

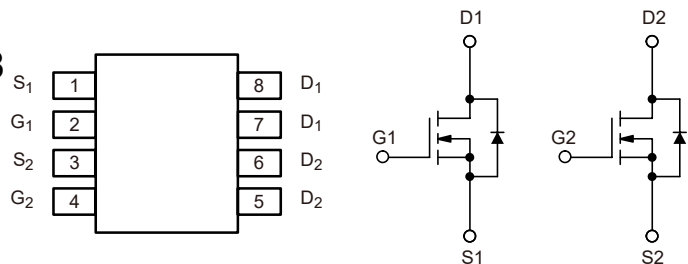
1.Features

- $V_{DS(V)}=60V$, $I_D=5.3A(V_{GS}=10V)$
- $R_{DS(ON)}<0.058m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<0.072m\Omega(V_{GS}=4.5V)$

3.Pinning information

Pin	Symbol	Description
2,4	G	GATE
1,3	S	SOURCE
5,6,7,8	D	DRAIN

SOP-8



4.Absolute Maximum Ratings $T_A=25^{\circ}C$

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^{\circ}C$)	$T_C=25^{\circ}C$	I_D	5.3	A
	$T_C=70^{\circ}C$		4.3	
	$T_A=25^{\circ}C$		4.3 ^{b,c}	
	$T_A=70^{\circ}C$		3.4 ^{b,c}	
Pulsed Drain Current (10 μs width)		I_{DM}	20	
Continuous Source-Drain Diode Current	$T_C=25^{\circ}C$	I_S	2.6	
	$T_A=25^{\circ}C$		1.7 ^{b,c}	
Avalanche current	L = 0.1 mH	I_{AS}	11	mJ
Single-pulse avalanche energy		E_{AS}	6.1	
Maximum Power Dissipation	$T_C=25^{\circ}C$	P_D	3.1	W
	$T_C=70^{\circ}C$		2	W
	$T_A=25^{\circ}C$		2 ^{b,c}	W
	$T_A=70^{\circ}C$		1.3 ^{b,c}	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}C$



5.Thermal resist ance rating

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^{a,d}		R _{thJA}	55	62.5	°C/W
Maximum Junction-to-Foot (drain)	Steady-State	R _{thJF}	33	40	°C/W

Notes:

- a. Based on T_C=25 °C
- b. Surface mounted on 1" x 1" FR4 board
- c. t=10s
- d. Maximum under steady state conditions is 110 °C/W



6. $T_J=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS}=0\text{V}$, $I_D=250\mu\text{A}$	60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D=250\mu\text{A}$		55		$\text{mV}/^{\circ}\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-6		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1		3	V
		$V_{DS}=V_{GS}$, $I_D=5\text{mA}$		2.5		V
Gate-Source Leakage	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=20\text{V}$			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$, $T_J=85^{\circ}\text{C}$			10	
On-State Drain Current ^a	$I_{D(ON)}$	$V_{DS}\geq 5\text{V}$, $V_{GS}=10\text{V}$	20			A
Drain-Source On-State Resistance ^a	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=4.3\text{A}$		0.046	0.058	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=3.9\text{A}$		0.059	0.072	
Forward Transconductance ^a	g_{FS}	$V_{DS}=15\text{V}$, $I_D=4.3\text{A}$		15		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS}=15\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		665		pF
Output Capacitance	C_{oss}			75		
Reverse Transfer Capacitance	C_{rss}			40		
Total Gate Charge	Q_g	$V_{DS}=30\text{V}$, $V_{GS}=10\text{V}$, $I_D=4.3\text{A}$		13	20	nC
		$V_{DS}=30\text{V}$, $V_{GS}=4.5\text{V}$, $I_D=4.3\text{A}$		6	9	
Gate Source Charge	Q_{gs}			2.3		
Gate Drain Charge	Q_{gd}			2.6		
Gate Resistance	R_g	$f=1\text{MHz}$		2		Ω
Turn-On DelayTime	$t_{D(on)}$	$V_{DD}=30\text{V}$, $R_L=8.8\Omega$, $I_D\leq 3.4\text{A}$ $V_{GEN}=4.5\text{V}$, $R_g=1\Omega$		15	25	ns
Rise Time	t_r			65	100	
Turn-Off DelayTime	$t_{D(off)}$			15	25	
Fall Time	t_f			10	15	



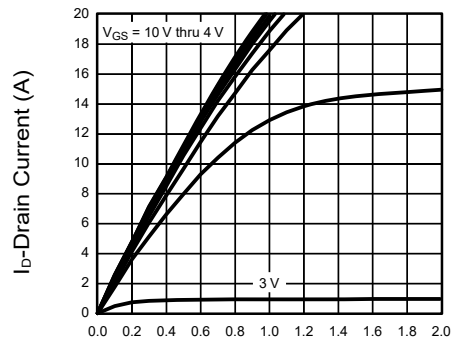
Turn-On DelayTime	$t_{D(on)}$	$V_{DD}=30V, R_L=8.8\Omega$ $I_D=3.4A, V_{GEN}=10V$ $R_g=1\Omega$		10	15	ns
Rise Time	t_r			15	25	ns
Turn-Off DelayTime	$t_{D(off)}$			20	30	ns
Fall Time	t_f			10	15	ns
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C=25^{\circ}C$			2.6	A
Pulse Diode Forward Current	I_{SM}				20	A
Body Diode Voltage	V_{SD}	$I_S=1.7A, V_{GS}=0V$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=1.7A, dI/dt=100A/\mu s$ $T_J=25^{\circ}C$		30	60	ns
Body Diode Reverse Recovery Charge	Q_{rr}			32	50	nC
Reverse Recovery Fall Time	t_a			25		ns
Reverse Recovery Rise Time	t_b			5		ns

Notes:

- Pulse test; pulse width $\leq 300 \mu s$, duty cycle $\leq 2 \%$.
- Guaranteed by design, not subject to production testing.

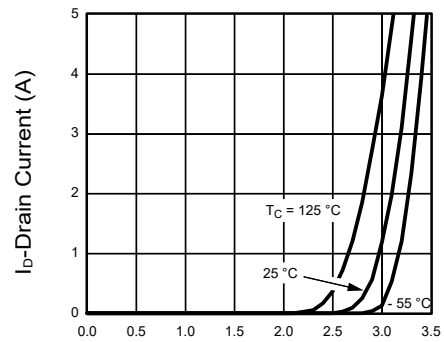


7.1 Typical Characteristics



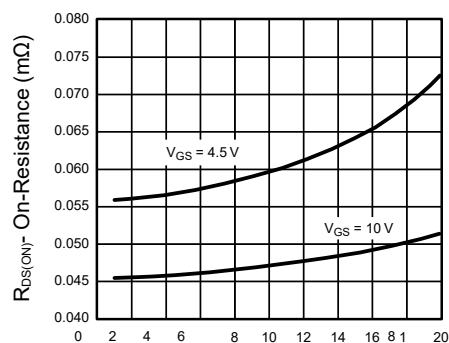
V_{DS} - Drain-to-Source Voltage (V)

Output Characteristics



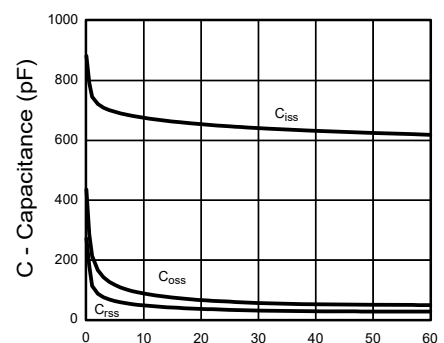
V_{GS} - Gate-to-Source Voltage (V)

Transfer Characteristics



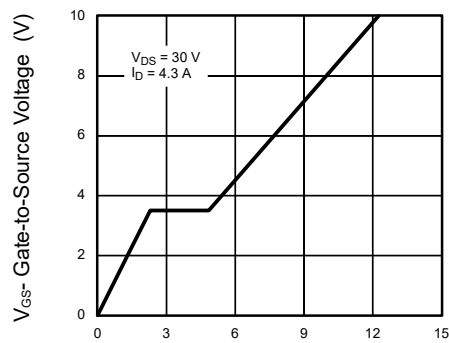
I_D -Drain Current (A)

On-Resistance vs. Drain Current and Gate Voltage



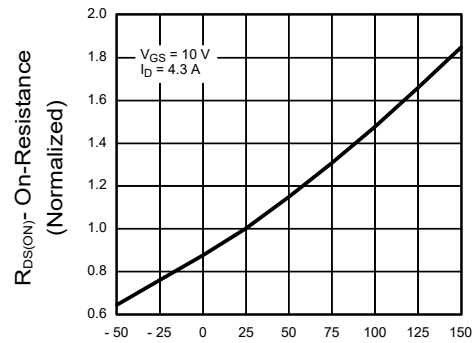
V_{DS} - Drain-to-Source Voltage (V)

Capacitance



Q_g - Total Gate Charge (nC)

Gate Charge

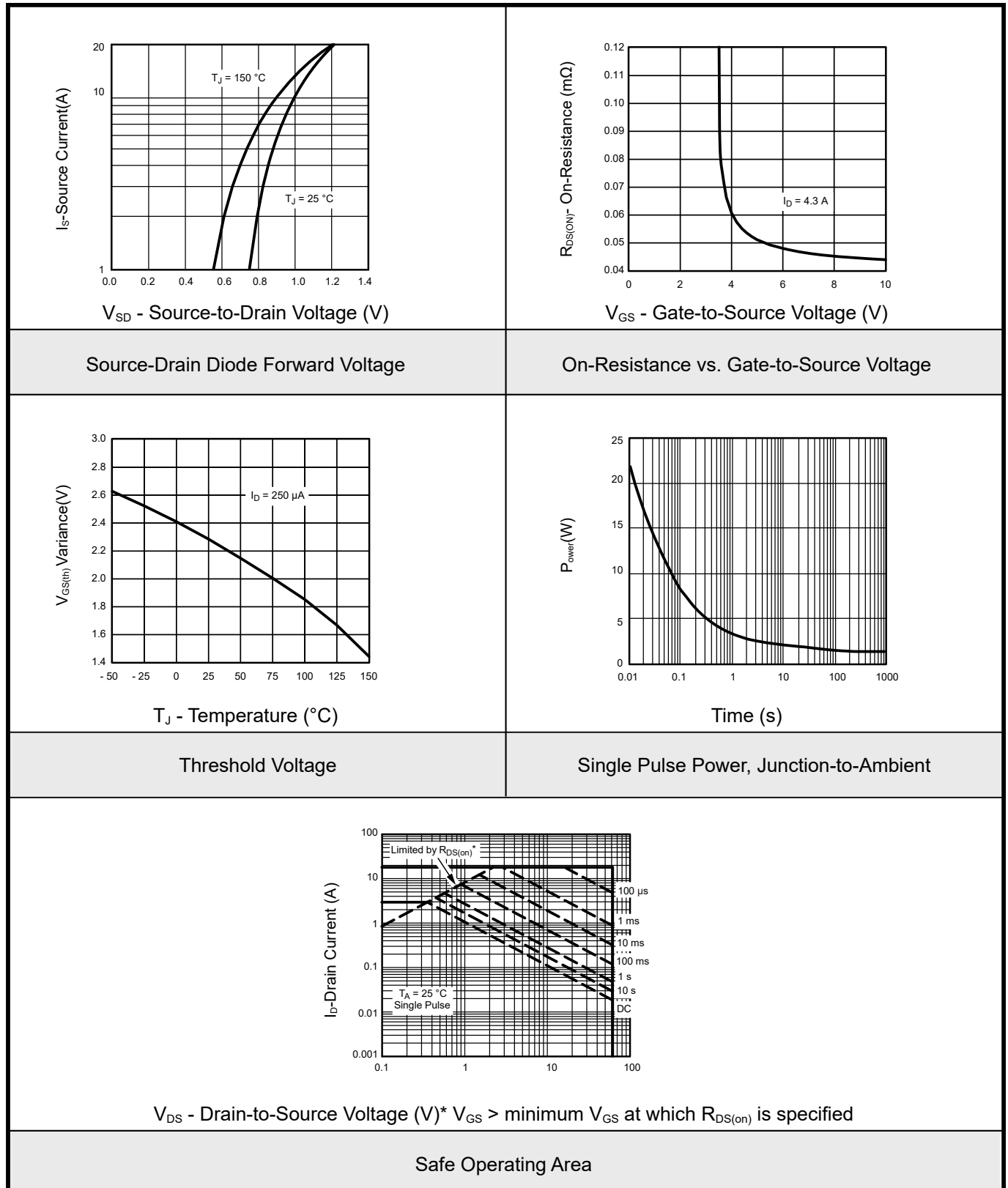


T_J - Junction Temperature ($^\circ\text{C}$)

On-Resistance vs. Junction Temperature

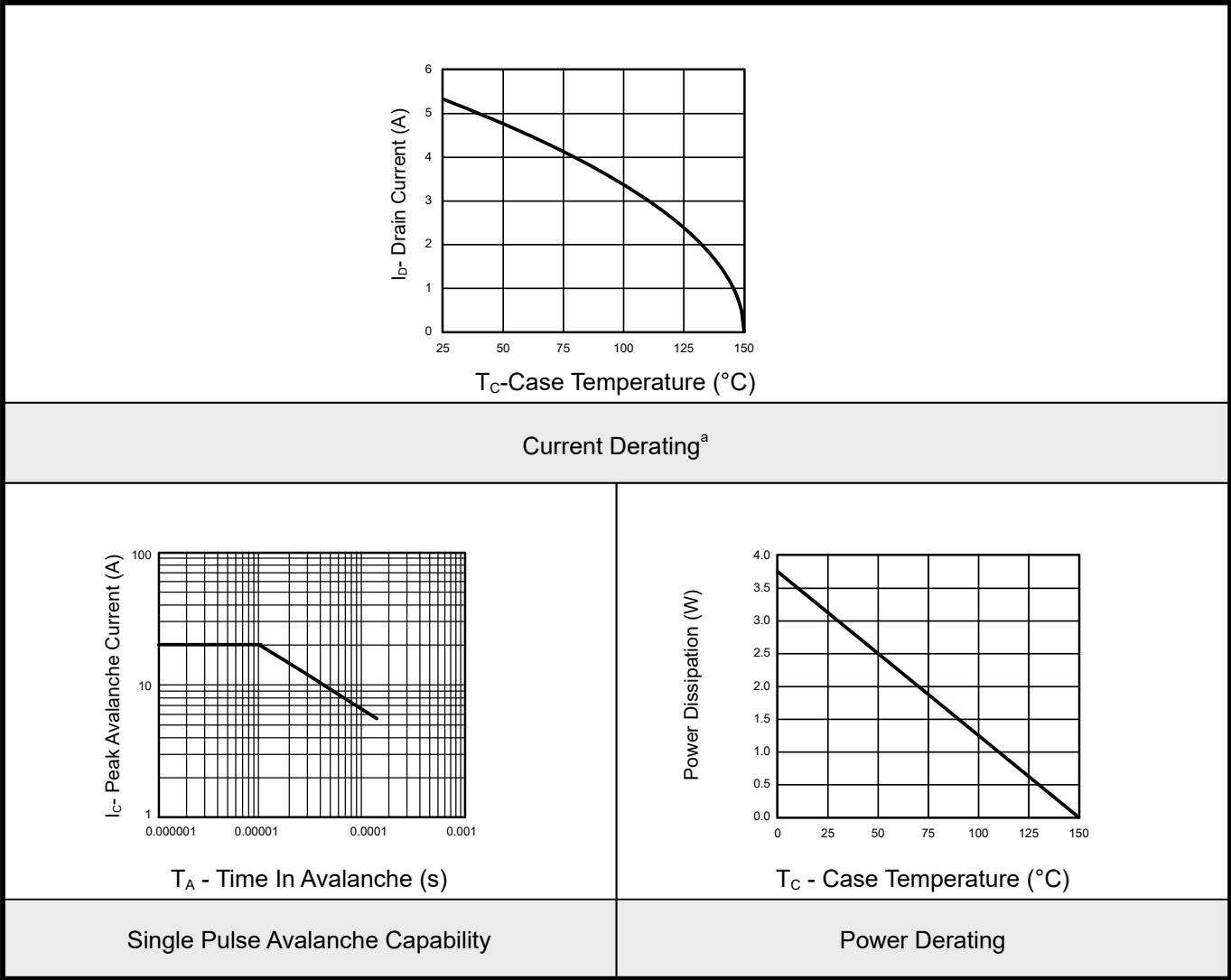


7.2 Typical Characteristics





7.3Typical Characterisitics

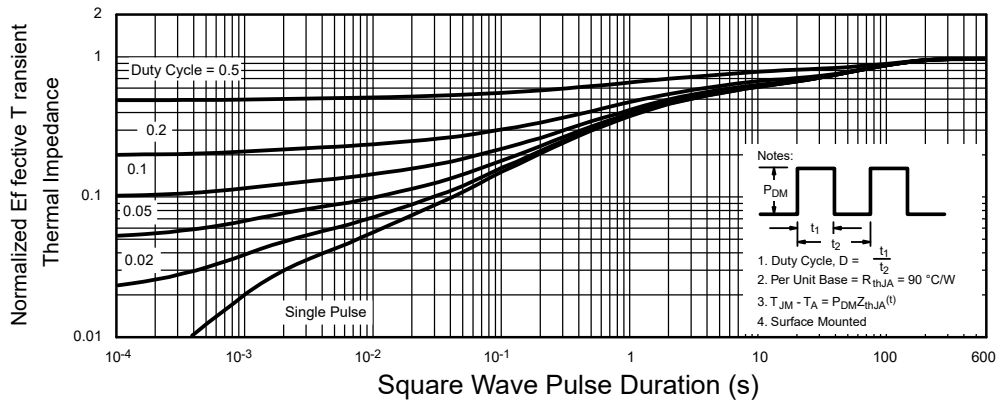


Note:

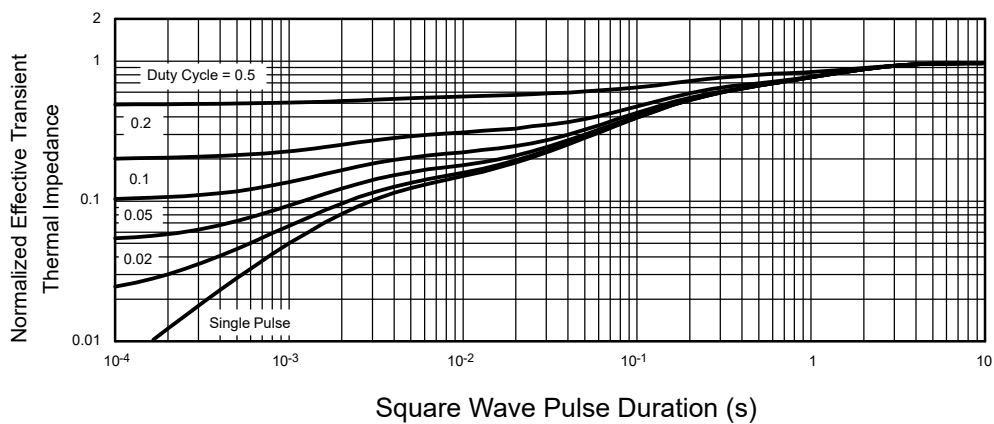
a. The power dissipation P_D is based on $T_{J(max)} = 150\text{ }^{\circ}\text{C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



7.4 Typical Characteristics



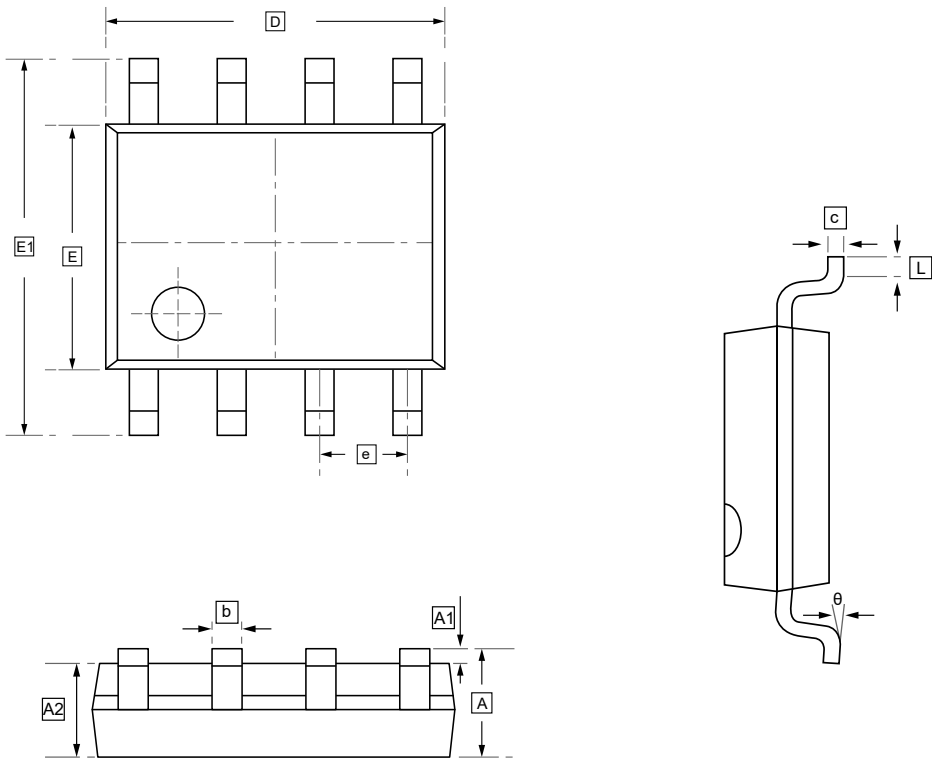
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case



8.SOP-8 Package Outline Dimensions

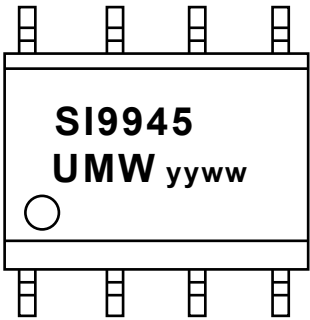


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW SI9945BDY	SOP-8	3000	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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