SamHop Microelectronics Corp.

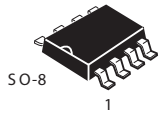
STM8305

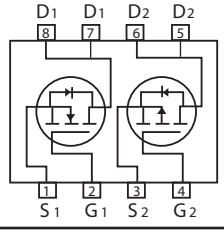
May,13 2005

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

PRODUCT SUMMARY (N-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
30V	7A	25 @ V_{GS} = 10V
		40 @ V_{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
-30V	-5.3A	45 @ V_{GS} = -10V
		60 @ 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] @ Ta	25°C	I_D	7	-5.3	A
	70°C		6	-4.2	A
-Pulsed [b]		I_{DM}	29	-21	A
Drain-Source Diode Forward Current [a]		I_S	1.7	-1.7	A
Maximum Power Dissipation [a]	Ta= 25°C	P_D	2		W
	Ta=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]	$R_{\theta JA}$	62.5	°C/W

STM8305

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			±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=6.6A		18	25	m ohm
		V_{GS}=4.5V, I_D=5A		32	40	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS}=5V, V_{GS}=4.5V	20			A
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=6.6A		9		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS}=15V, V_{GS}=0V f=1.0MHz		630	745	pF
Output Capacitance	C_{OSS}			170	200	pF
Reverse Transfer Capacitance	C_{RSS}			105	125	pF
Gate resistance	Rg	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		3.5		ohm
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD}=15V I_D=6.6 A V_{GS}=10V R_{GEN}=3 ohm		15.2	18	ns
Rise Time	t_r			5.3	6	ns
Turn-Off Delay Time	$t_{D(OFF)}$			22.1	26	ns
Fall Time	t_f			12.8	15	ns
Total Gate Charge	Q_g	V_{DS}=15V, I_D=6.6A, V_{GS}=10V		13.3	15	nC
		V_{DS}=15V, I_D=6.6A, V_{GS}=4.5V		7.2	8	nC
Gate-Source Charge	Q_{gs}	V_{DS}=15V, I_D=6.6 A V_{GS}=10V		2.9	3.4	nC
Gate-Drain Charge	Q_{gd}			3.6	4.2	nC

STM8305

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			±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=-5A		35	45	m ohm
		V_{GS}=-4.5V, I_D=-4A		48	60	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS}=-5V, V_{GS}=-10V	-12			A
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-5A		9		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS}=-15V, V_{GS}=0V f=1.0MHz		770	885	pF
Output Capacitance	C_{OSS}			180	205	pF
Reverse Transfer Capacitance	C_{RSS}			110	133	pF
Gate resistance	Rg	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		3.3		ohm
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD}=-15V R_L=3 ohm V_{GS}=-10V R_{GEN}=3 ohm		12.6	15	ns
Rise Time	t_r			9.6	11	ns
Turn-Off Delay Time	$t_{D(OFF)}$			49.5	56	ns
Fall Time	t_f			27.8	32	ns
Total Gate Charge	Q_g	V_{DS}=-15V, I_D=-5A, V_{GS}=-10V		14	16	nC
		V_{DS}=-15V, I_D=-5A, V_{GS}=-4.5V		7.2	8	nC
Gate-Source Charge	Q_{gs}	V_{DS}=-15V, I_D=-5 A V_{GS}=-10V		2.3	2.7	nC
Gate-Drain Charge	Q_{gd}			3.2	3.8	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		0.8	1.2	V
		V_{GS} = 0V, Is =-1.7A	P-Ch		-0.8	-1.2	

Notes

a.Surface Mounted on FR4 Board, t≤10sec.

* $R_{\theta JA}$ is 62.5℃/W when mounted on 1in^2 FR-4 board with 2oz Copper
* $R_{\theta JA}$ is 125℃/W when mounted on 0.02 in^2 FR-4 board with 2oz Copper

b.Pulse Test:Pulse Width≤300 μs, Duty Cycle ≤2%.

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

N-Channel

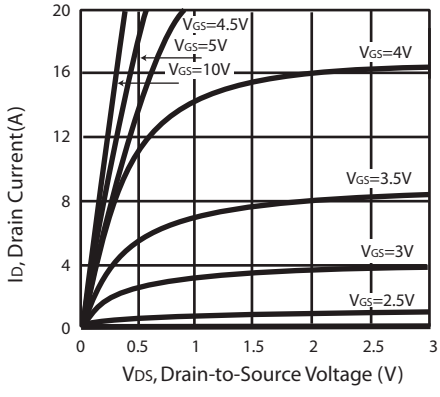


Figure 1. Output Characteristics

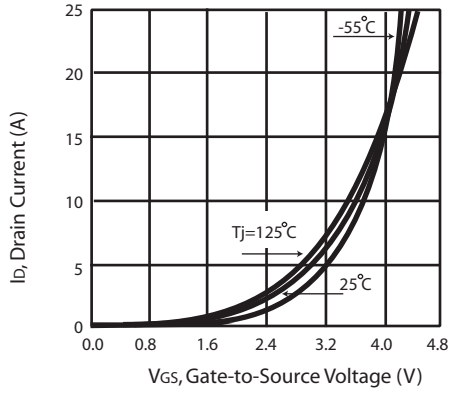


Figure 2. Transfer Characteristics

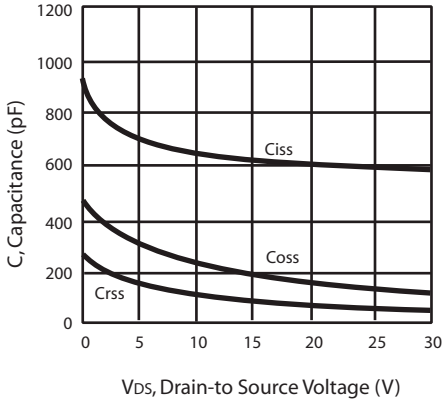


Figure 3. Capacitance

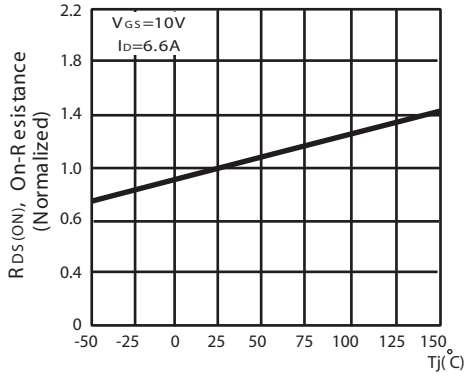


Figure 4. On-Resistance Variation with Drain Current and Temperature

N-Channel

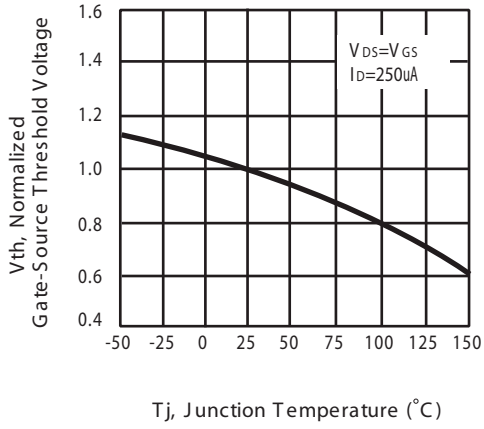


Figure 5. Gate Threshold Variation with Temperature

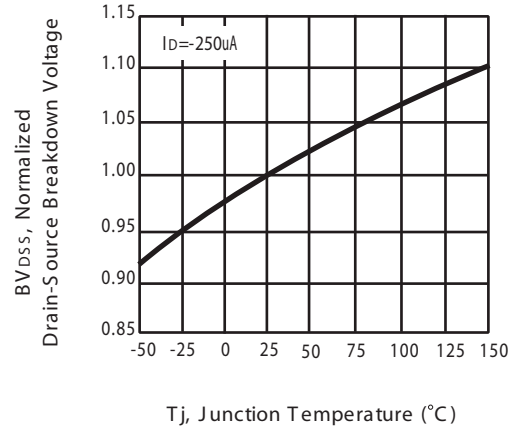


Figure 6. Breakdown Voltage Variation with Temperature

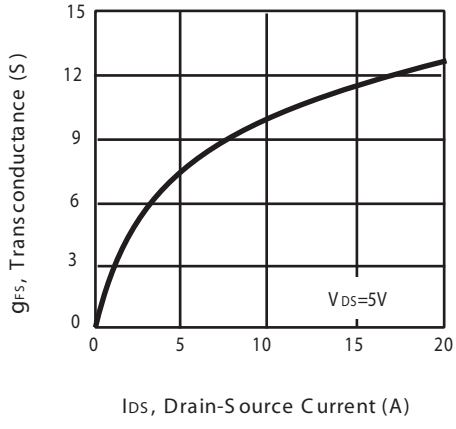


Figure 7. Transconductance Variation with Drain Current

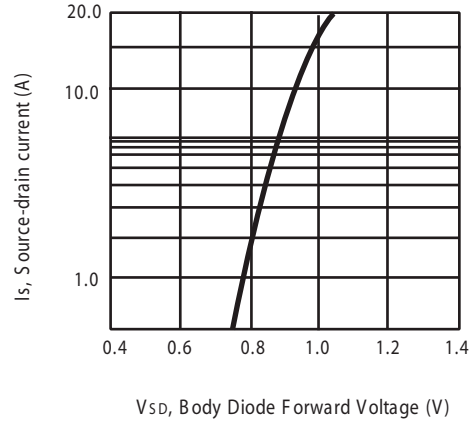


Figure 8. Body Diode Forward Voltage Variation with Source Current

STM8305

P-Channel

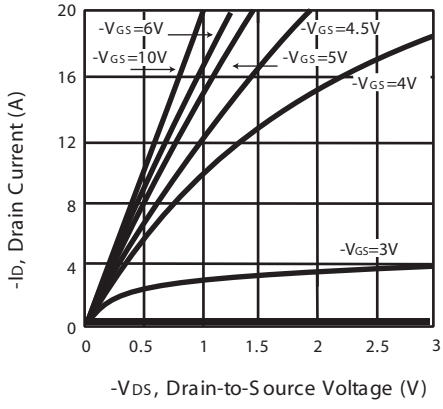


Figure 1. Output Characteristics

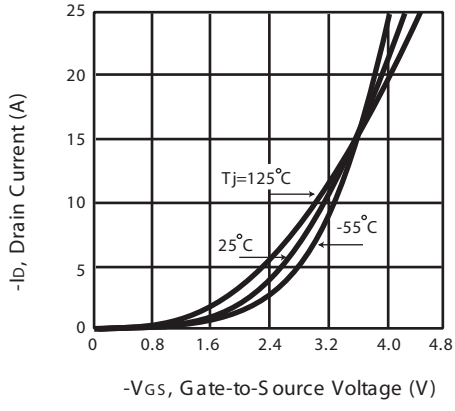


Figure 2. Transfer Characteristics

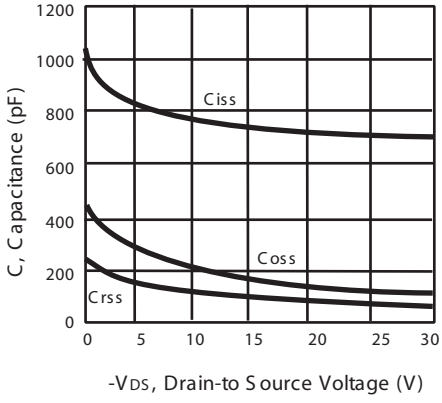


Figure 3. Capacitance

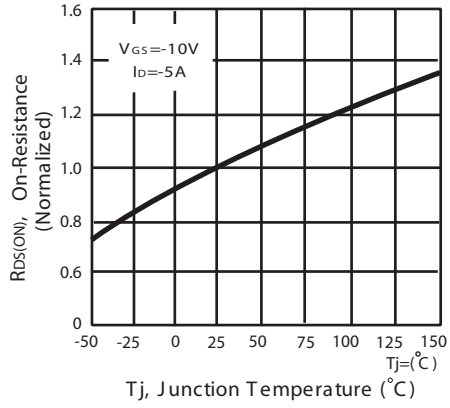


Figure 4. On-Resistance Variation with Temperature

P-Channel

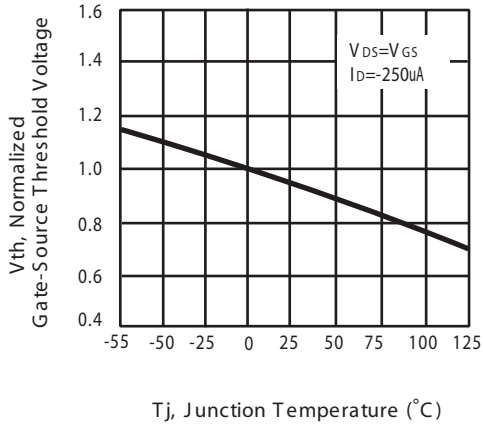


Figure 5. Gate Threshold Variation with Temperature

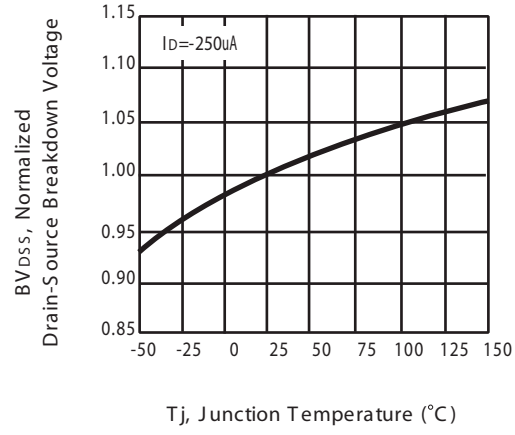


Figure 6. Breakdown Voltage Variation with Temperature

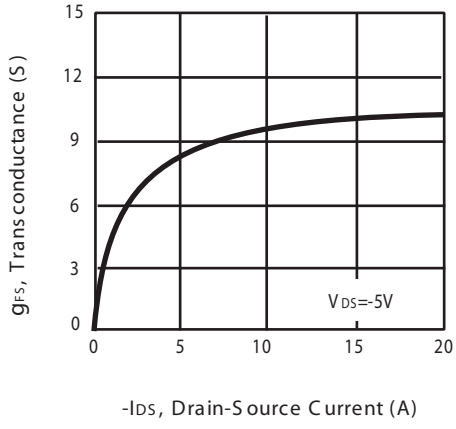


Figure 7. Transconductance Variation with Drain Current

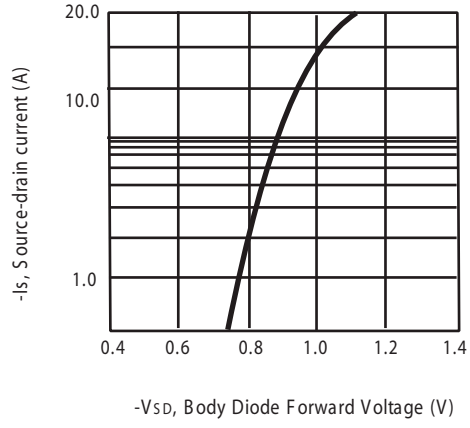


Figure 8. Body Diode Forward Voltage Variation with Source Current

STM8305

N-Channel

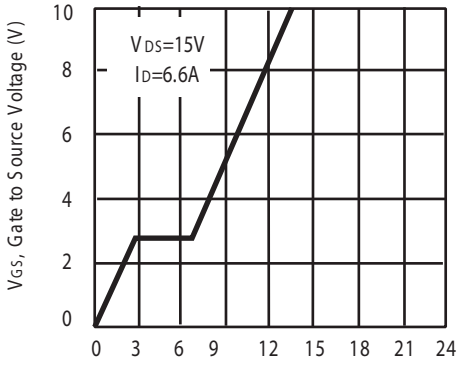


Figure 9. Gate Charge

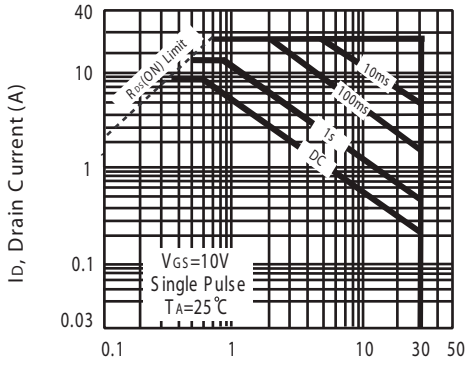


Figure 10. Maximum Safe Operating Area

P-Channel

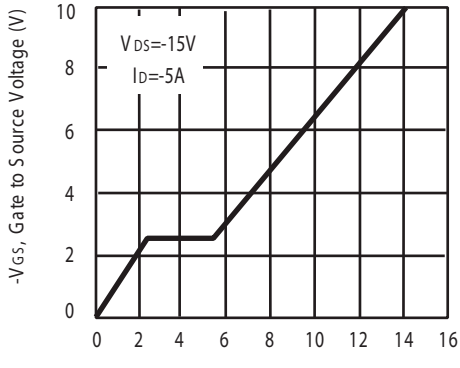


Figure 9. Gate Charge

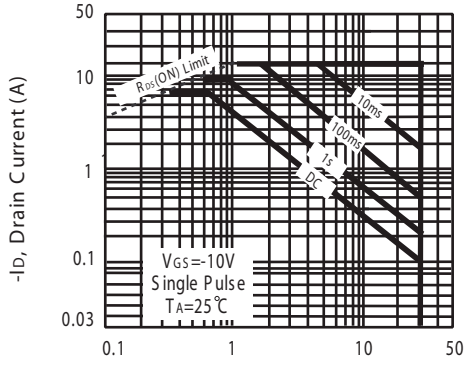


Figure 10. Maximum Safe Operating Area

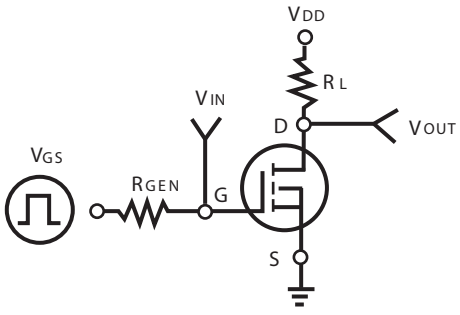


Figure 11. Switching Test Circuit

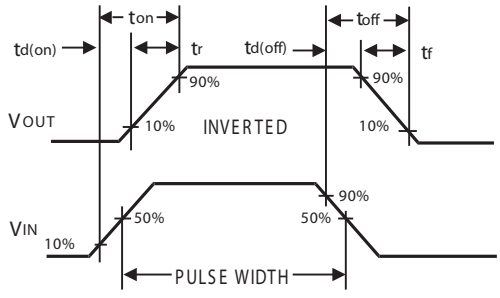
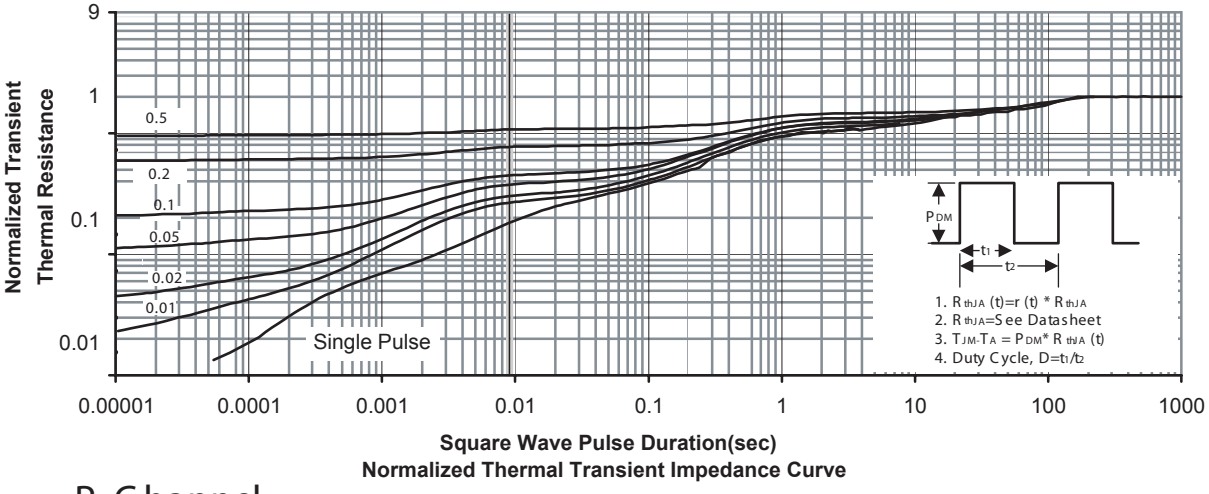
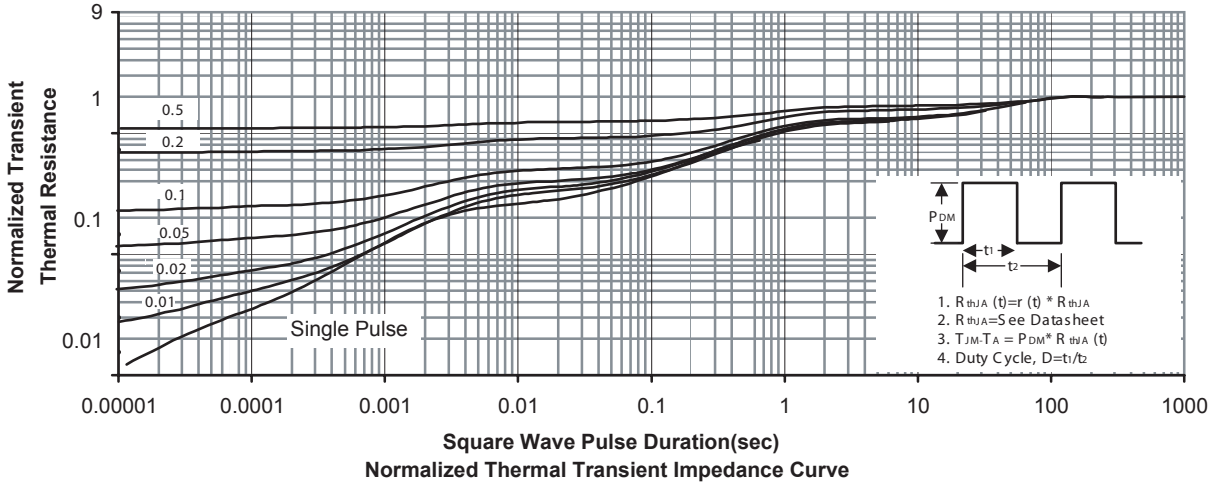


Figure 12. Switching Waveforms

N-Channel



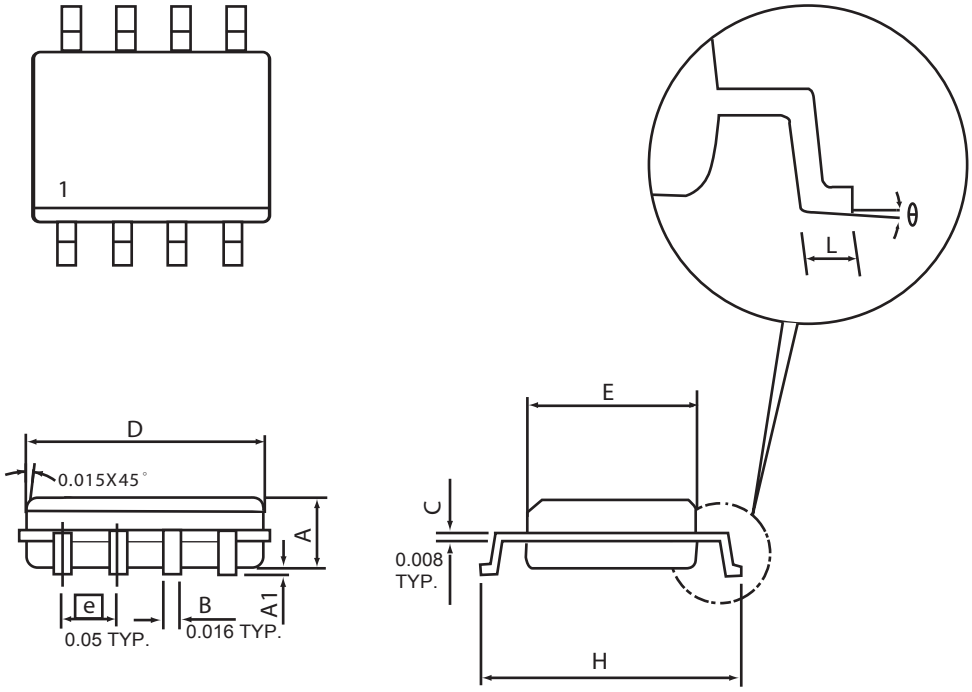
P-Channel



STM8305

PACKAGE OUTLINE DIMENSIONS

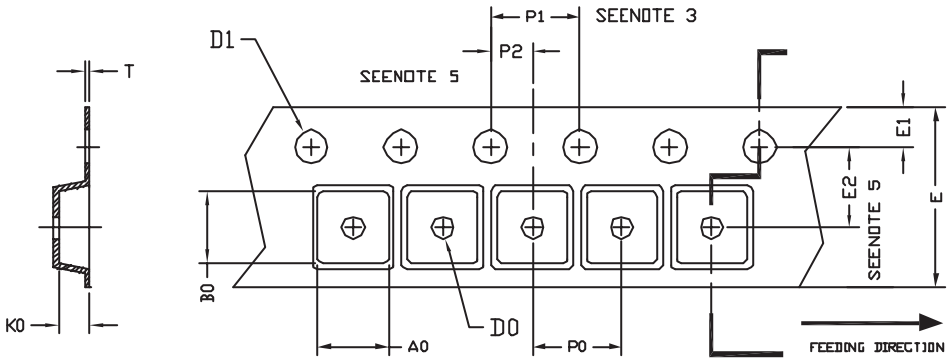
SO-8



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

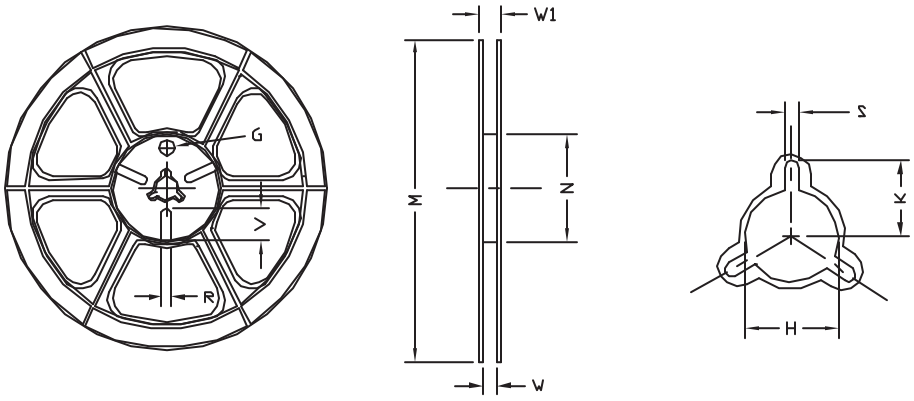
SO-8 Carrier Tape



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	---	---	---