SamHop Microelectronics Corp.

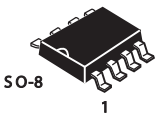
STM4512

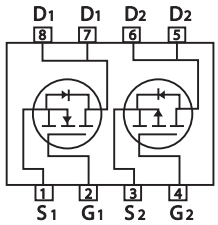
Arp,12 2005 Ver1.3

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] @ Ta	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]	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

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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°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		0.85	1.2	V
		V_{GS} = 0V, Is =-1.7A	P-Ch		-0.81	-1.2	

Notes

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

N-Channel

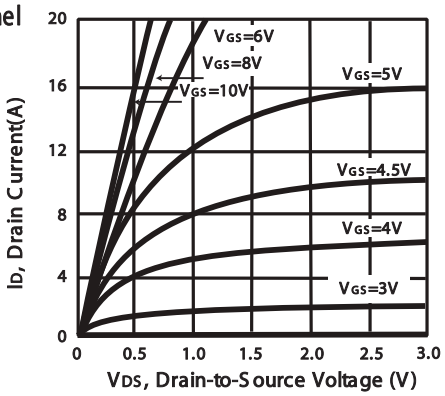

Figure 1. Output Characteristics

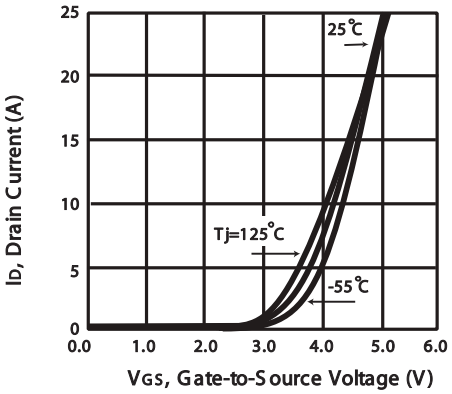

Figure 2. Transfer Characteristics

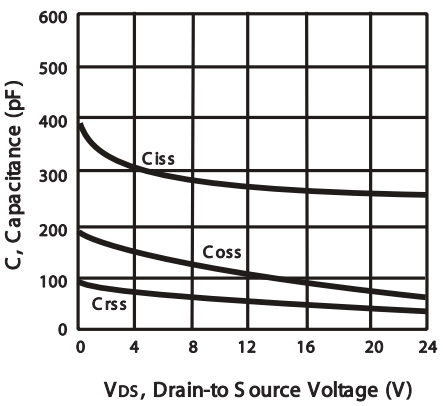

Figure 3. Capacitance

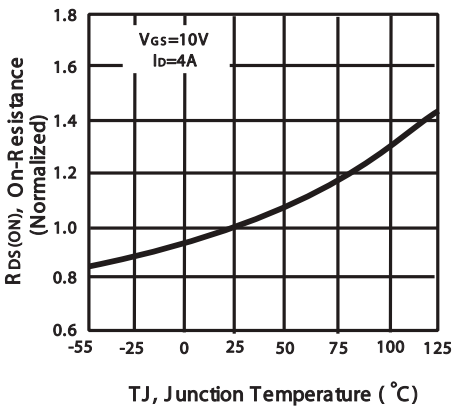

Figure 4. On-Resistance Variation with Drain Current and Temperature

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N-Channel

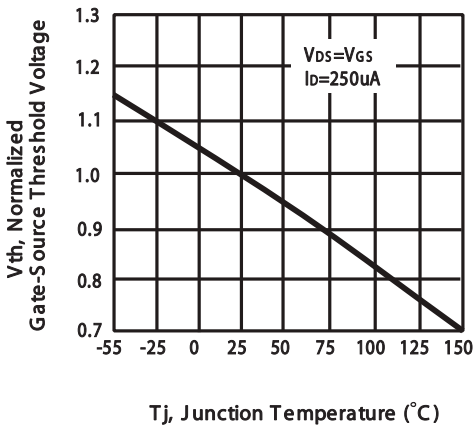

Figure 5. Gate Threshold Variation with Temperature

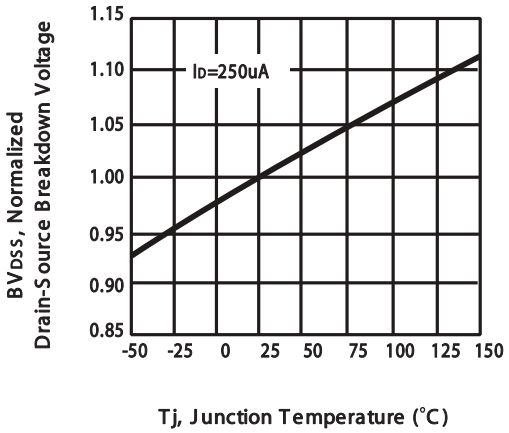

Figure 6. Breakdown Voltage Variation with Temperature

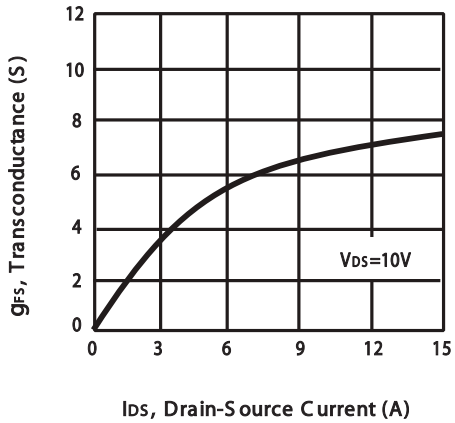

Figure 7. Transconductance Variation with Drain Current

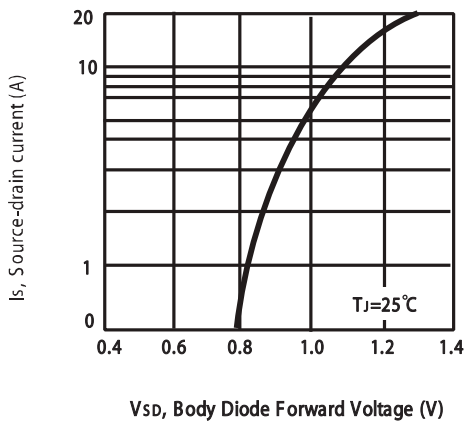

Figure 8. Body Diode Forward Voltage Variation with Source Current

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P-Channel

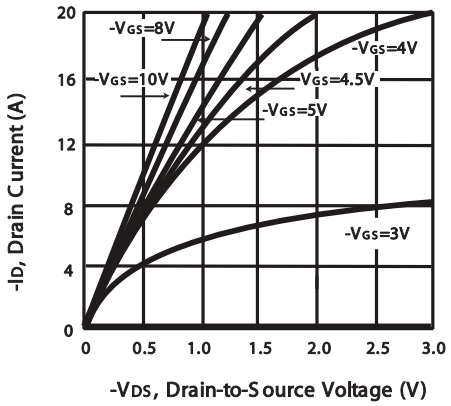


Figure 1. Output Characteristics

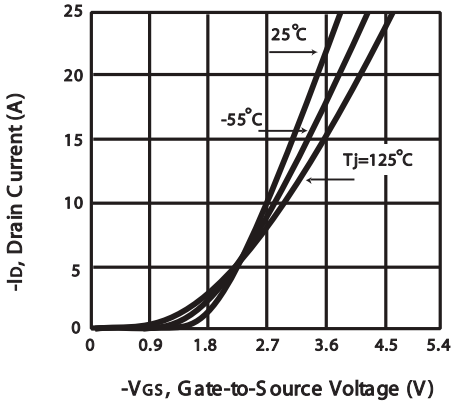
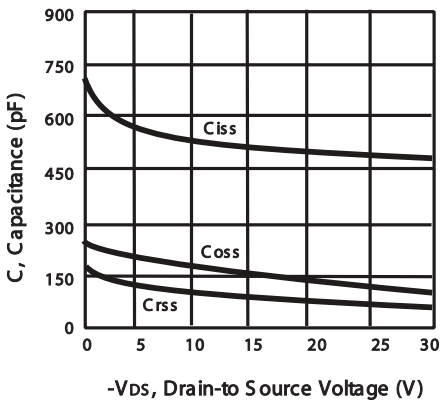


Figure 2. Transfer Characteristics



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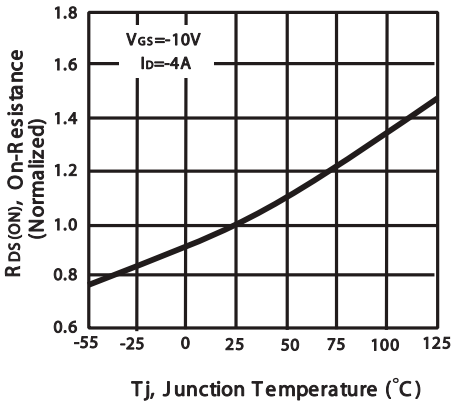

Figure 4. On-Resistance Variation with Temperature

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P-Channel

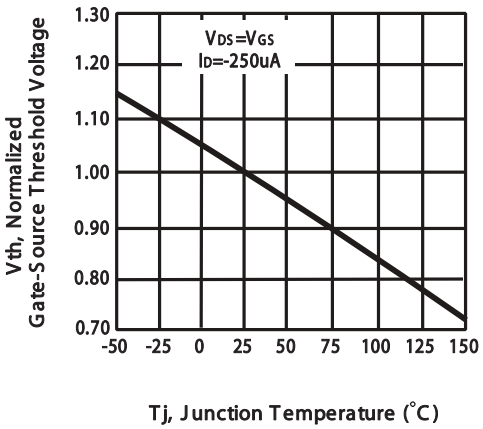

Figure 5. Gate Threshold Variation with Temperature

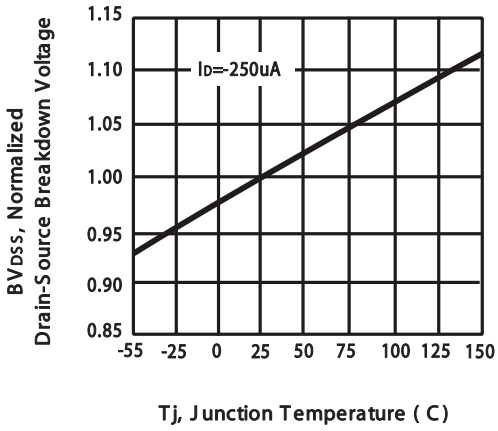

Figure 6. Breakdown Voltage Variation with Temperature

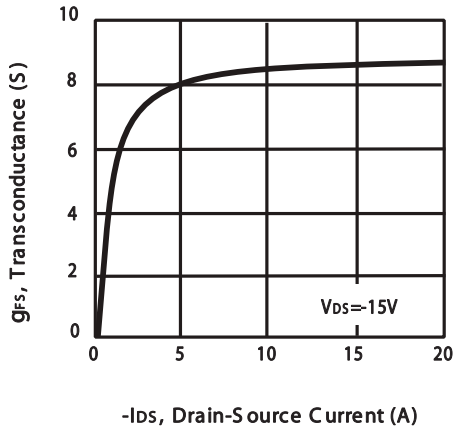

Figure 7. Transconductance Variation with Drain Current

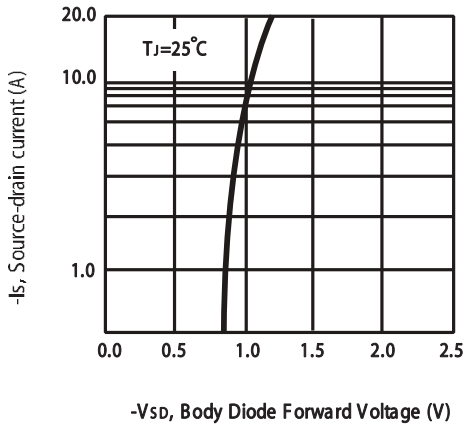

Figure 8. Body Diode Forward Voltage Variation with Source Current

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N-Channel

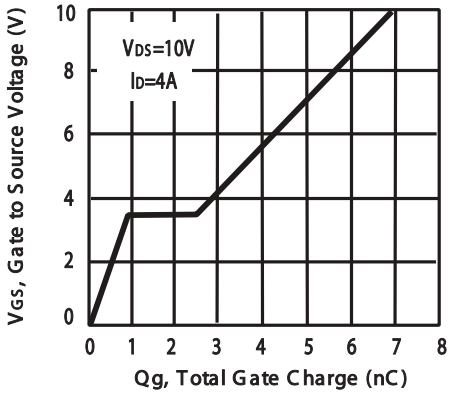


Figure 9. Gate Charge

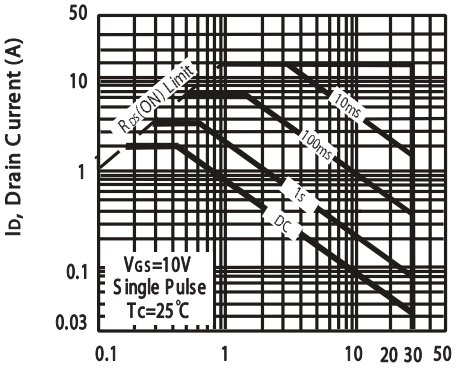
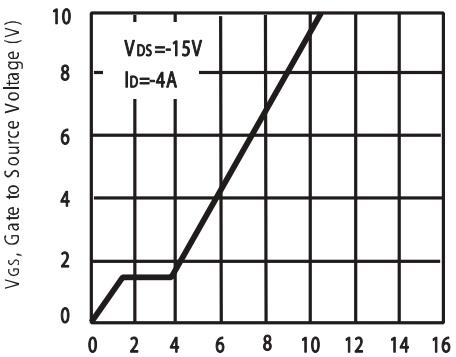


Figure 10. Maximum Safe Operating Area

P-Channel



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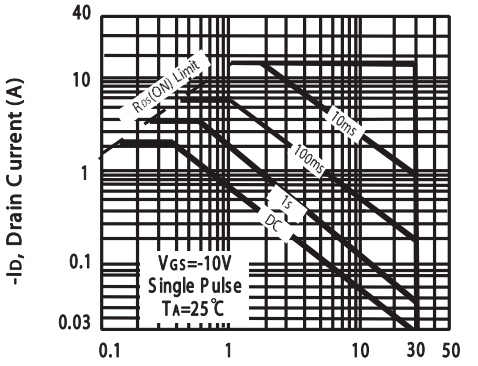

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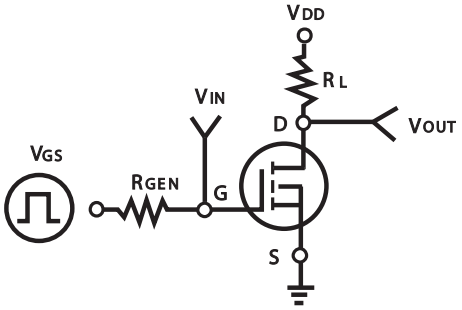


Figure 11. Switching Test Circuit

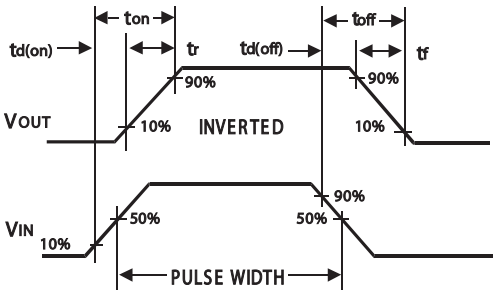
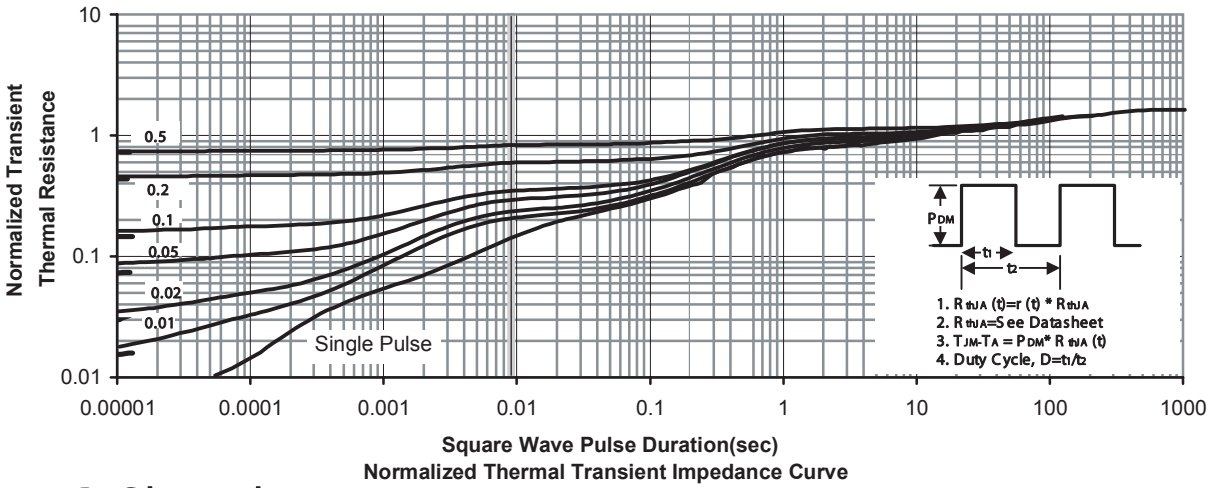


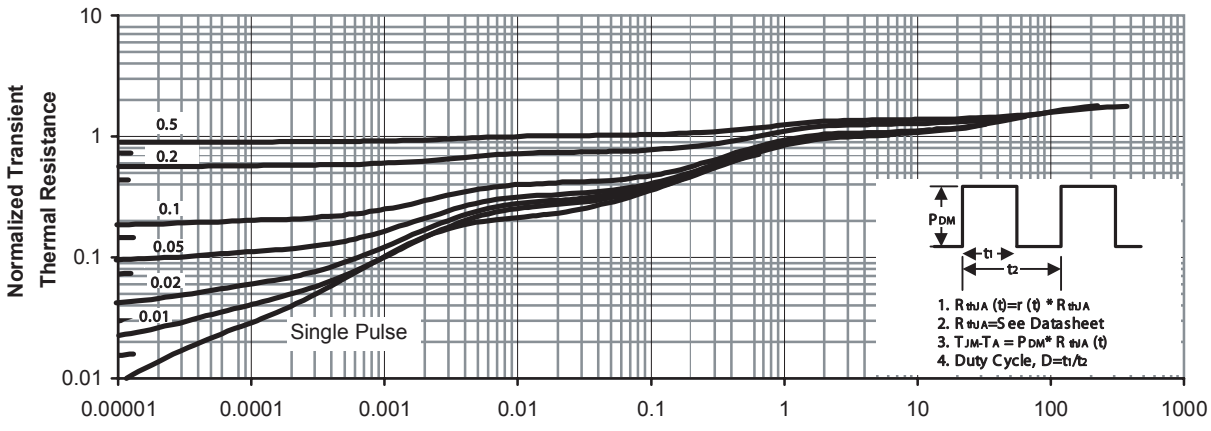
Figure 12. Switching Waveforms

N-Channel



Normalized Thermal Transient Impedance Curve

P-Channel



Normalized Thermal Transient Impedance Curve

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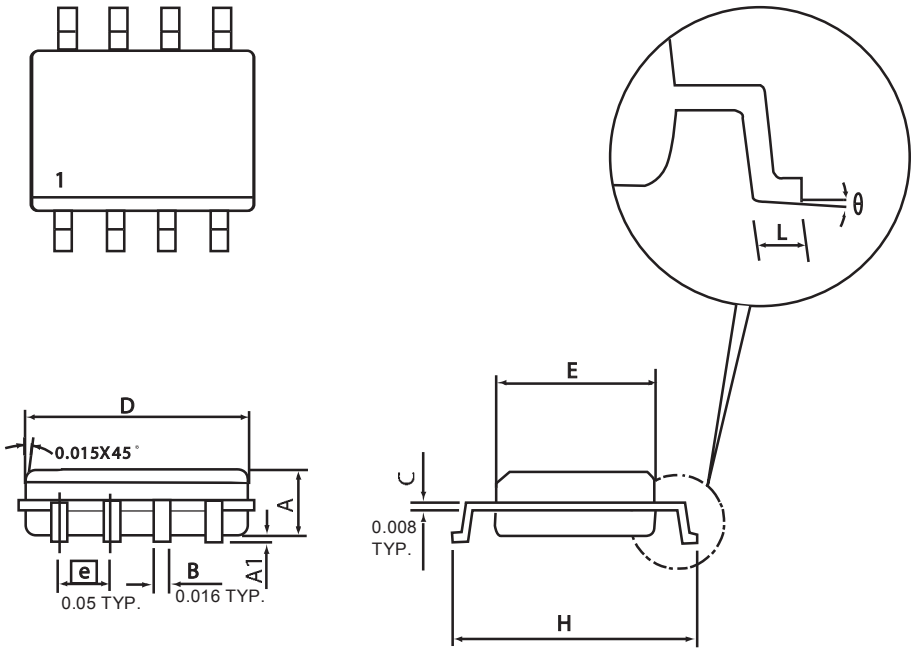
PACKAGE OUTLINE DIMENSIONS

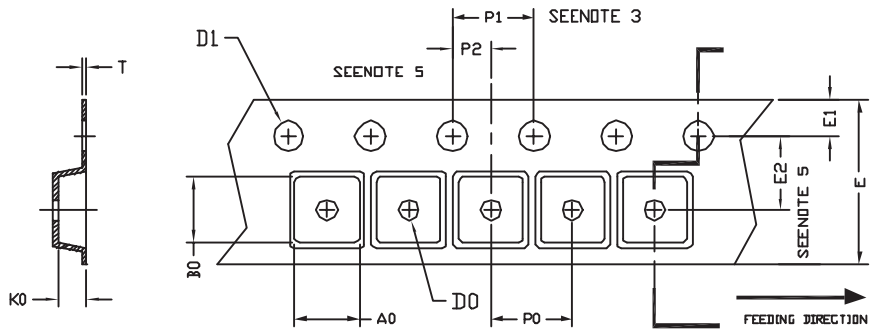
SO-8



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

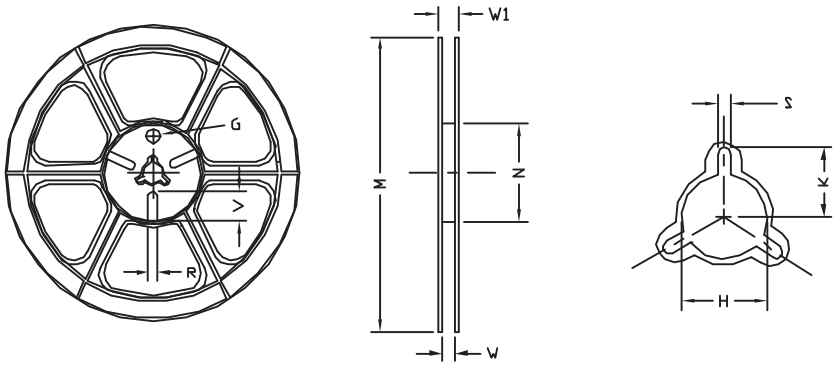
SO-8 Carrier Tape



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	---	---	---