



SamHop Microelectronics Corp.

STM4512

Arp,12 2005 Ver1.3

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

PRODUCT SUMMARY (N-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
30V	5A	50 @ V _{GS} = 10V
		90 @ V _{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
-30V	-4.5A	60 @ V _{GS} = -10V
		85 @ 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	5	-4.5	A
	70°C		4.1	-3.8	A
-Pulsed ^b		I _{DM}	20	-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 °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	1.6	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4A		35	50	m ohm
		V _{GS} =4.5V, I _D =2A		75	90	m ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = 5V, V _{GS} = 10V	18			A
Forward Transconductance	g _{FS}	V _{DS} = 10V, I _D =4A		4.4		S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} = 0V f =1.0MHz		285	330	pF
Output Capacitance	C _{OSS}			140	160	pF
Reverse Transfer Capacitance	C _{RSS}			75	88	pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 10V, I _D = 1A, V _{GEN} = 4.5V, R _{GEN} = 6 ohm		5.6	6.5	ns
Rise Time	t _r			21.2	23	ns
Turn-Off Delay Time	t _{D(OFF)}			8.8	10	ns
Fall Time	t _f			17.1	20	ns
Total Gate Charge	Q _g	V _{DS} =10V, I _D =4A,V _{GS} =10V		7	7.4	nC
		V _{DS} =10V, I _D =4A,V _{GS} =4.5V		4.1	4.9	nC
Gate-Source Charge	Q _{gs}	V _{DS} =10V, I _D = 4A, V _{GS} =10V		0.9	1.1	nC
Gate-Drain Charge	Q _{gd}			1.6	2	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			±100	nA
ON CHARACTERISTICS ^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250uA	-1	-1.4	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D = -4A		50	60	m ohm
		V _{GS} =-4.5V, I _D = -3A		70	85	m ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = -5V, V _{GS} = -10V	-15			A
Forward Transconductance	g _{FS}	V _{DS} =-15V, I _D = - 4A		8		S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} =-15V, V _{GS} = 0V f=1.0MHz		500	590	pF
Output Capacitance	C _{OSS}			125	145	pF
Reverse Transfer Capacitance	C _{RSS}			90	105	pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _D = -15V, I _D = -1A, V _{GEN} = -10V, R _{GEN} = 6 ohm		5.2	6.1	ns
Rise Time	t _r			15.6	18	ns
Turn-Off Delay Time	t _{D(OFF)}			40.6	48	ns
Fall Time	t _f			18.2	21	ns
Total Gate Charge	Q _g	V _{DS} =-15V, I _D =-4A, V _{GS} =-10V		10.2	12	nC
		V _{DS} =-15V, I _D =-4A, V _{GS} =-4.5V		5.3	6.2	nC
Gate-Source Charge	Q _{gs}	V _{DS} = -15V, I _D = - 4A, V _{GS} =-10V		1.1	1.3	nC
Gate-Drain Charge	Q _{gd}			2.8	3.2	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		0.85	1.2	V
		$V_{GS} = 0\text{V}, I_S = 1.7\text{A}$ P-Ch		-0.81	-1.2	

Notes

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

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

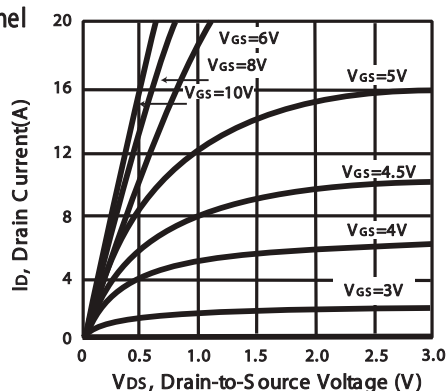


Figure 1. Output Characteristics

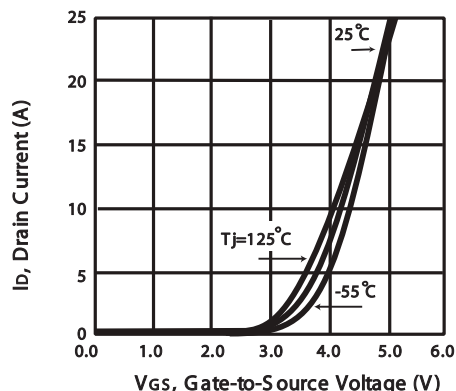


Figure 2. Transfer Characteristics

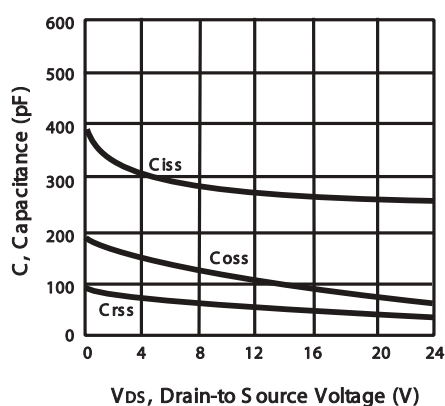


Figure 3. Capacitance

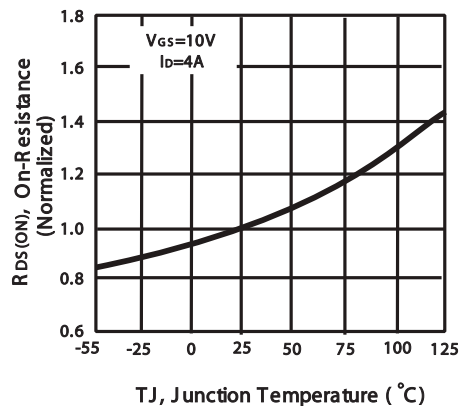


Figure 4. On-R resistance Variation with Drain Current and Temperature

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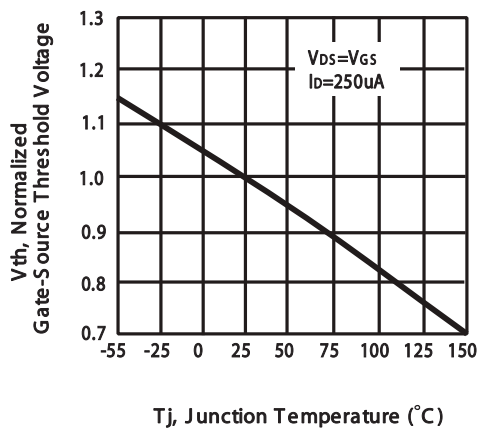


Figure 5. Gate Threshold Variation with Temperature

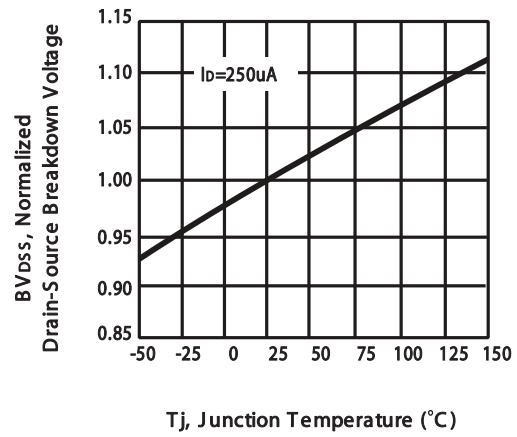


Figure 6. Breakdown Voltage Variation with Temperature

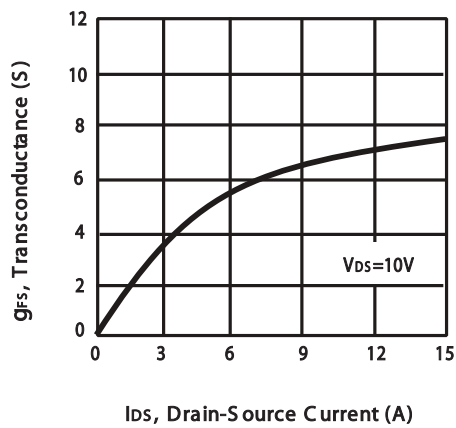


Figure 7. Transconductance Variation with Drain Current

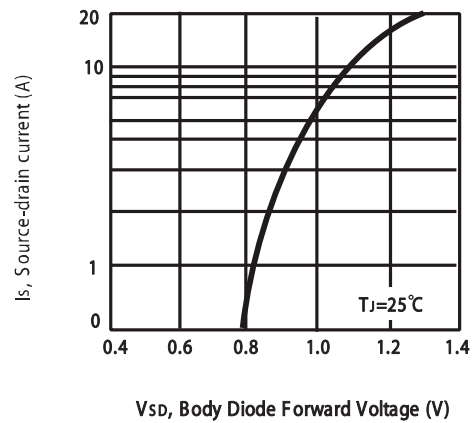


Figure 8. Body Diode Forward Voltage Variation with Source Current

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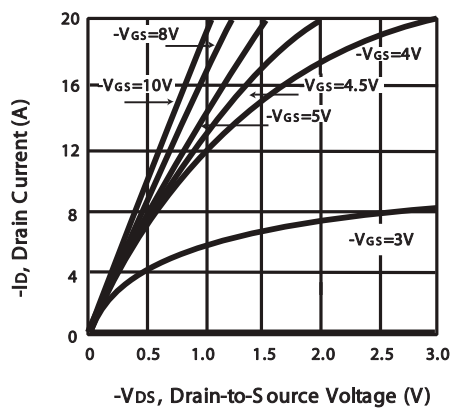


Figure 1. Output Characteristics

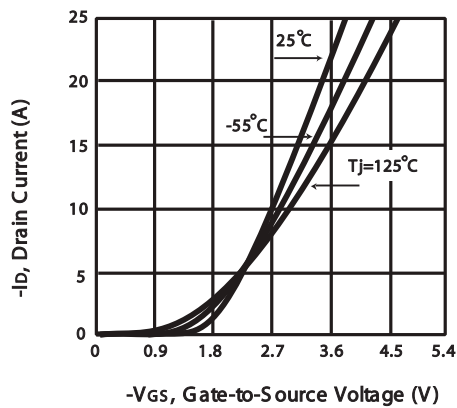


Figure 2. Transfer Characteristics

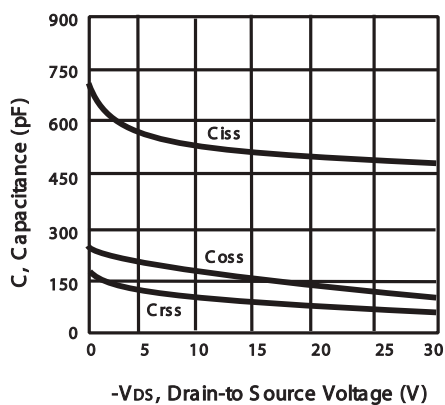


Figure 3. Capacitance

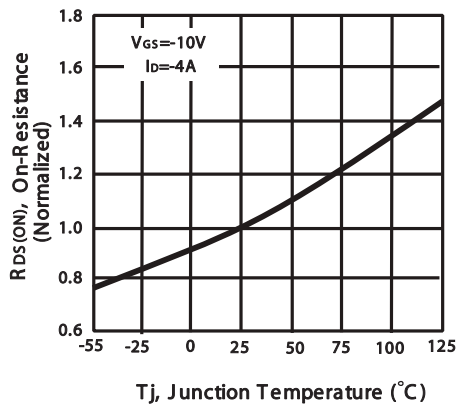


Figure 4. On-Resistance Variation with Temperature

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P-Channel

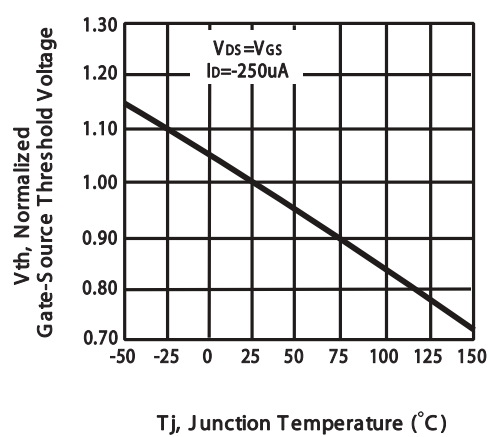


Figure 5. Gate Threshold Variation with Temperature

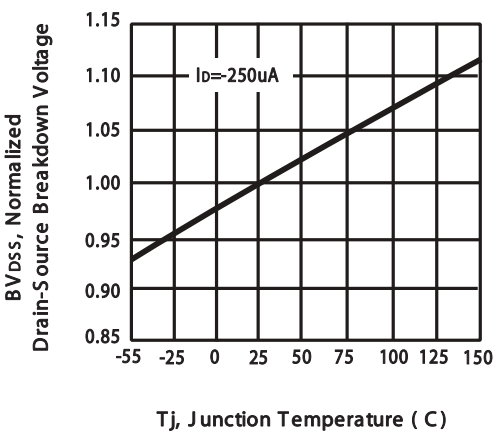


Figure 6. Breakdown Voltage Variation with Temperature

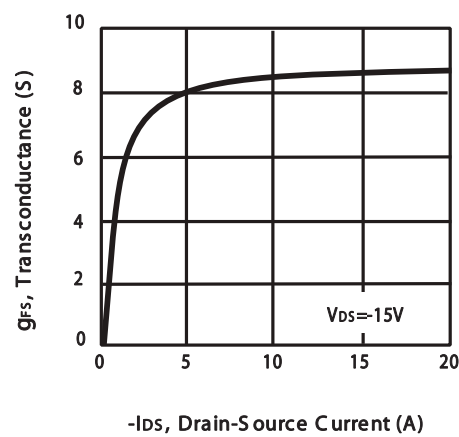


Figure 7. Transconductance Variation with Drain Current

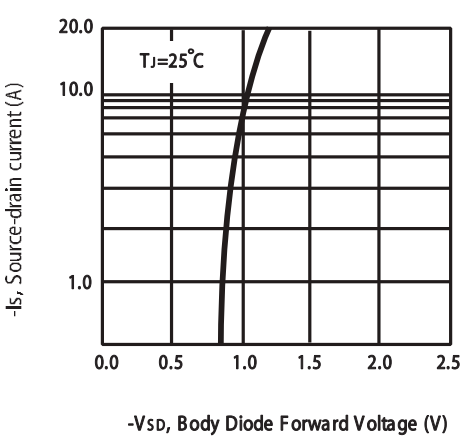
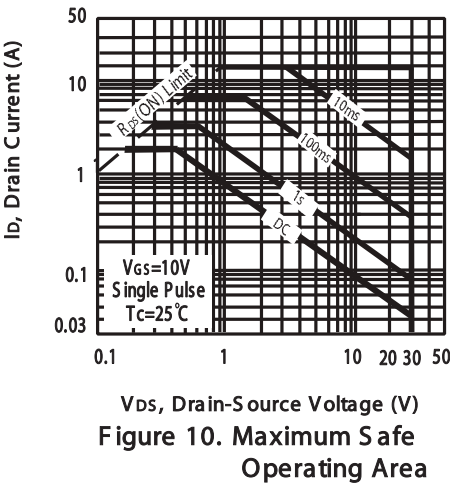
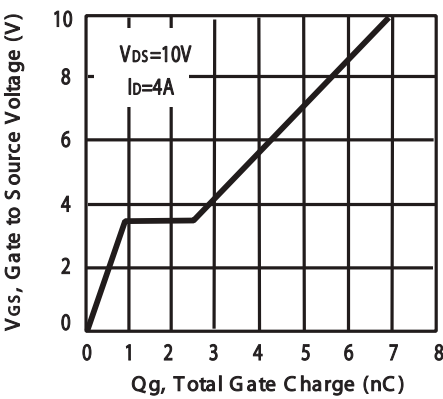


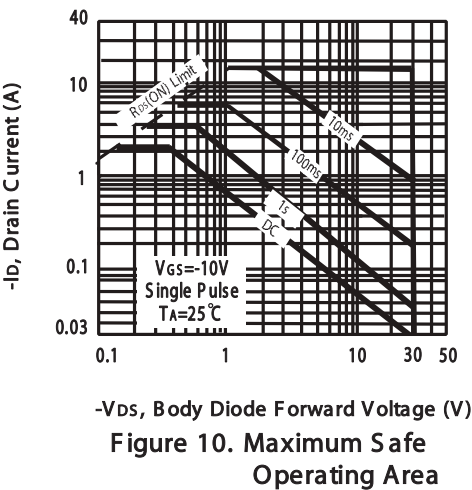
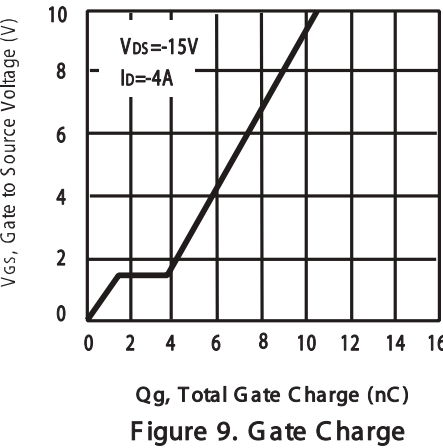
Figure 8. Body Diode Forward Voltage Variation with Source Current

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N-Channel



P-Channel



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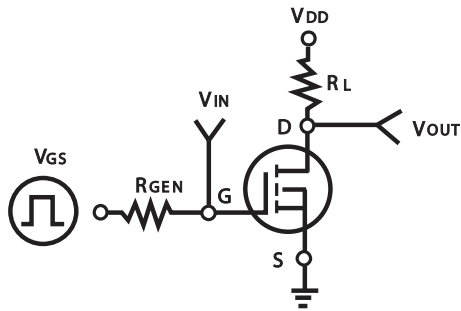


Figure 11. Switching Test Circuit

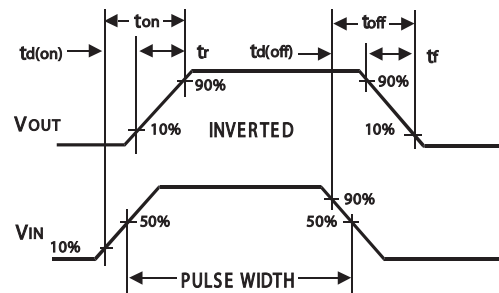
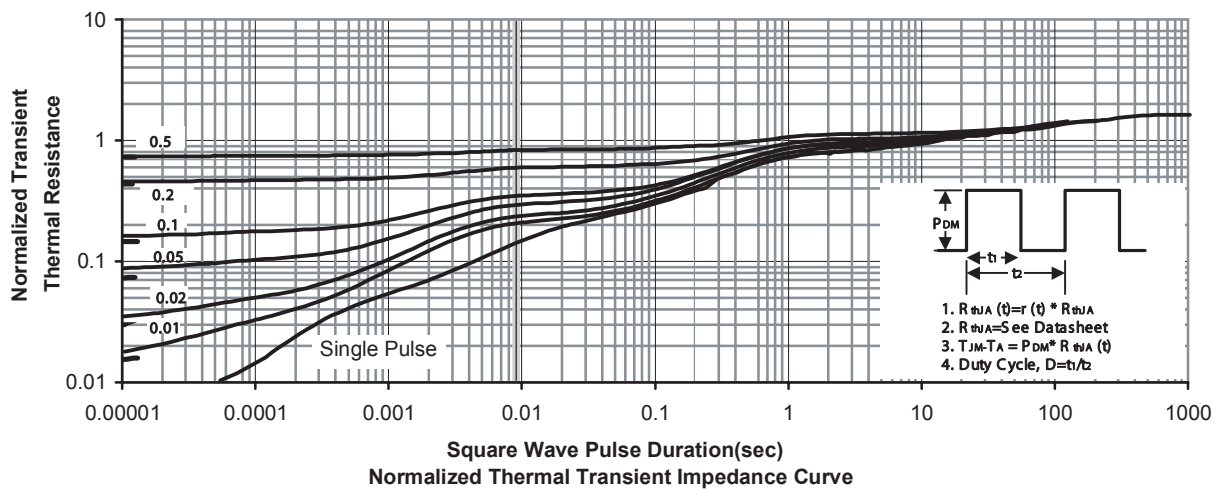
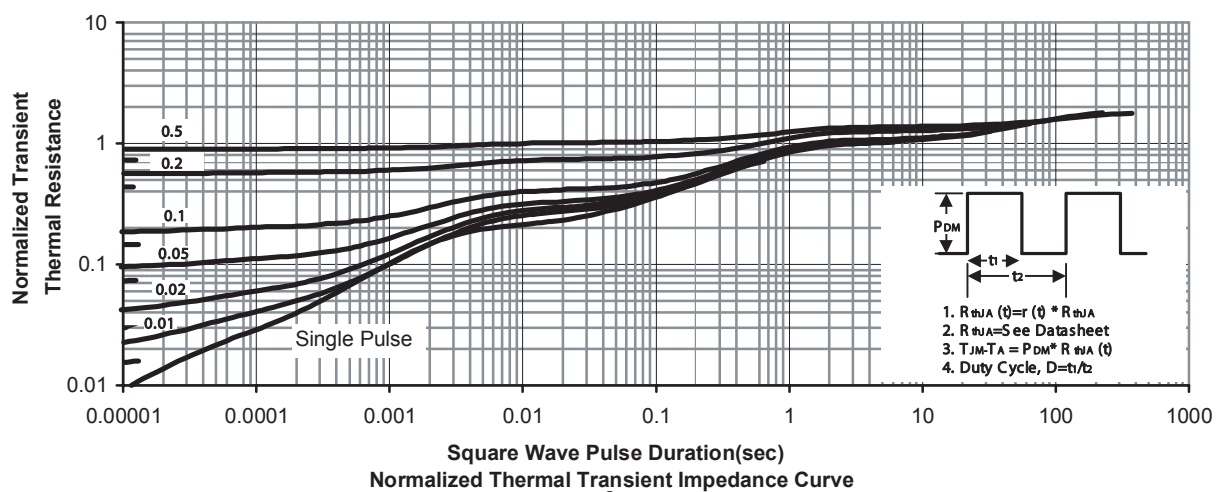


Figure 12. Switching Waveforms

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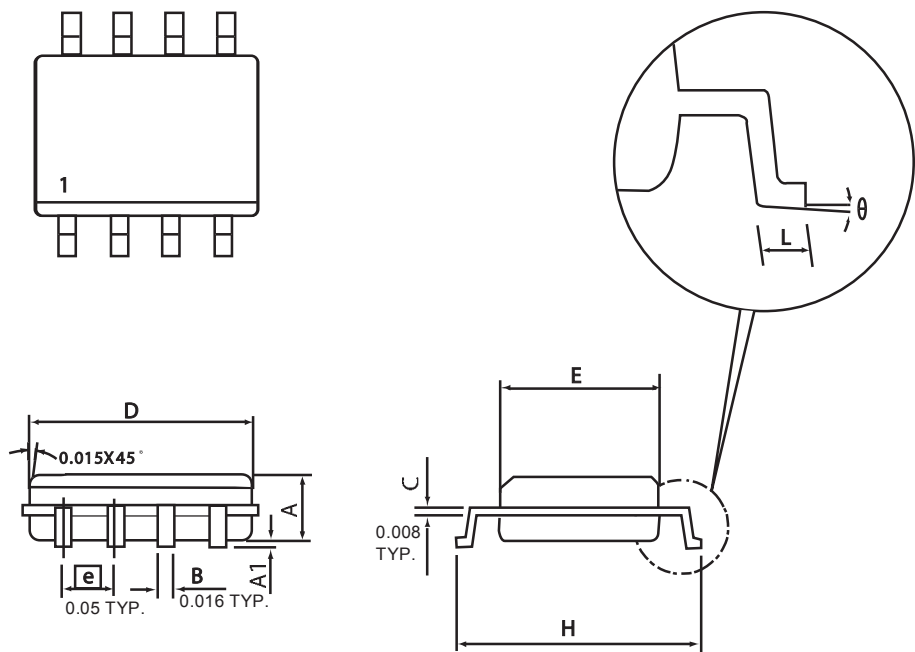
P-Channel



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PACKAGE OUTLINE DIMENSIONS

SO-8

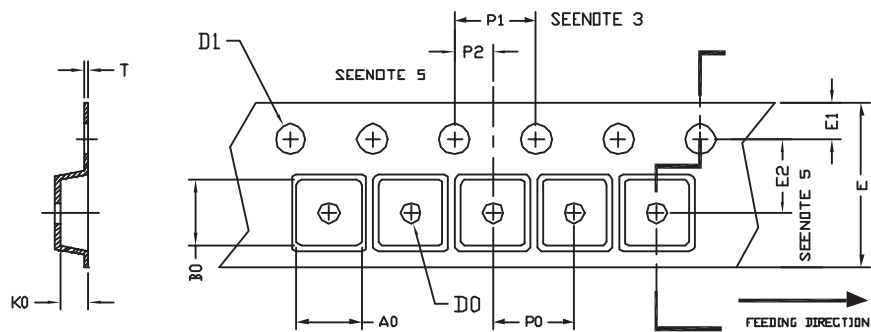


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

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SO-8 Tape and Reel Data

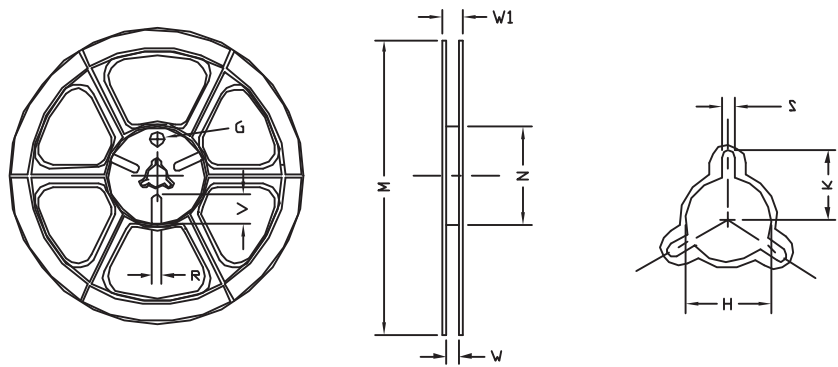
SO-8 Carrier Tape



unit:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N 150mil	6.40	5.20	2.10	$\phi 1.5$ (MIN)	$\phi 1.5$ + 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	$\phi 330$	330 ± 1	62 ± 1.5	12.4 + 0.2	16.8 - 0.4	$\phi 12.75$ + 0.15	---	2.0 ± 0.15	---	---	---