



STM9930A

SamHop Microelectronics Corp.

Dec.20, 2005

2N and 2P Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY (N-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
30V	6A	35 @ V _{GS} = 10V
		54 @ V _{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
-30V	-5.3A	53 @ V _{GS} = -10V
		75 @ 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	I _D	25°C	6	-5.3	A
		70°C	4	-3.5	A
-Pulsed ^b	I _{DM}	20	-20	A	
Drain-Source Diode Forward Current ^a	I _S	1.7	-1.7	A	
Maximum Power Dissipation ^a	P _D	T _a =25°C	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	1.5	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$		29	35	m ohm
		$V_{GS}=4.5V, I_D=3A$		42	54	m ohm
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=5V, V_{GS}=4.5V$	20			A
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=5A$		8		S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V$ $f=1.0MHz$		550		pF
Output Capacitance	C_{OSS}			130		pF
Reverse Transfer Capacitance	C_{RSS}			60		pF
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1.0MHz$		2.3		ohm
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=15V$ $I_D=1A$ $V_{GS}=10V$ $R_{GEN}=6\text{ ohm}$		7		ns
Rise Time	t_r			8		ns
Turn-Off Delay Time	$t_{D(OFF)}$			15		ns
Fall Time	t_f			6		ns
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=5A, V_{GS}=10V$		13		nC
		$V_{DS}=15V, I_D=5A, V_{GS}=4.5V$		6.6		nC
Gate-Source Charge	Q_{gs}	$V_{DS}=15V, I_D=5A$		1.4		nC
Gate-Drain Charge	Q_{gd}	$V_{GS}=10V$		3.8		nC

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P-Channel ELECTRICAL CHARACTERISTICS (TA = 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		44	53	m ohm
		V _{GS} = -4.5V, I _D = -3A		62	75	m ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = -5V, V _{GS} = -10V	-20			A
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -5A		9		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C _{ISS}	V _{DS} = -25V, V _{GS} = 0V f = 1.0MHz		650		pF
Output Capacitance	C _{OSS}			170		pF
Reverse Transfer Capacitance	C _{RSS}			100		pF
Gate resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1.0MHz		2.2		ohm
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = -15V I _D = -1A V _{GS} = -10V R _{GEN} = 6 ohm		9		ns
Rise Time	t _r			16		ns
Turn-Off Delay Time	t _{D(OFF)}			51		ns
Fall Time	t _f			36		ns
Total Gate Charge	Q _g	V _{DS} = -15V, I _D = -5A, V _{GS} = -10V		13		nC
		V _{DS} = -15V, I _D = -5A, V _{GS} = -4.5V		6.6		nC
Gate-Source Charge	Q _{gs}	V _{DS} = -15V, I _D = -5 A		1.2		nC
Gate-Drain Charge	Q _{gd}	V _{GS} = -10V		4.3		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	0.82	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, $t \leq 10\text{sec}$.
- 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

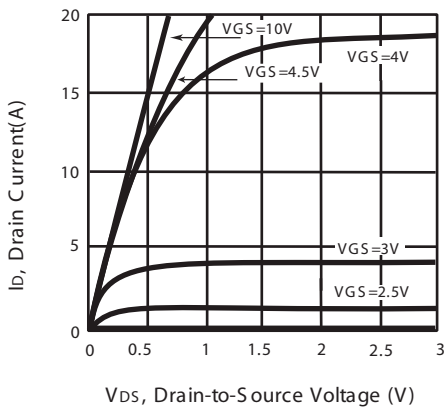


Figure 1. Output Characteristics

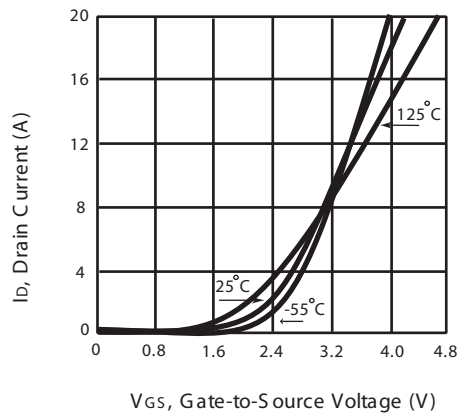


Figure 2. Transfer Characteristics

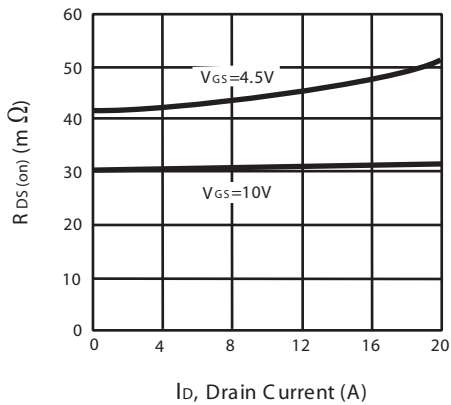


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

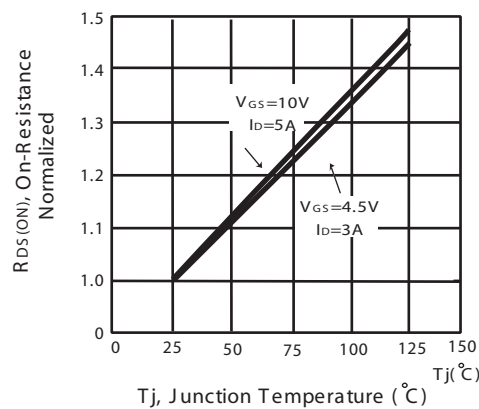


Figure 4. On-Resistance Variation with Drain Current and Temperature

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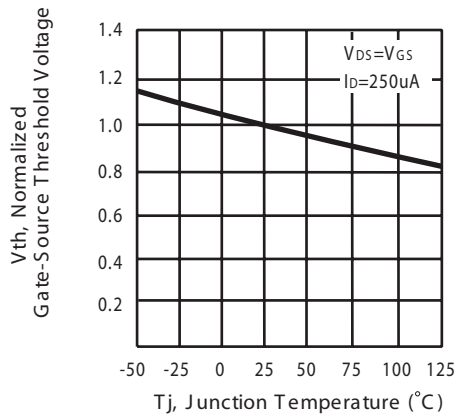


Figure 5. Gate Threshold Variation with Temperature

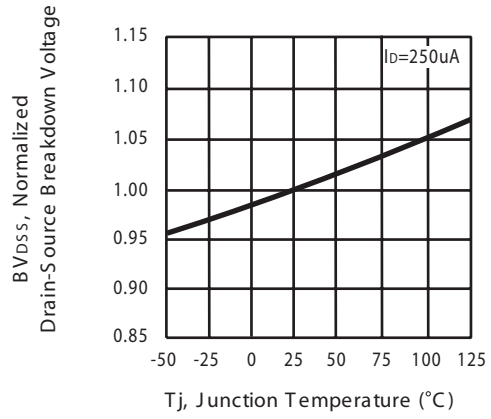


Figure 6. Breakdown Voltage Variation with Temperature

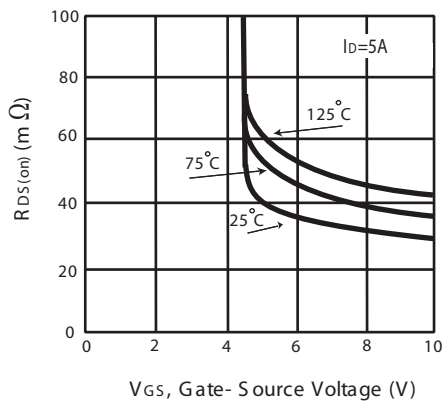


Figure 7. On-Resistance vs. Gate-Source Voltage

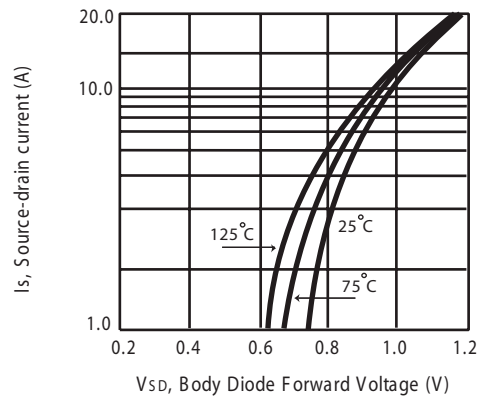


Figure 8. Body Diode Forward Voltage Variation with Source Current

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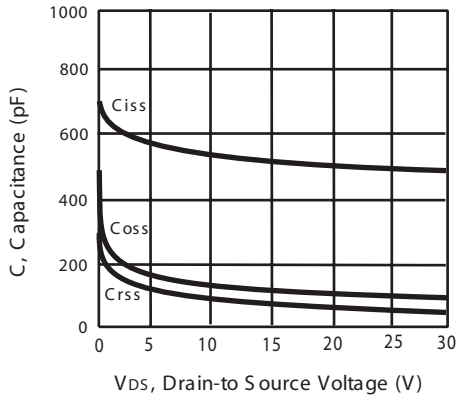


Figure 9. Capacitance

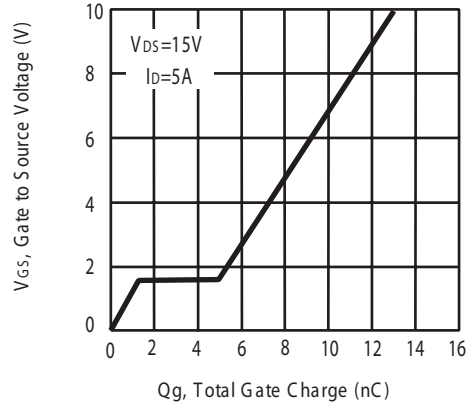


Figure 10. Gate Charge

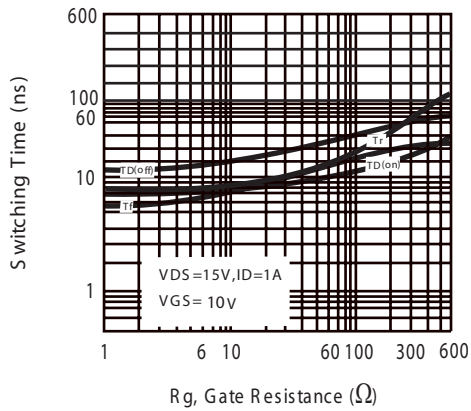


Figure 11. switching characteristics

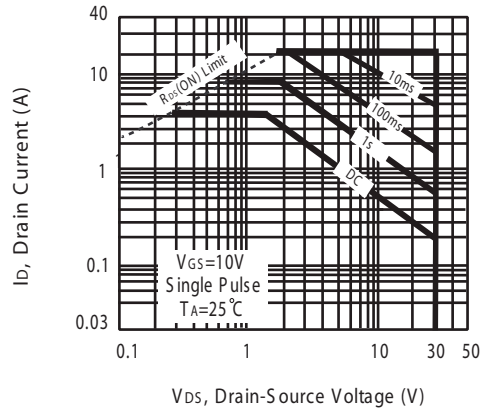


Figure 12. Maximum Safe Operating Area

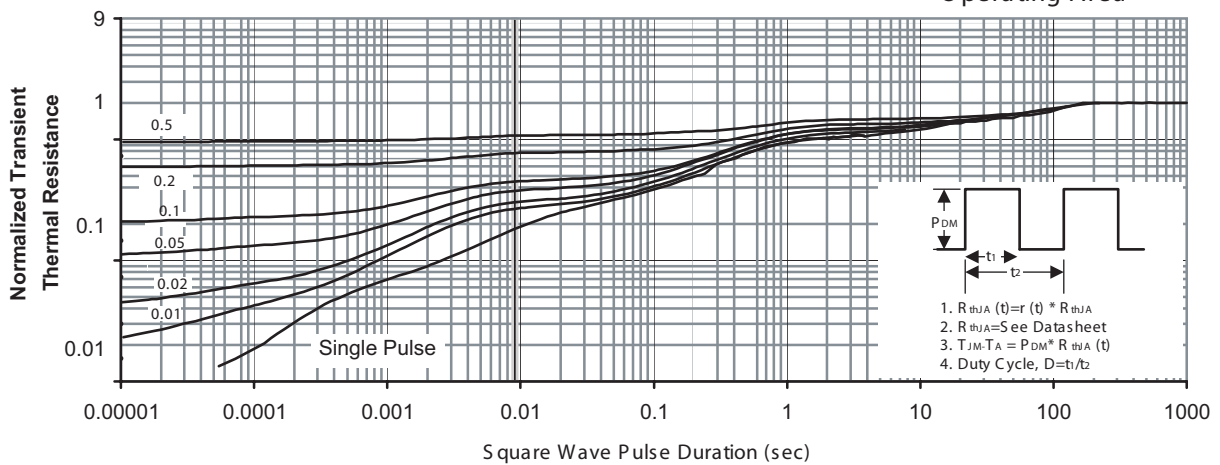


Figure 13. Normalized Thermal Transient Impedance Link Curve

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P-Channel

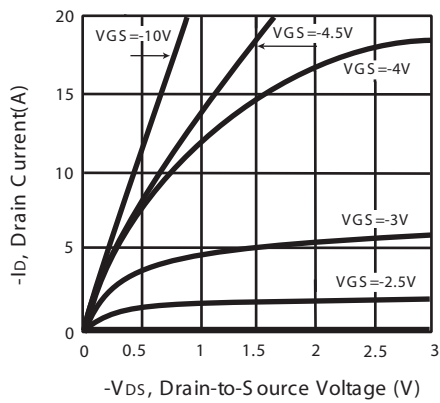


Figure 1. Output Characteristics

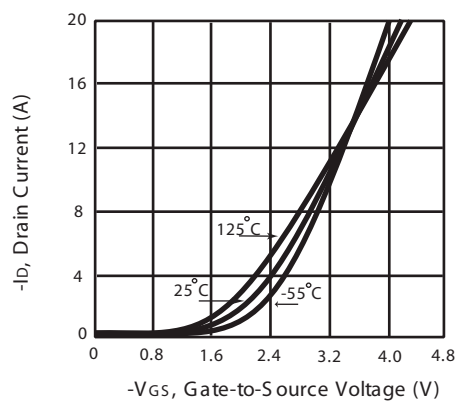


Figure 2. Transfer Characteristics

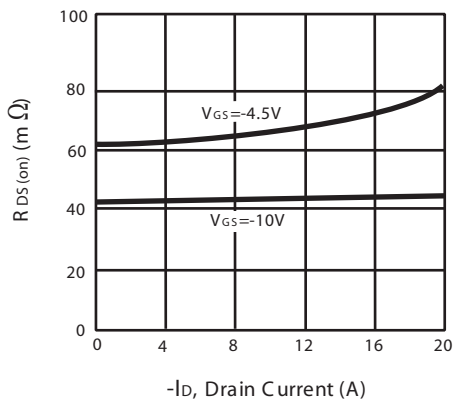


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

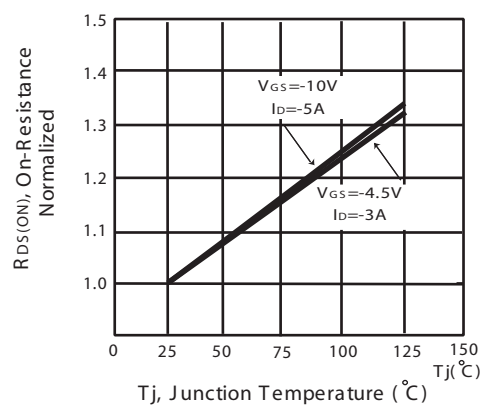


Figure 4. On-Resistance Variation with Drain Current and Temperature

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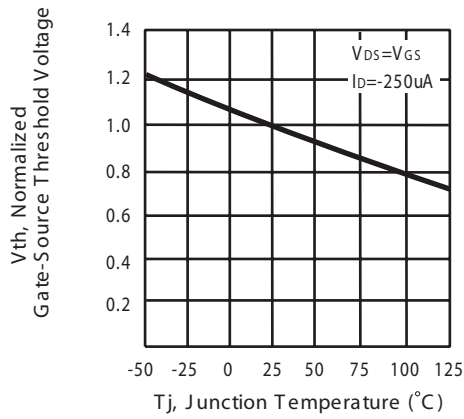


Figure 5. Gate Threshold Variation with Temperature

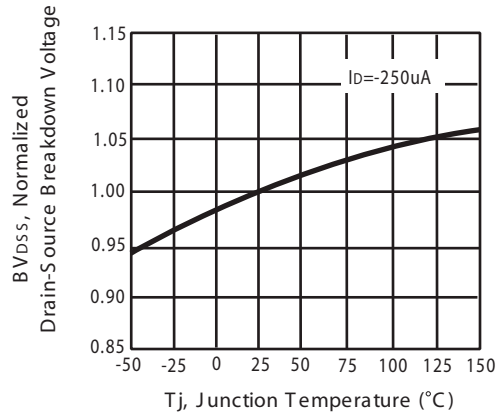


Figure 6. Breakdown Voltage Variation with Temperature

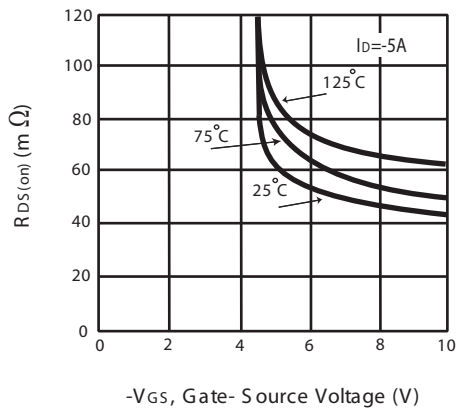


Figure 7. On-Resistance vs. Gate-Source Voltage

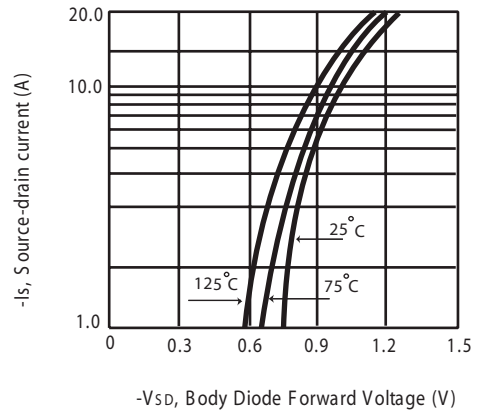


Figure 8. Body Diode Forward Voltage Variation with Source Current

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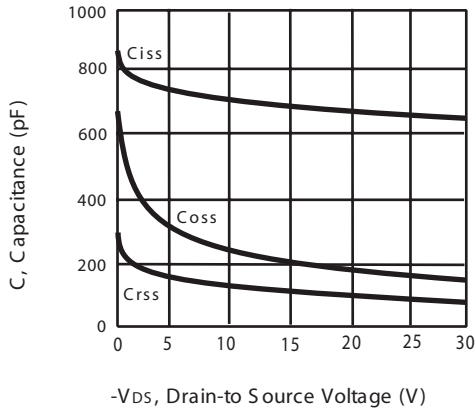


Figure 9. Capacitance

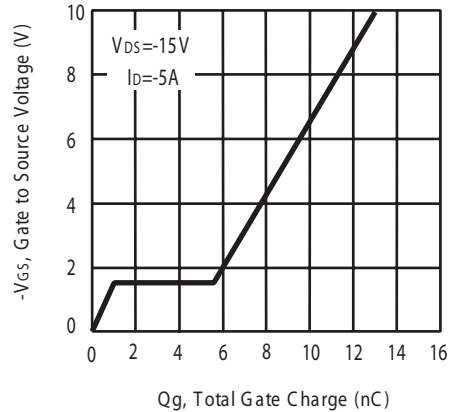


Figure 10. Gate Charge

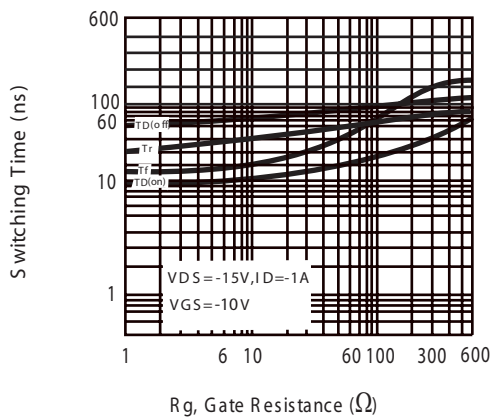


Figure 11. switching characteristics

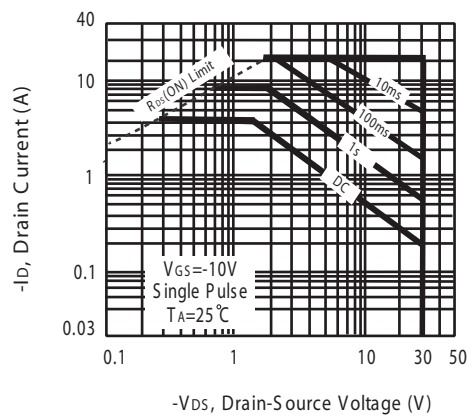


Figure 12. Maximum Safe Operating Area

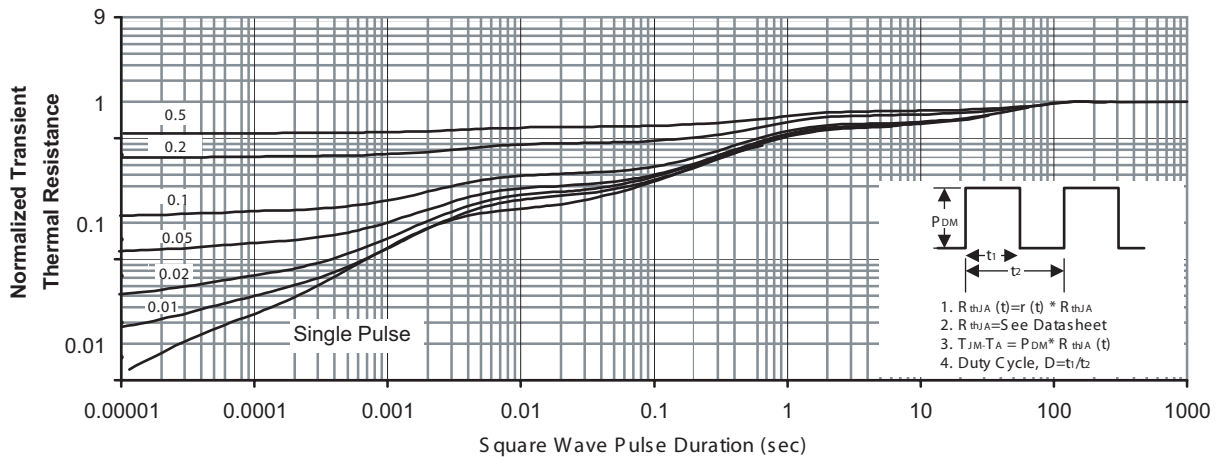
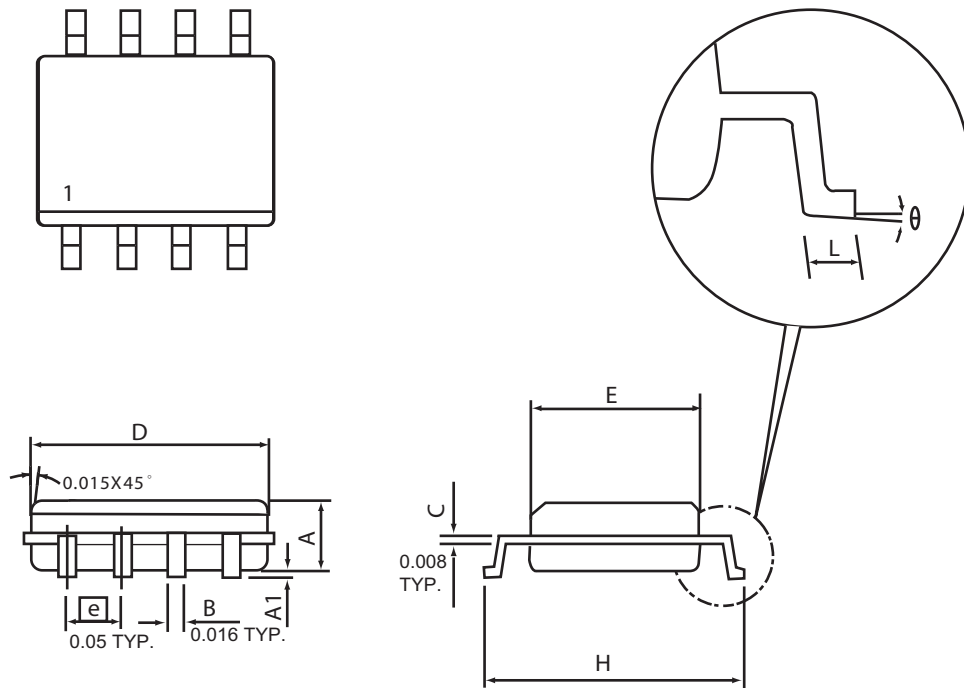


Figure 13. Normalized Thermal Transient Impedance Curve

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PACKAGE OUTLINE DIMENSIONS

SO-8

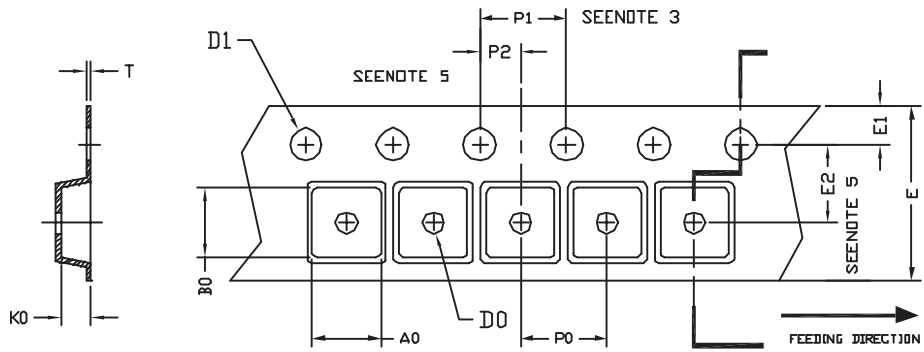


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

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SO-8 Tape and Reel Data

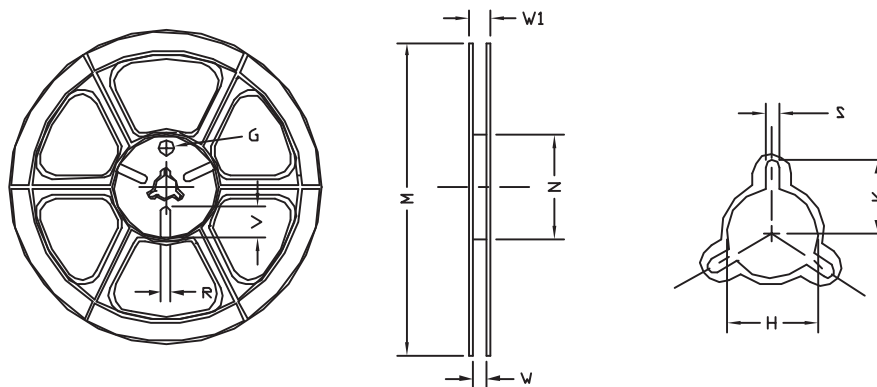
SO-8 Carrier Tape



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	---	---	---