



STM8501

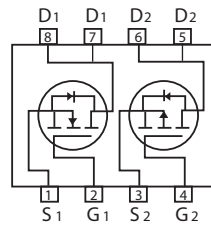
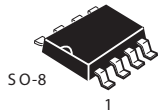
Dual Enhancement Mode Field Effect Transistor (N and P Channel)

PRODUCT SUMMARY (N-Channel)

V _{DSS}	I _D	R _{DS(ON)} (m Ω) Max
55V	5A	50 @ V _{GS} = 10V
		70 @ V _{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)

V _{DSS}	I _D	R _{DS(ON)} (m Ω) 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 @ T _a	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	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 θ JA	62.5	°C/W
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N-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	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	R _g	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 (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	-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	R _g	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, I _S = 1.7A	N-Ch	0.8	1.2	V
		V _{GS} = 0V, I _S = -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 R_g=6 ohm and t_f < t_f max.
- N-Channel

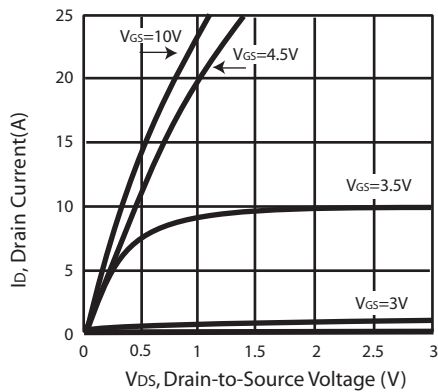


Figure 1. Output Characteristics

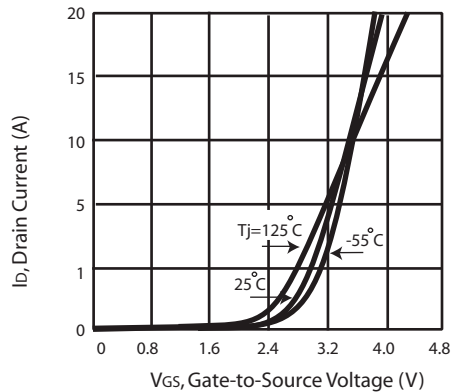


Figure 2. Transfer Characteristics

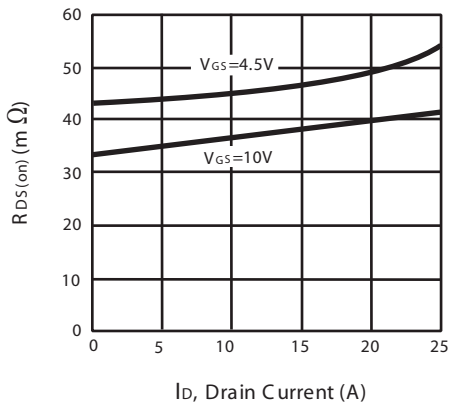


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

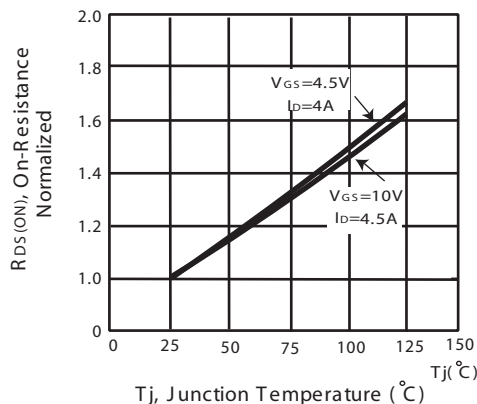


Figure 4. On-Resistance Variation with Drain Current and Temperature

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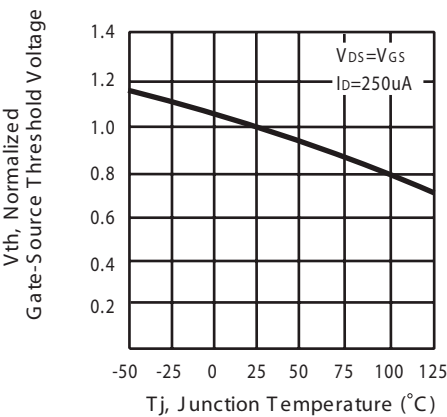


Figure 5. Gate Threshold Variation with Temperature

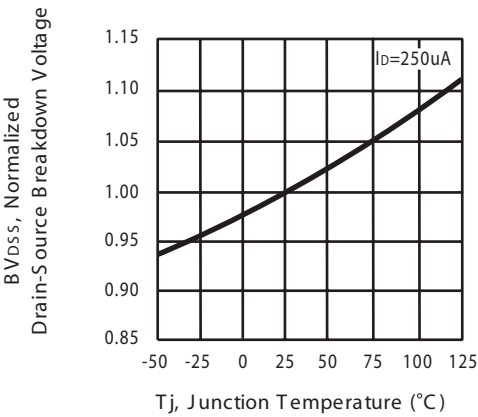


Figure 6. Breakdown Voltage Variation with Temperature

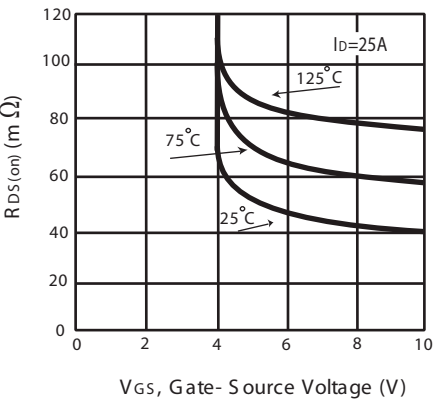


Figure 7. On-Resistance vs. Gate-Source Voltage

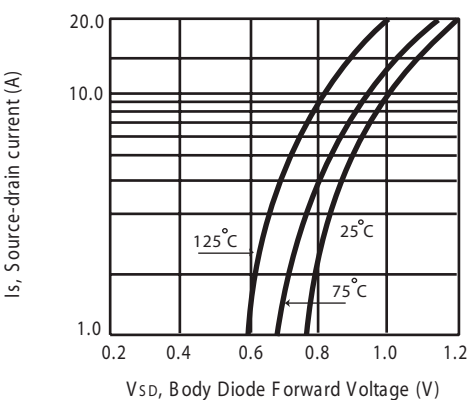


Figure 8. Body Diode Forward Voltage Variation with Source Current

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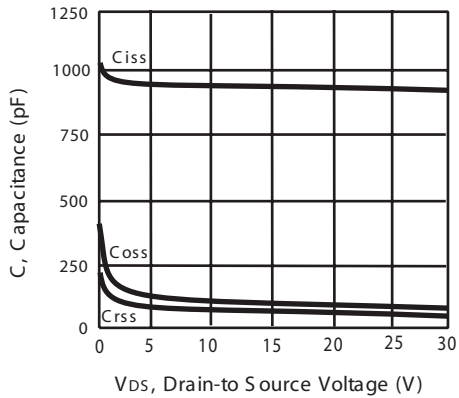


Figure 9. Capacitance

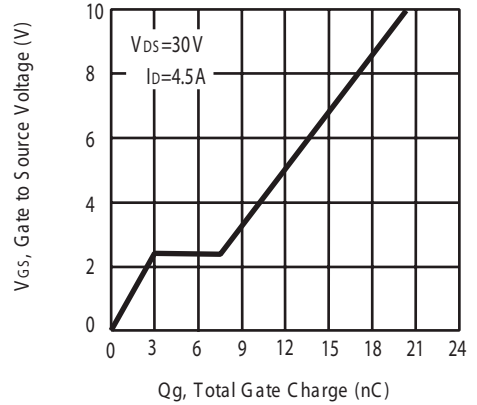


Figure 10. Gate Charge

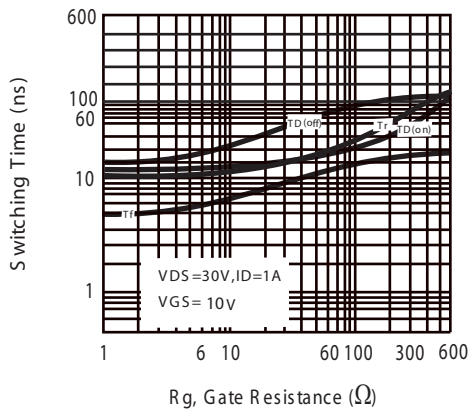


Figure 11. switching characteristics

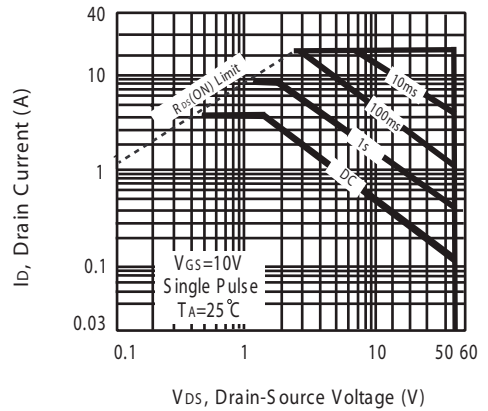


Figure 12. Maximum Safe Operating Area

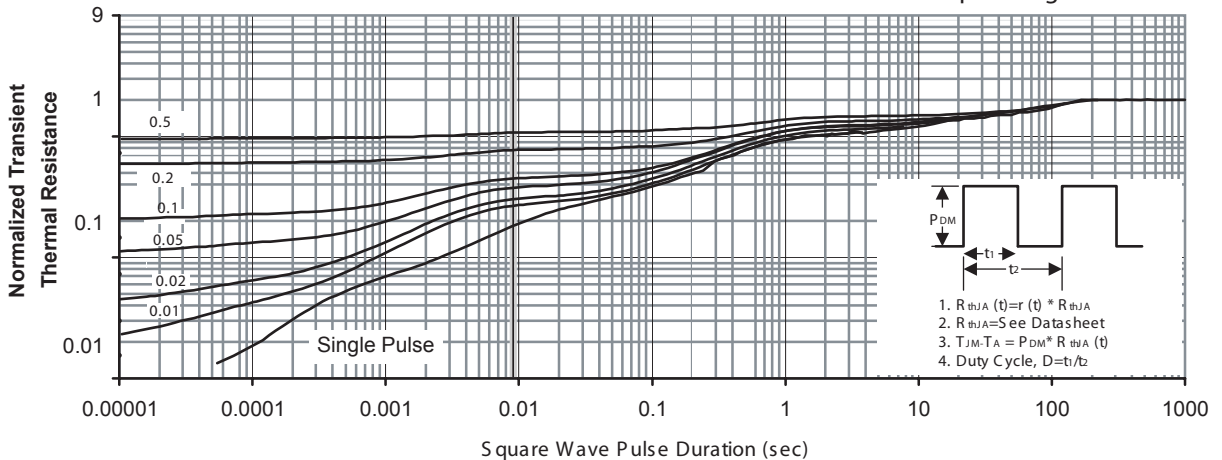


Figure 13. Normalized Thermal Transient Impedance Curve

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P-Channel

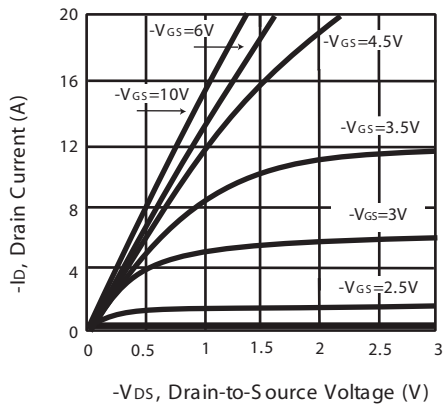


Figure 1. Output Characteristics

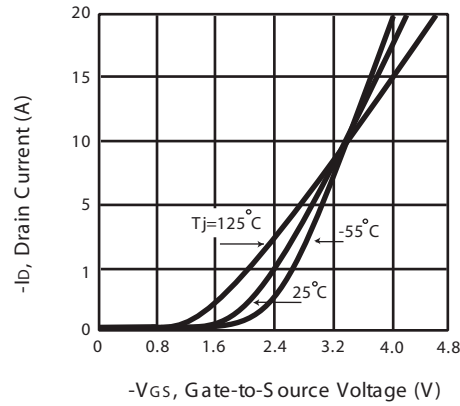


Figure 2. Transfer Characteristics

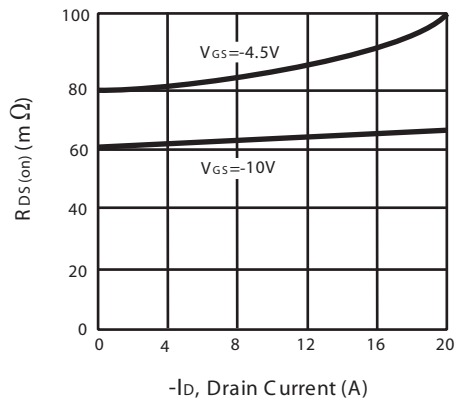


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

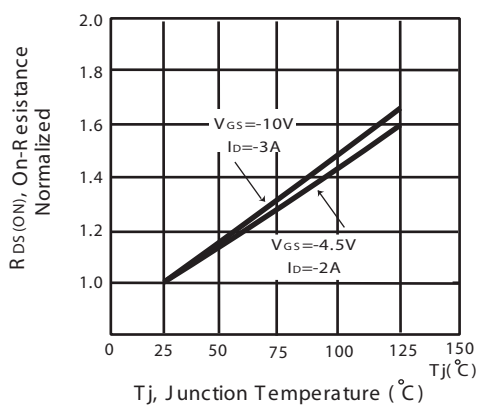


Figure 4. On-Resistance Variation with Drain Current and Temperature

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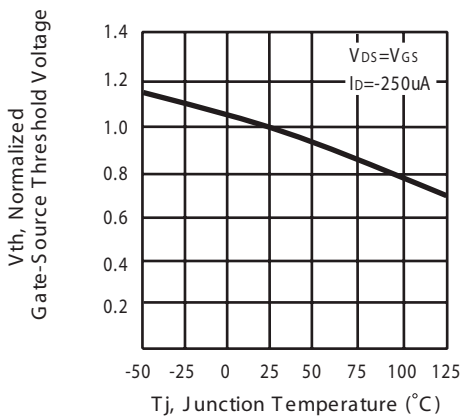


Figure 5. Gate Threshold Variation with Temperature

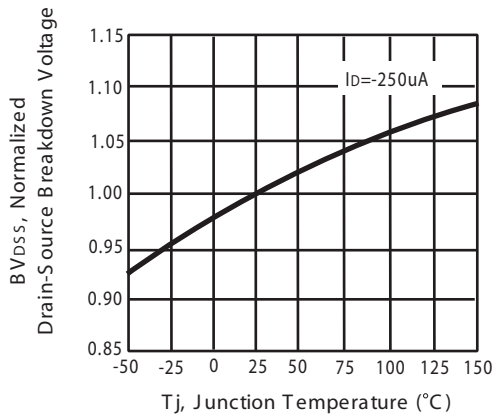


Figure 6. Breakdown Voltage Variation with Temperature

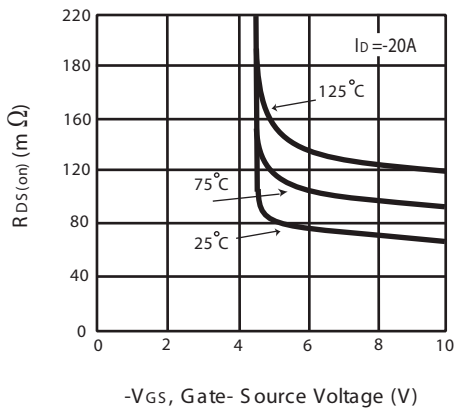


Figure 7. On-Resistance vs. Gate-Source Voltage

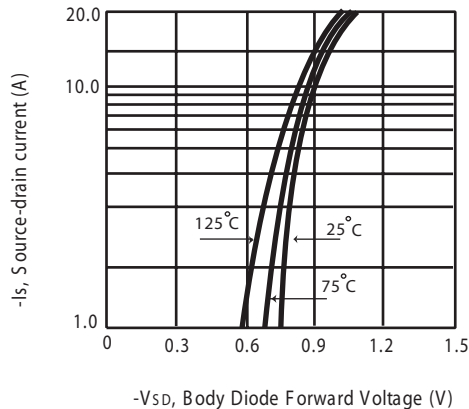


Figure 8. Body Diode Forward Voltage Variation with Source Current

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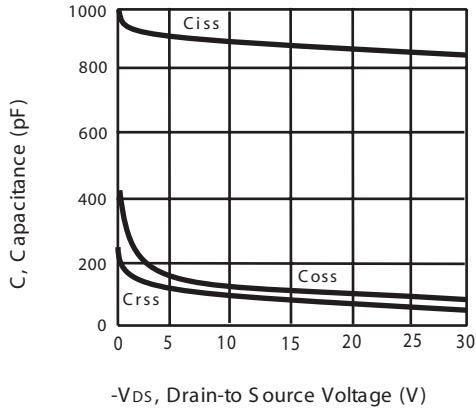


Figure 9. Capacitance

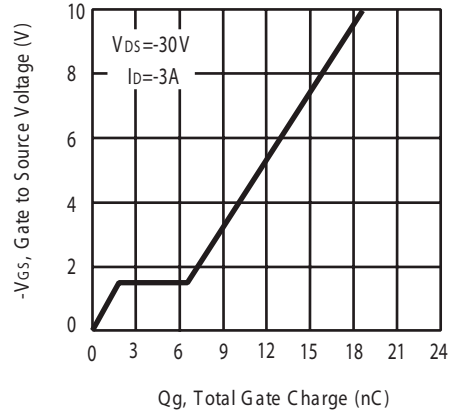


Figure 10. Gate Charge

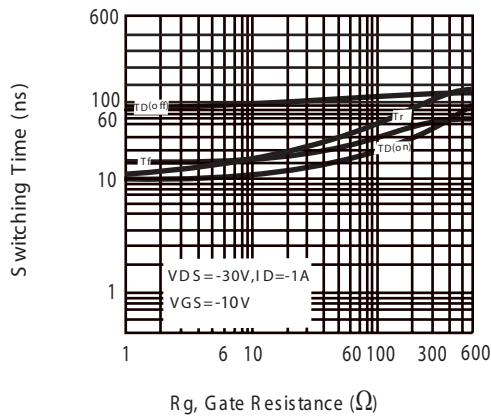


Figure 11. switching characteristics

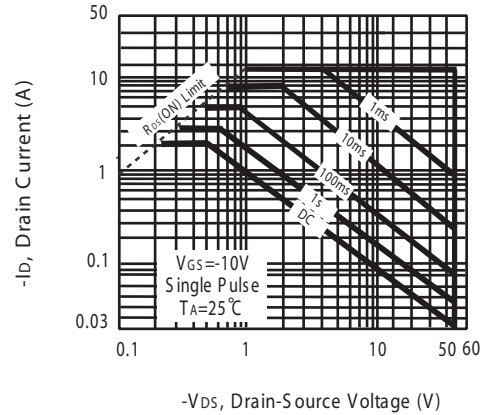


Figure 12. Maximum Safe Operating Area

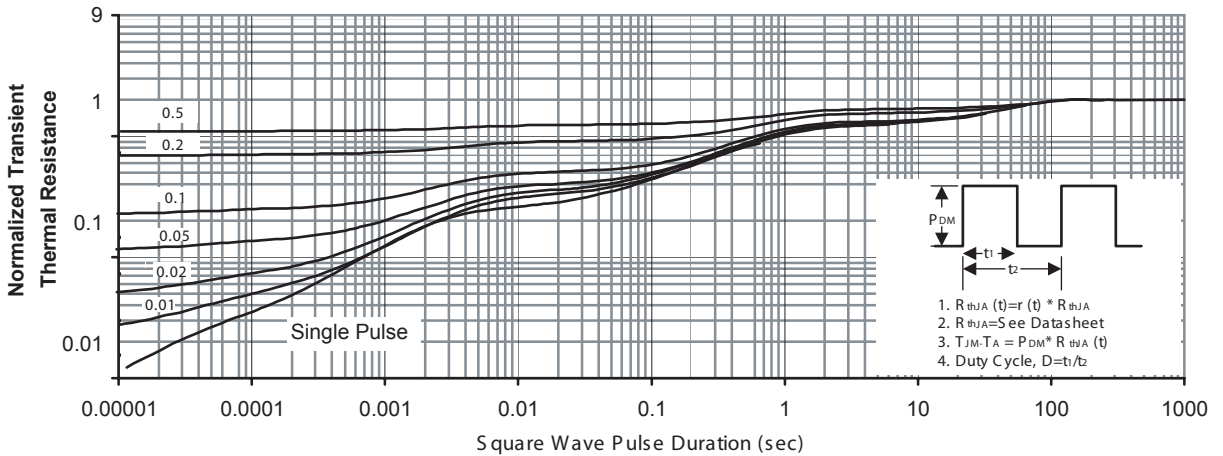
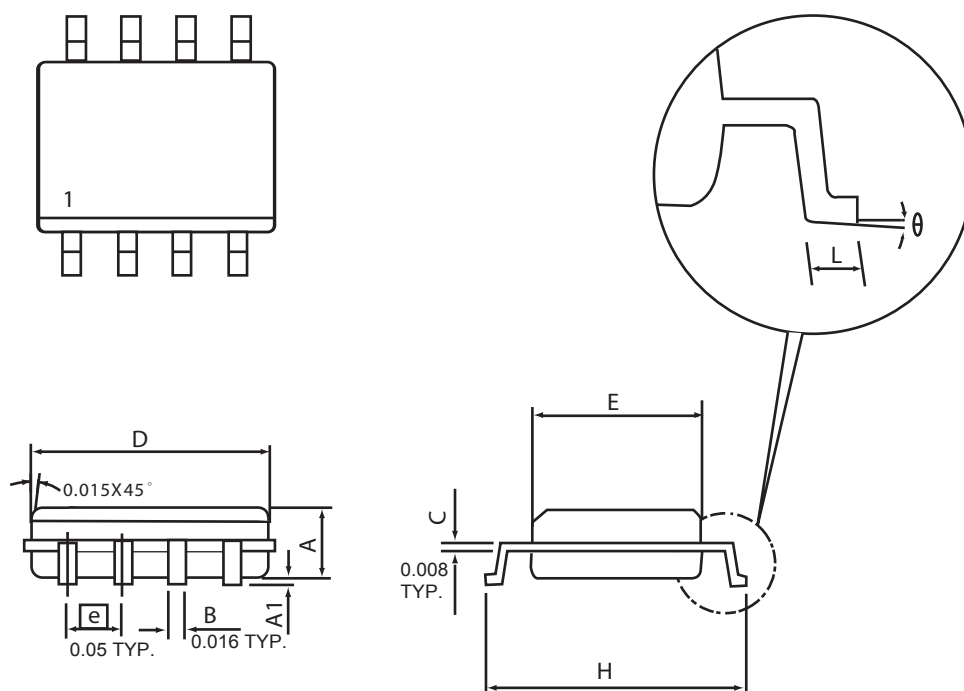


Figure 13. Normalized Thermal Transient Impedance Curve

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PACKAGE OUTLINE DIMENSIONS

SO-8

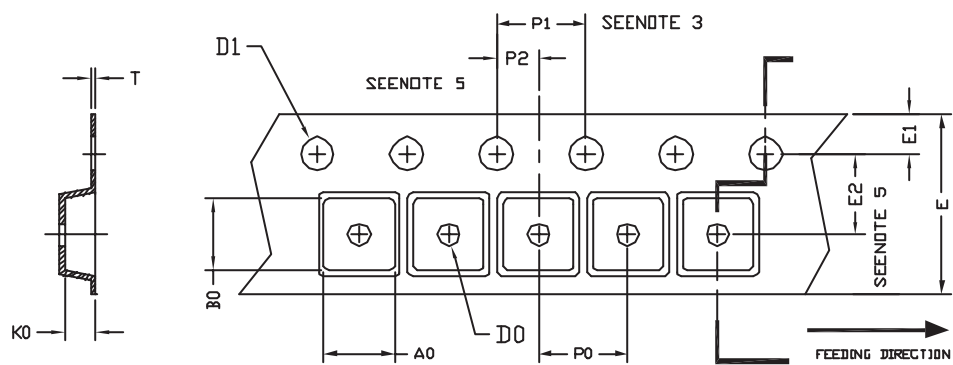


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

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SO-8 Tape and Reel Data

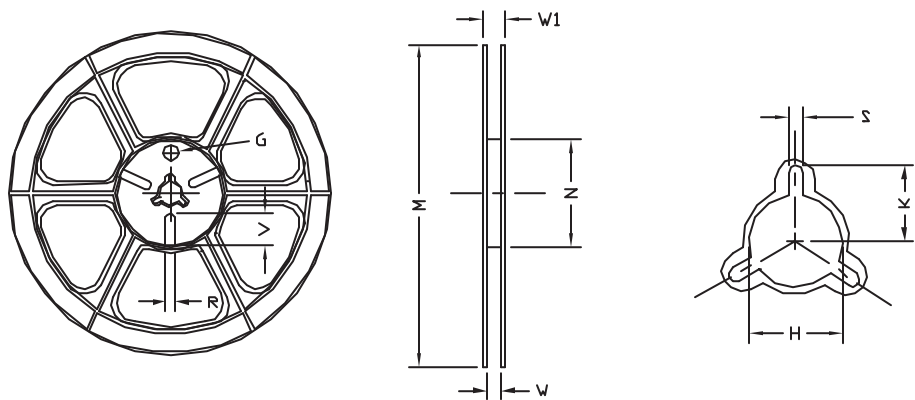
SO-8 Carrier Tape



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	---	---	---