SamHop Microelectronics Corp.

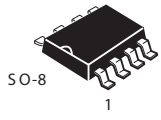
STM8501

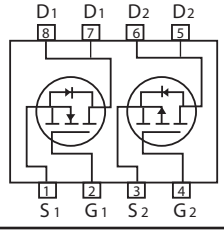
Jan.10 2006

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

PRODUCT SUMMARY (N-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
55V	5A	50 @ V_{GS} = 10V
		70 @ V_{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
-55V	- 3.5A	80 @ V_{GS} = -10V
		100 @ V_{GS} = -4.5V





ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage Rating		V_{spike} [d]	60	-60	V
Drain-Source Voltage		V_{DS}	55	-55	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Drain Current-Continuous [a] @ Ta	25°C	I_D	5	- 3.5	A
	70°C		4.2	- 2.8	A
-Pulsed [b]		I_{DM}	22	- 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	55			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=44V, 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	1.0	1.7	3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4.5A		34	50	m ohm
		V_{GS}=4.5V, I_D= 4A		45	70	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	15			A
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 4.5A		15		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS} = 0V f =1.0MHz		930		pF
Output Capacitance	C_{OSS}			85		pF
Reverse Transfer Capacitance	C_{RSS}			50		pF
Gate resistance	Rg	V_{GS} =0V, V_{DS} = 0V, f=1.0MHz		3.9		ohm
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 30V I_D = 1 A V_{GS} = 10V R_{GEN} = 6 ohm		17		ns
Rise Time	t_r			14		ns
Turn-Off Delay Time	$t_{D(OFF)}$			29		ns
Fall Time	t_f			5		ns
Total Gate Charge	Q_g	V_{DS} =30V, I_D =4.5A, V_{GS} =10V		20		nC
		V_{DS} =30V, I_D =4.5A, V_{GS} =4.5V		9.5		nC
Gate-Source Charge	Q_{gs}	V_{DS} =30V, I_D = 4.5 A V_{GS} =10V		2.9		nC
Gate-Drain Charge	Q_{gd}			4.5		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	-55			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =-44V, 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	-1.0	-1.7	- 3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} =-10V, I_D= -3A		60	80	m ohm
		V_{GS} =-4.5V, I_D= -2A		80	100	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V	10			A
Forward Transconductance	g_{FS}	V_{DS} = -5V, I_D= -3A		8.5		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS} =-30V, V_{GS} = 0V f =1.0MHz		900		pF
Output Capacitance	C_{OSS}			85		pF
Reverse Transfer Capacitance	C_{RSS}			58		pF
Gate resistance	Rg	V_{GS} =0V, V_{DS} = 0V, f=1.0MHz		4.2		ohm
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = -30V R_L = 30 ohm V_{GS} = -10V R_{GEN} = 6 ohm		13		ns
Rise Time	t_r			16		ns
Turn-Off Delay Time	$t_{D(OFF)}$			84		ns
Fall Time	t_f			24		ns
Total Gate Charge	Q_g	V_{DS} =-30V, I_D =-3A,V_{GS} =-10V		18.5		nC
		V_{DS} =-30V, I_D =-3A,V_{GS} =-4.5V		9.1		nC
Gate-Source Charge	Q_{gs}	V_{DS} =-30V, I_D = -3 A V_{GS} =-10V		1.8		nC
Gate-Drain Charge	Q_{gd}			4.5		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		0.8	1.2	V
		V_{GS} = 0V, Is =-1.7A	P-Ch		-0.78	-1.2	

Notes

a.Surface Mounted on FR4 Board, t≤10sec.
b.Pulse Test:Pulse Width≤300 μs, Duty Cycle≤2%.
c.Guaranteed by design, not subject to production testing.
d.Guaranteed when external Rg=6 ohm and tf < tf max.
N-Channel

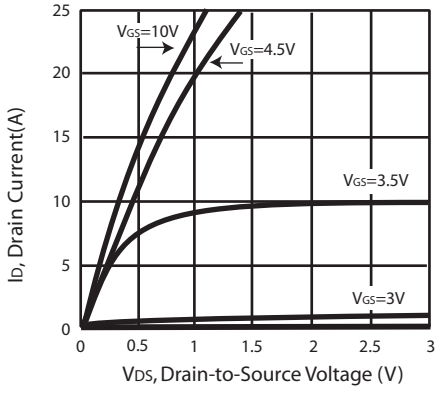


Figure 1. Output Characteristics

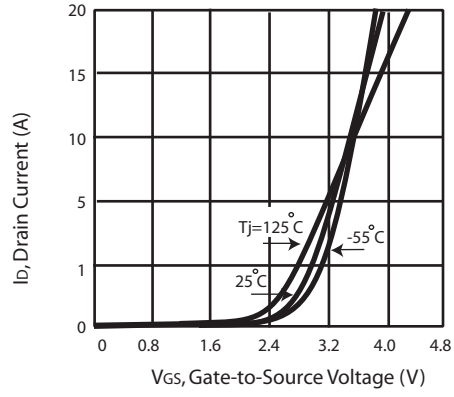


Figure 2. Transfer Characteristics

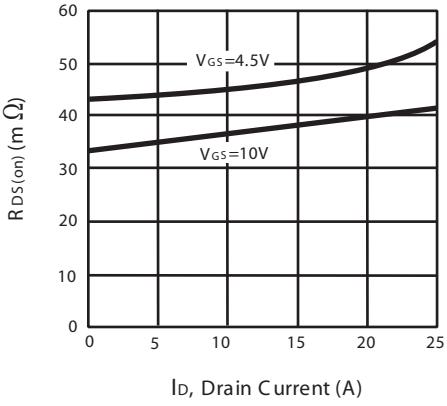


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

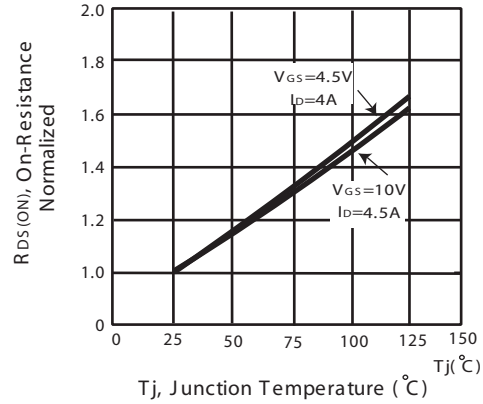


Figure 4. On-Resistance Variation with Drain Current and Temperature

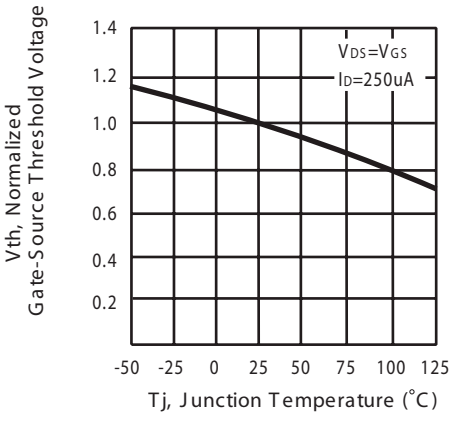


Figure 5. Gate Threshold Variation with Temperature

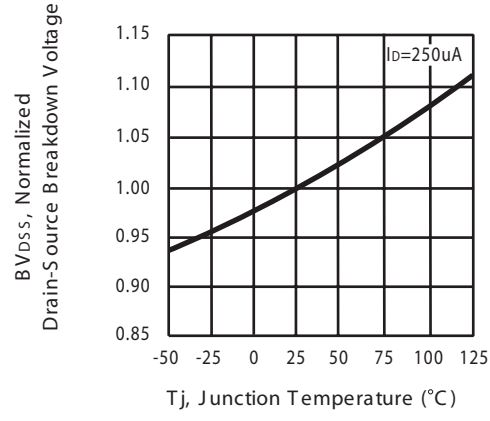


Figure 6. Breakdown Voltage Variation with Temperature

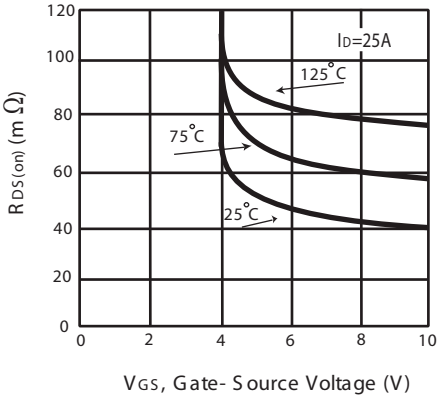


Figure 7. On-Resistance vs. Gate-Source Voltage

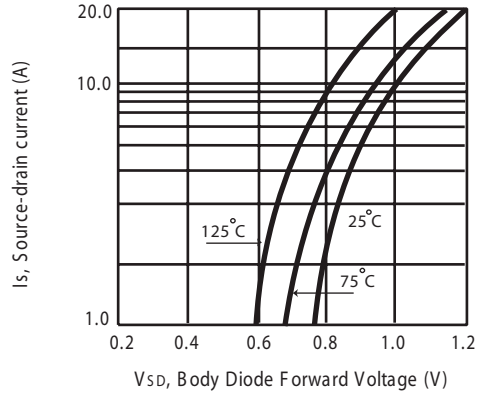


Figure 8. Body Diode Forward Voltage Variation with Source Current

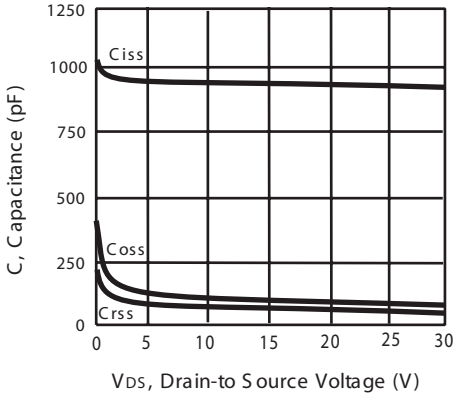


Figure 9. Capacitance

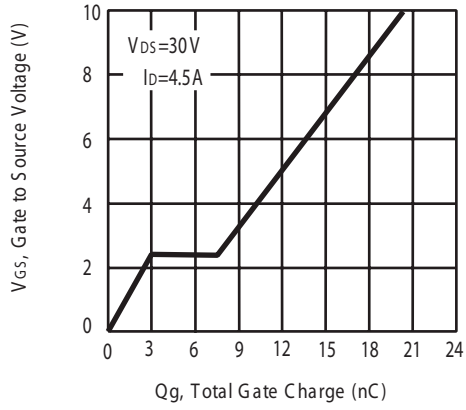


Figure 10. Gate Charge

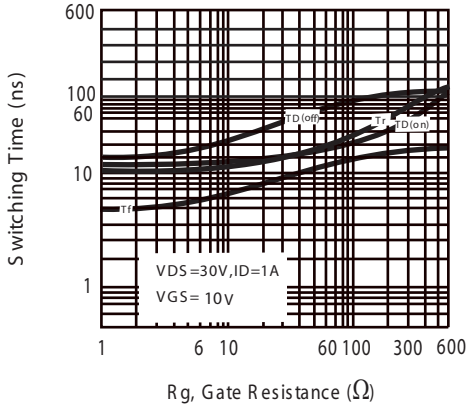


Figure 11.switching characteristics

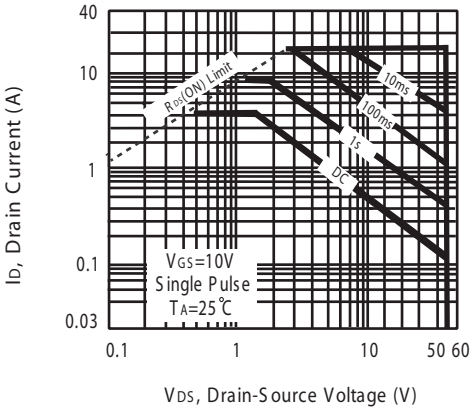


Figure 12. Maximum Safe Operating Area

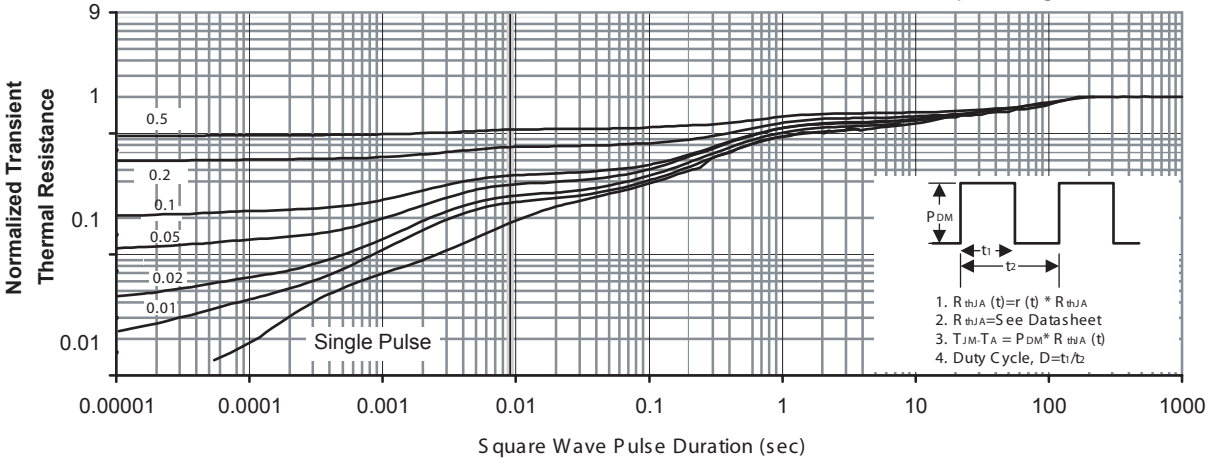


Figure 13. Normalized Thermal Transient Impedance Curve

P-Channel

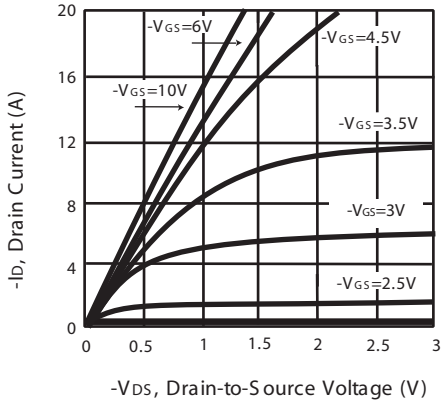
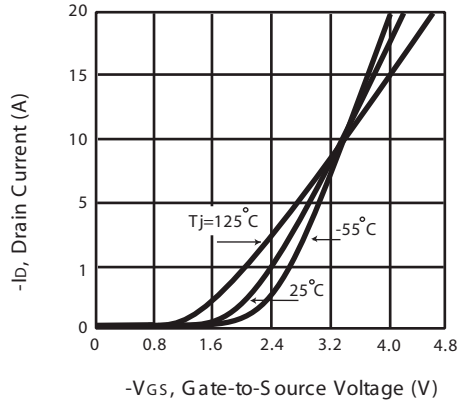


Figure 1. Output Characteristics



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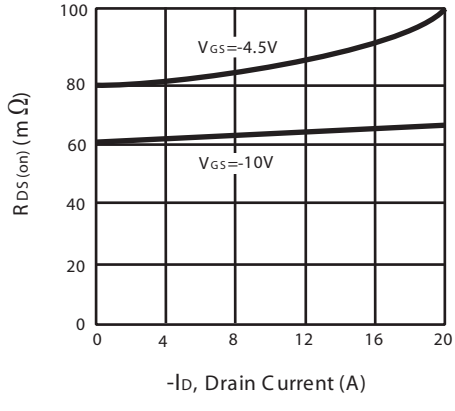

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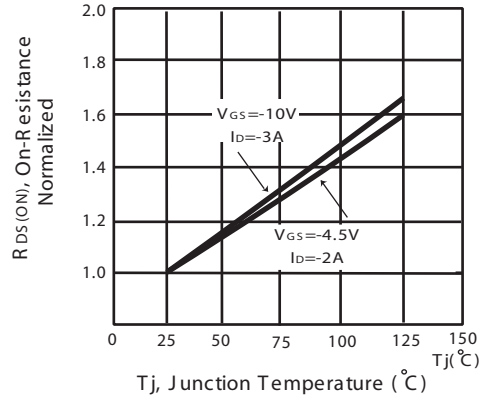


Figure 4. On-Resistance Variation with Drain Current and Temperature

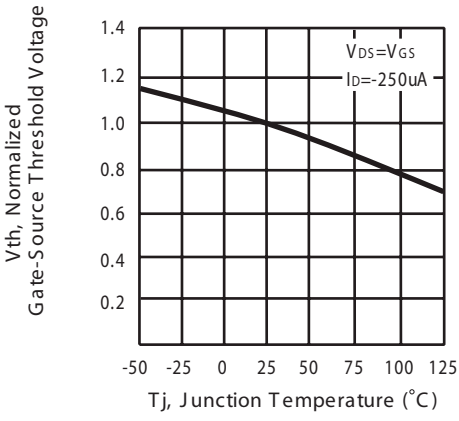


Figure 5. Gate Threshold Variation with Temperature

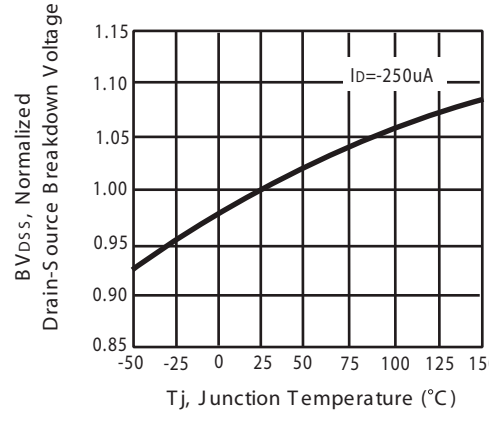
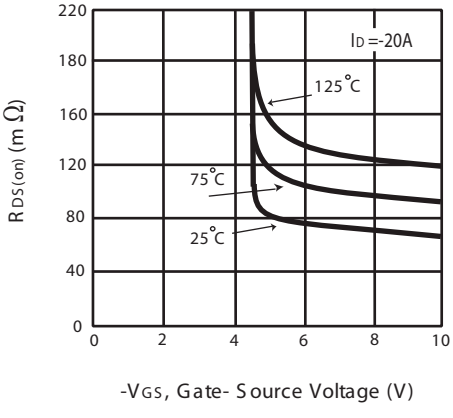


Figure 6. Breakdown Voltage Variation with Temperature



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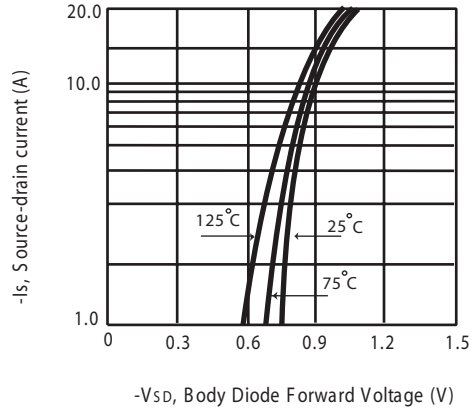

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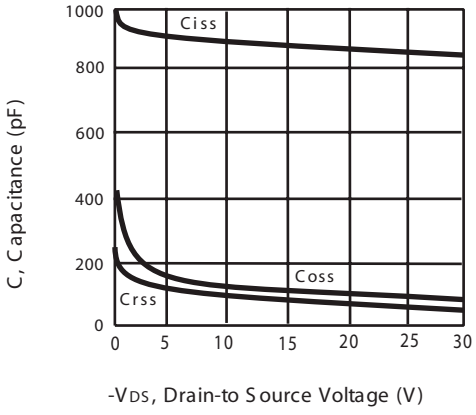


Figure 9. Capacitance

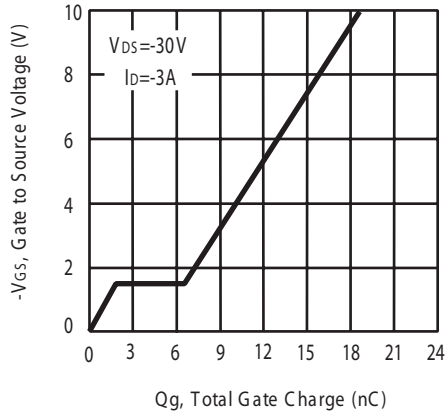
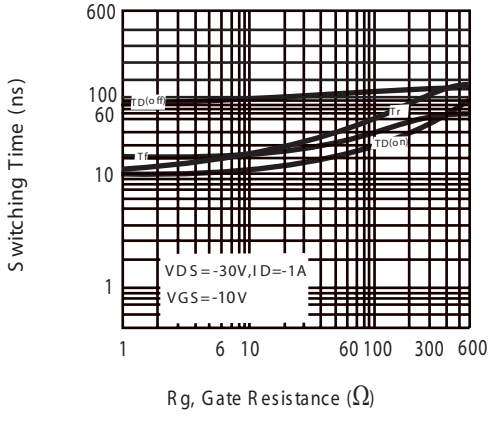


Figure 10. Gate Charge



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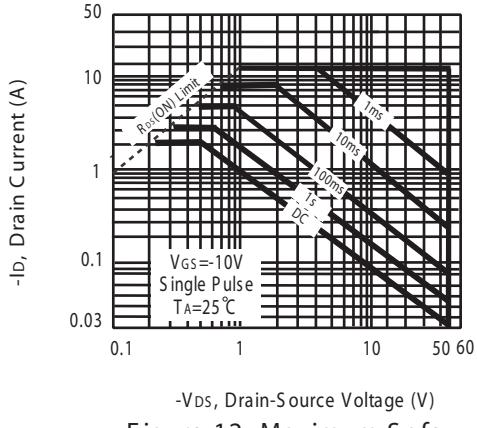

Figure 12. Maximum Safe Operating Area

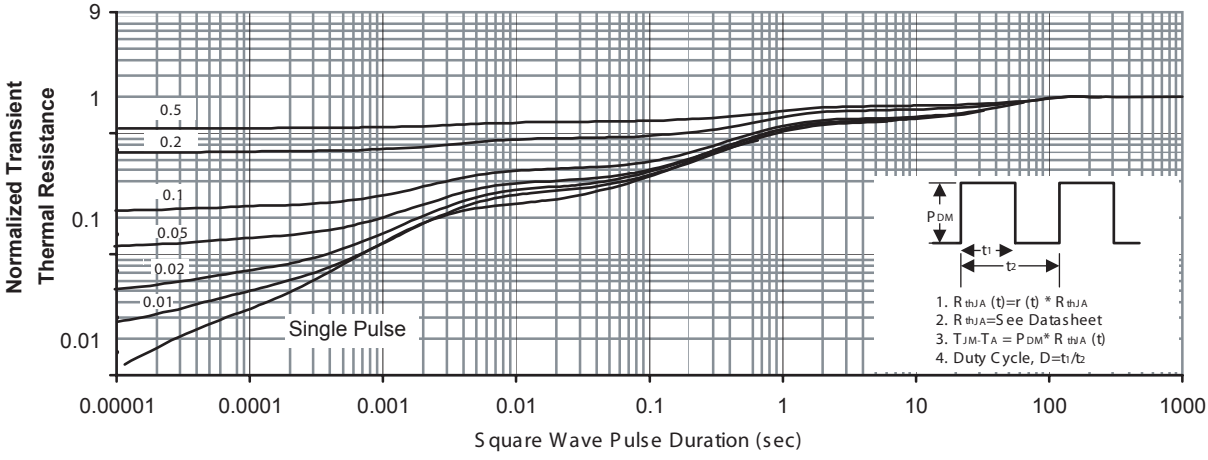

Figure 13. Normalized Thermal Transient Impedance Curve

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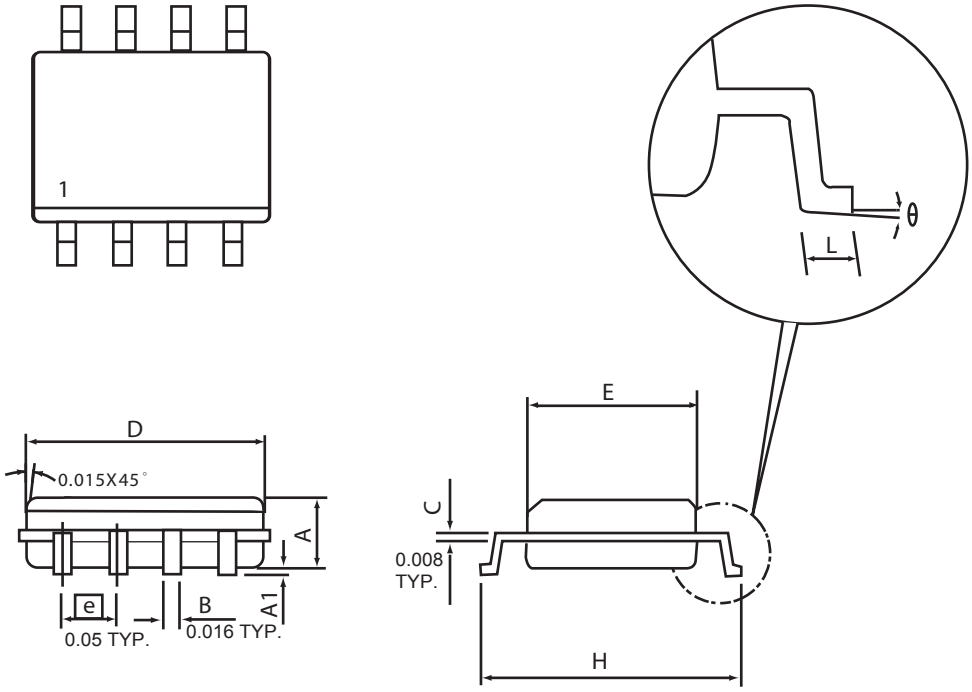
PACKAGE OUTLINE DIMENSIONS

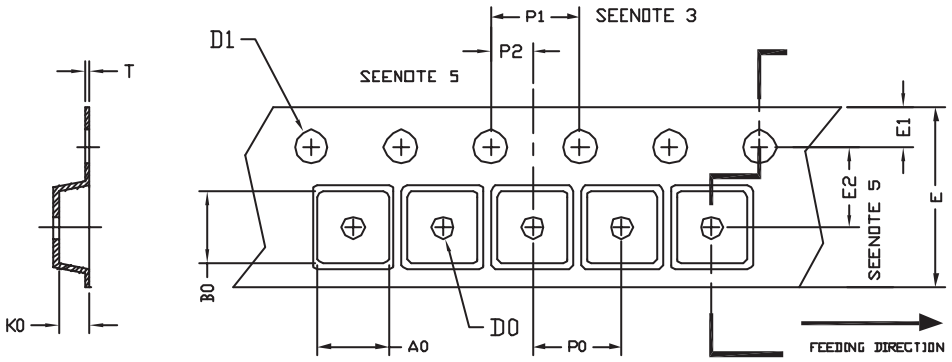
SO-8



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°

SO-8 Tape and Reel Data

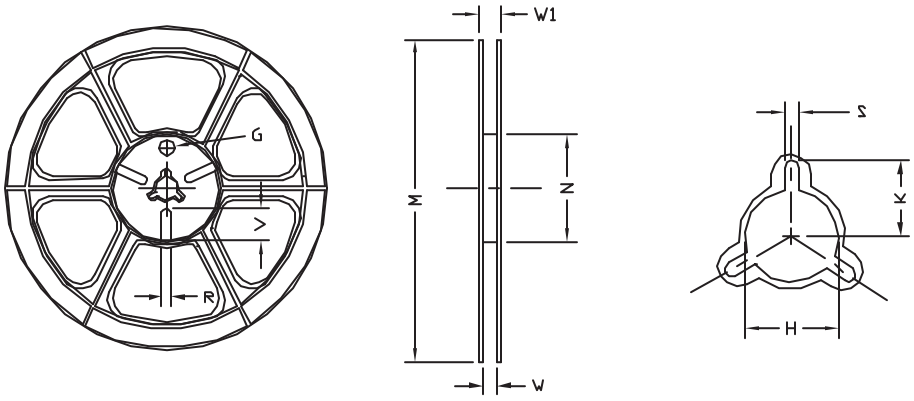
SO-8 Carrier Tape



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	---	---	---