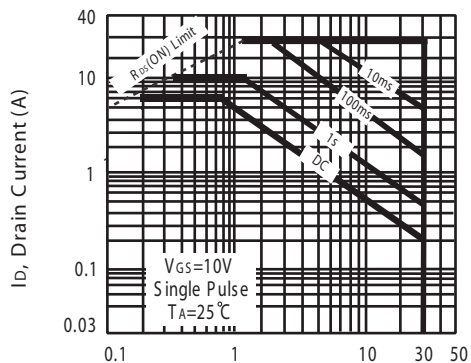
Figure 8. Body Diode Forward Voltage Variation with Source Current

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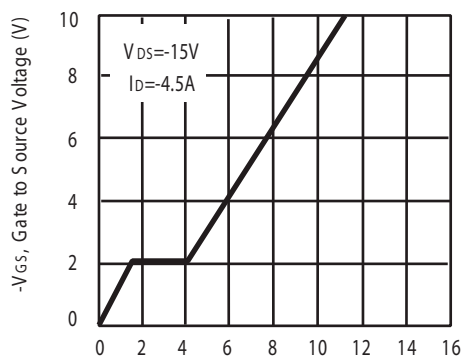


Qg, Total Gate Charge (nC)
Figure 9. Gate Charge

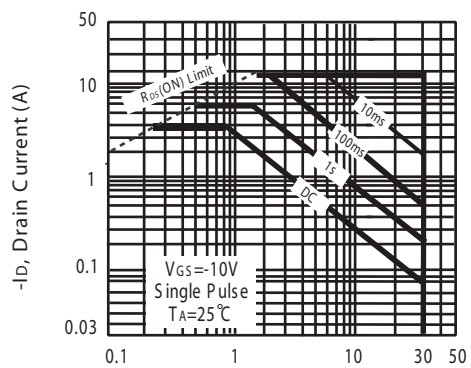


Vds, Drain-Source Voltage (V)
Figure 10. Maximum Safe Operating Area

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Qg, Total Gate Charge (nC)
Figure 9. Gate Charge



-Vds, Body Diode Forward Voltage (V)
Figure 10. Maximum Safe Operating Area

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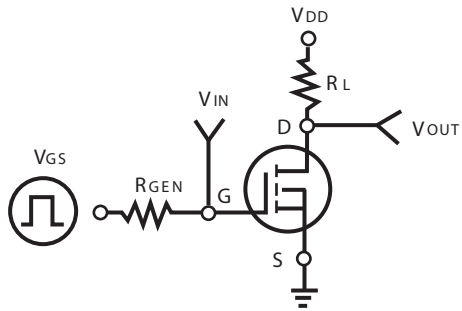


Figure 11. Switching Test Circuit

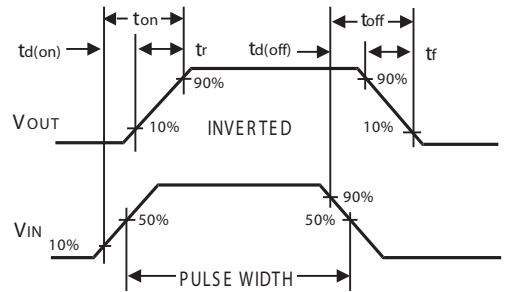
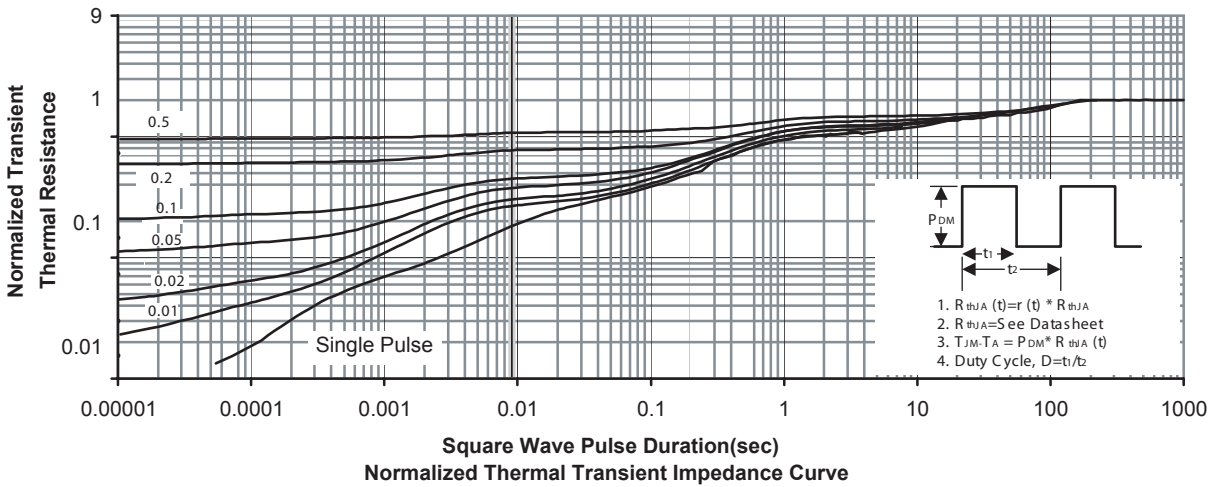
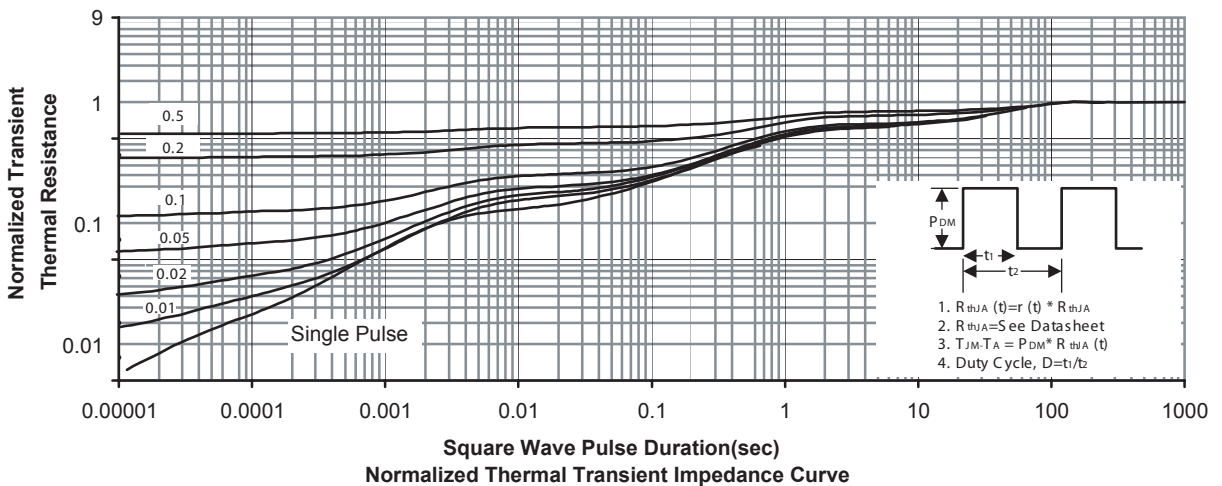


Figure 12. Switching Waveforms

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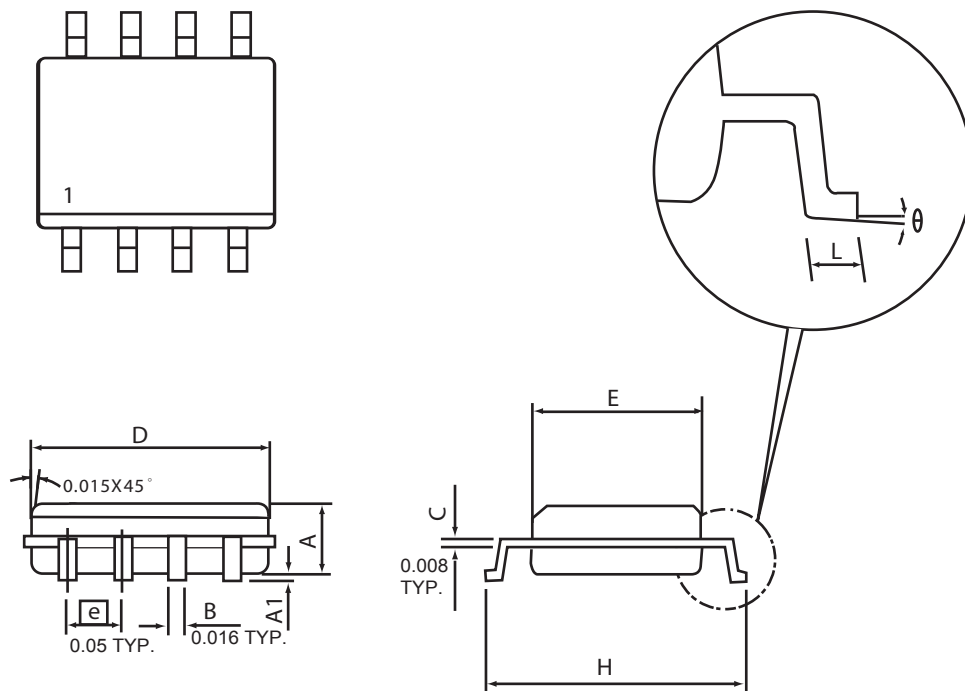
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PACKAGE OUTLINE DIMENSIONS

SO-8

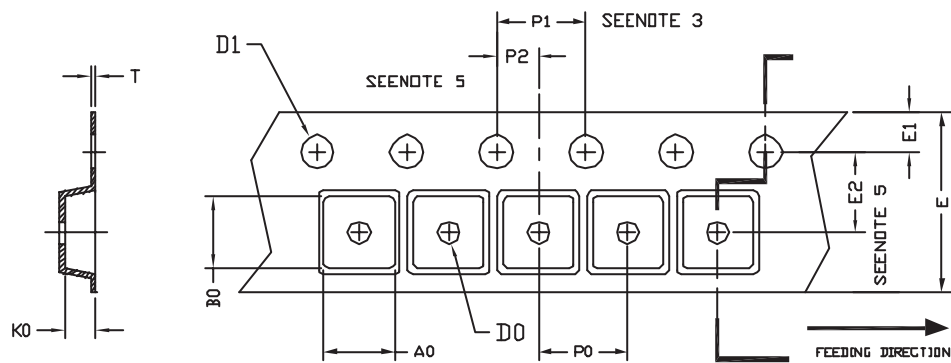


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

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SO-8 Tape and Reel Data

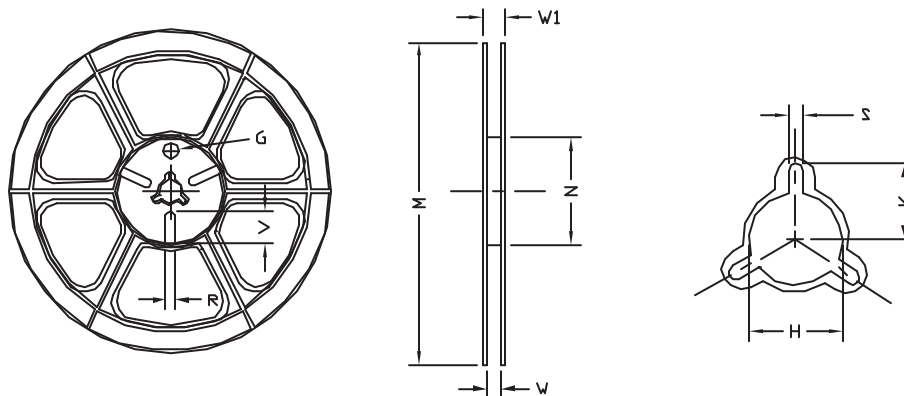
SO-8 Carrier Tape



unit:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N 150mil	6.40	5.20	2.10	ϕ 1.5 (MIN)	ϕ 1.5 + 0.1 - 0.0	12.0 \pm 0.3	1.75	5.5 \pm 0.05	8.0	4.0	2.0 \pm 0.05	0.3 \pm 0.05

SO-8 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	ϕ 330	330 \pm 1	62 \pm 1.5	12.4 + 0.2	16.8 - 0.4	ϕ 12.75 + 0.15	---	2.0 \pm 0.15	---	---	---