

1.Description

The SOP-8 has been modified through a customized eadframe for enhanced thermalcharacteristics and multiple-die capabilitymaking it ideal in a variety of powerapplications.With these improvements.multiple devices can be used in an appication with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave sodering technique.

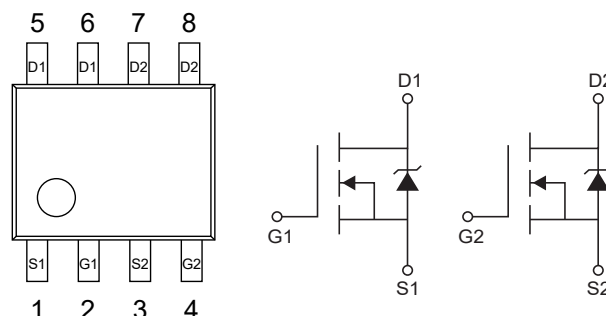
2.Features

- $V_{DS(V)}=30V$, $I_D=2.2A(V_{GS}=-10V)$
- $R_{DS(ON)}<100m\Omega(V_{GS}=-10V)$
- $R_{DS(ON)}<200m\Omega(V_{GS}=-4.5V)$
- Generation V Technolog
- Ultra Low On-Resistance
- Surface Mount
- Fully Avalanche Rated
- Lead-Free

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 $T_A=25^{\circ}C$ unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ⑤	$T_A=25^{\circ}C$	I_D	3.5	A
	$T_A=70^{\circ}C$		2.8	
Pulsed Drain Current		I_{DM}	16	
Continuous Source Current (Diode Conduction)		I_S	1.7	
Maximum Power Dissipation ⑤	$T_A=25^{\circ}C$	P_D	2	W
	$T_A=70^{\circ}C$		1.3	W
Single Pulse Avalanche Energy②		E_{AS}	44	mJ
Avalanche Current		I_{AR}	2	A



Repetitive Avalanche Energy	E_{AR}	0.2	mJ
Peak Diode Recovery dv/dt ③	dv/dt	5	V/ns
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

5. Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ⑤	$R_{\theta JA}$		62.5	°C/W



6. Electrical Characteristics $T_J=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.015		V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=2.2\text{A}$ ④		60	100	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=1\text{A}$ ④		90	200	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1			V
Forward Transconductance	g_{FS}	$V_{DS}=15\text{V}$, $I_D=3.5\text{A}$		12		S
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			2	μA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			25	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=24\text{V}$			100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=-24\text{V}$			-100	
Total Gate Charge	Q_g	$I_D=1.8\text{A}$		6.9	14	nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=10\text{V}$, $V_{GS}=10\text{V}$		1	2	
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig. 10 ④		1.8	3.5	
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=10\text{V}$		6.2	12	ns
Rise Time	t_r	$I_D=1\text{A}$		8.8	18	ns
Turn-Off Delay Time	$t_{D(off)}$	$R_G=6\Omega$		13	26	ns
Fall Time	t_f	$R_D=10\Omega$ ④		3	6	ns
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$		190		pF
Output Capacitance	C_{oss}	$V_{DS}=15\text{V}$		120		pF
Reverse Transfer Capacitance	C_{rss}	$f=1.0\text{MHz}$, See Fig. 9		61		pF



Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			1.7	A
Pulsed Source Current (Body Diode) ①	I_{SM}				16	
Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}\text{C}, I_S=1.25\text{A}, V_{GS}=0\text{V}$ ③		0.82	1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=1.25\text{A}$		27	53	ns
Reverse Recovery Charge	Q_{rr}	$dI/dt=100\text{A}/\mu\text{s}$ ③		28	57	nC

Notes:

① Repetitive rating; pulse width limited by max.junction temperature.(See fig.11)

② Starting $T_J=25^{\circ}\text{C}$, $L=22\text{mH}$, $R_G=25\Omega$, $I_{AS}=2\text{A}$.

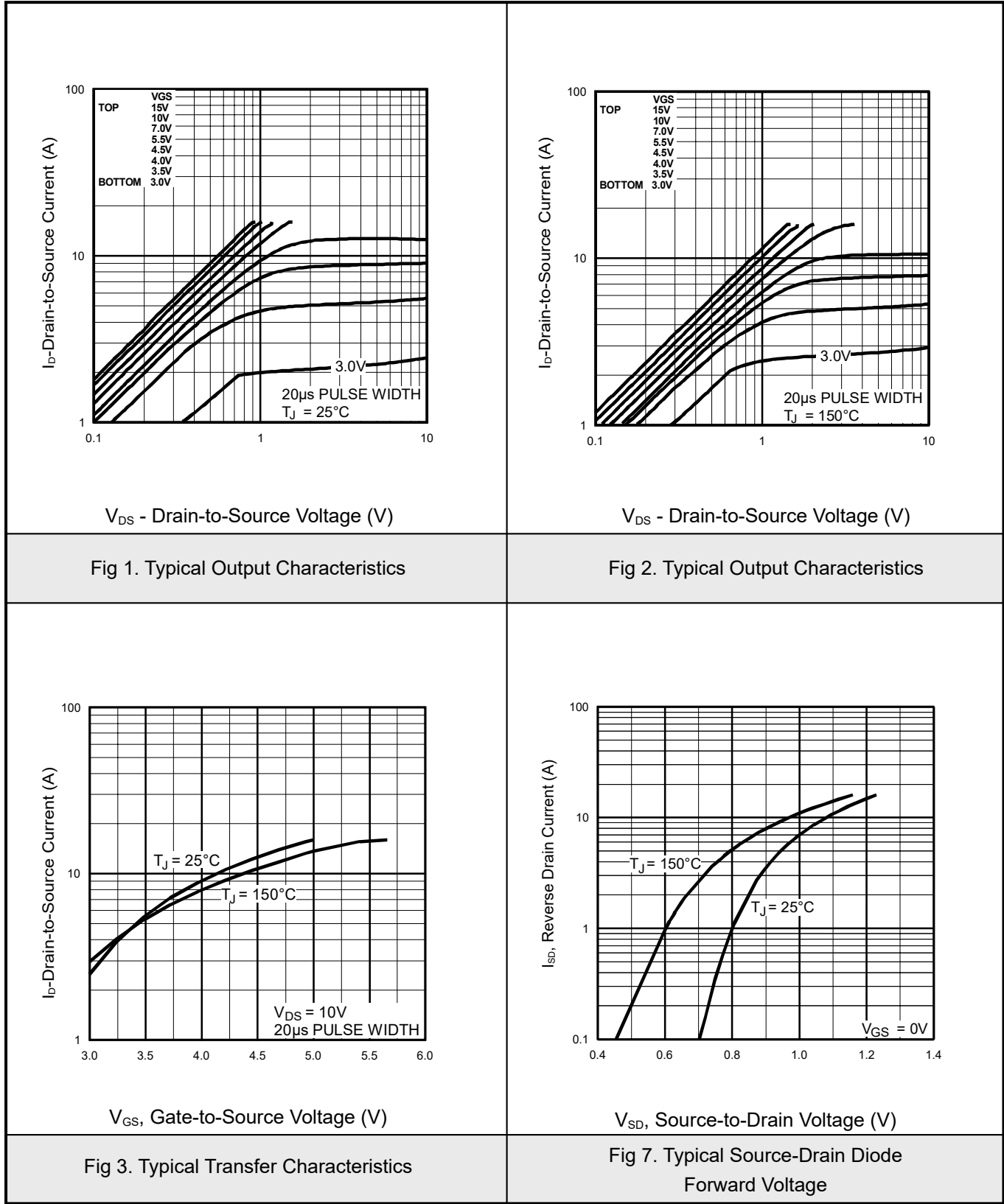
③ $I_{SD}\leq 2.0\text{A}$, $dI/dt\leq 100\text{A}/\mu\text{s}$, $V_{DD}\leq V_{(BR)DSS}$, $T_J\leq 150^{\circ}\text{C}$

④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

⑤ Surface mounted on FR-4 board, $t\leq 10\text{sec}$.

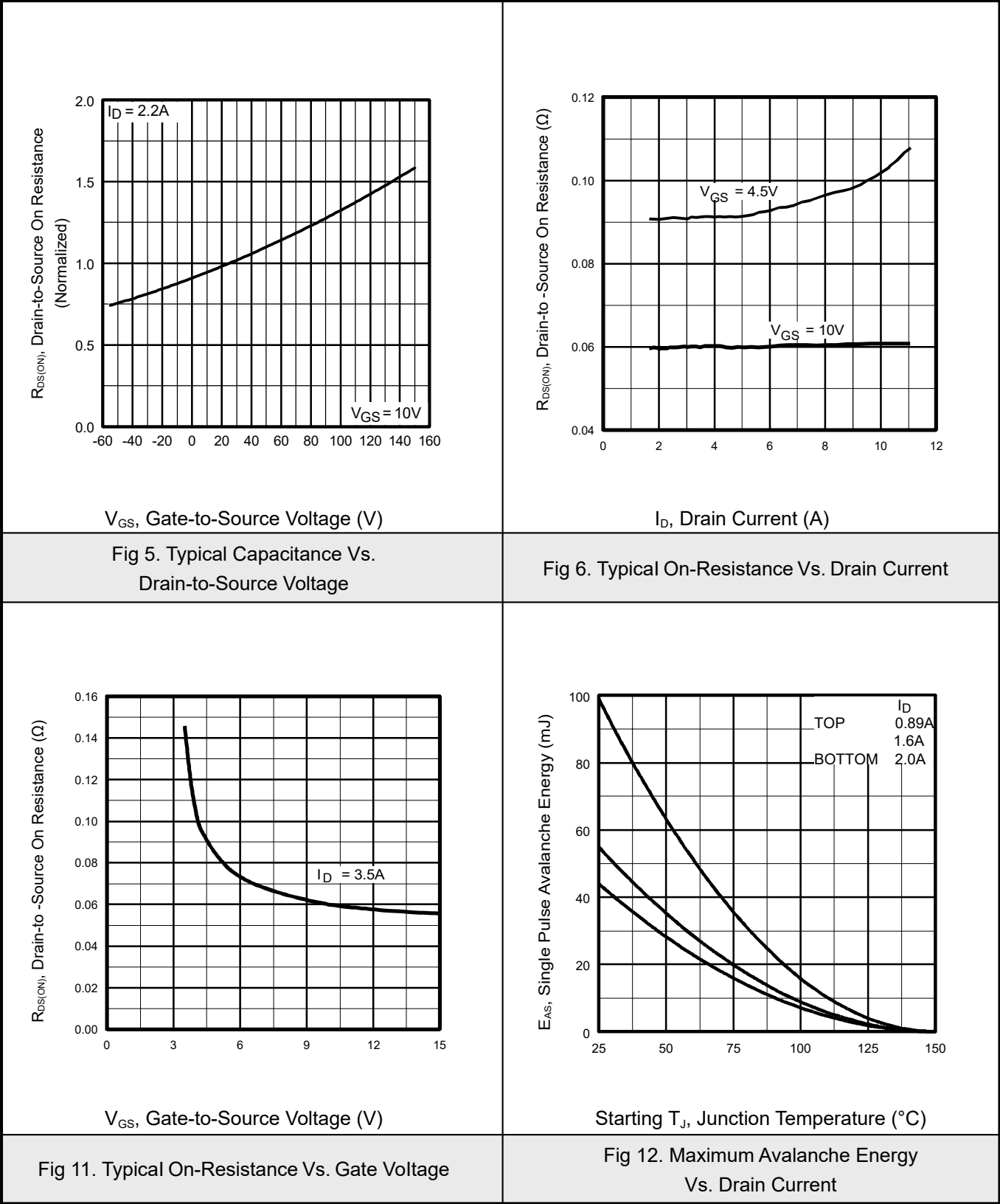


7.1Typical Characterisitics





7.2Typical Characterisitics





7.3 Typical Characteristics

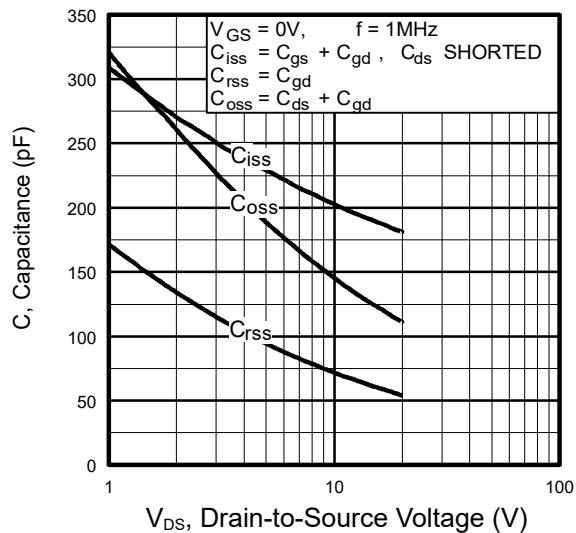


Fig 9. Typical capacitance Vs.Drain-to-Source Voltage

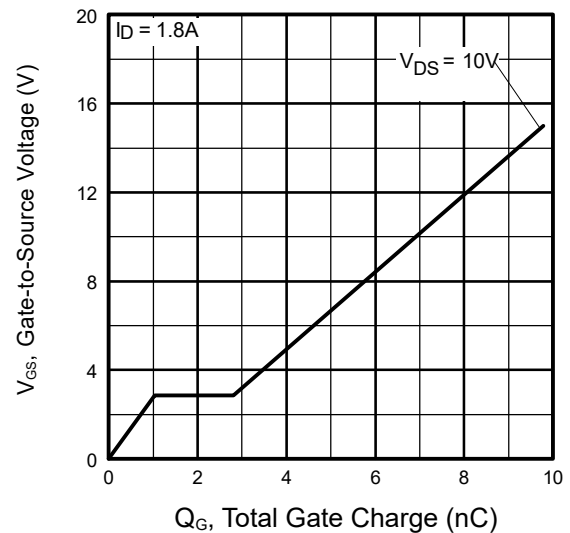


Fig 10. Typical Gate Charge Vs.Gate-to-Source Voltage

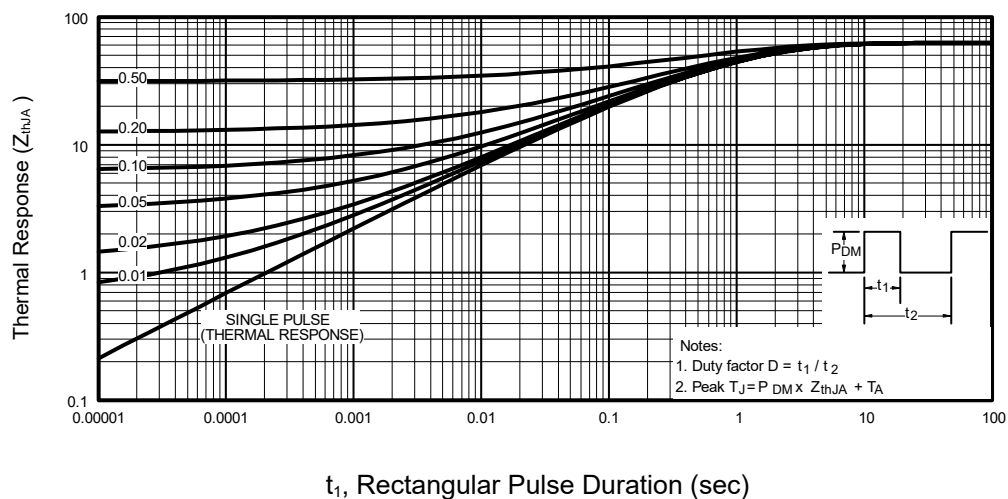
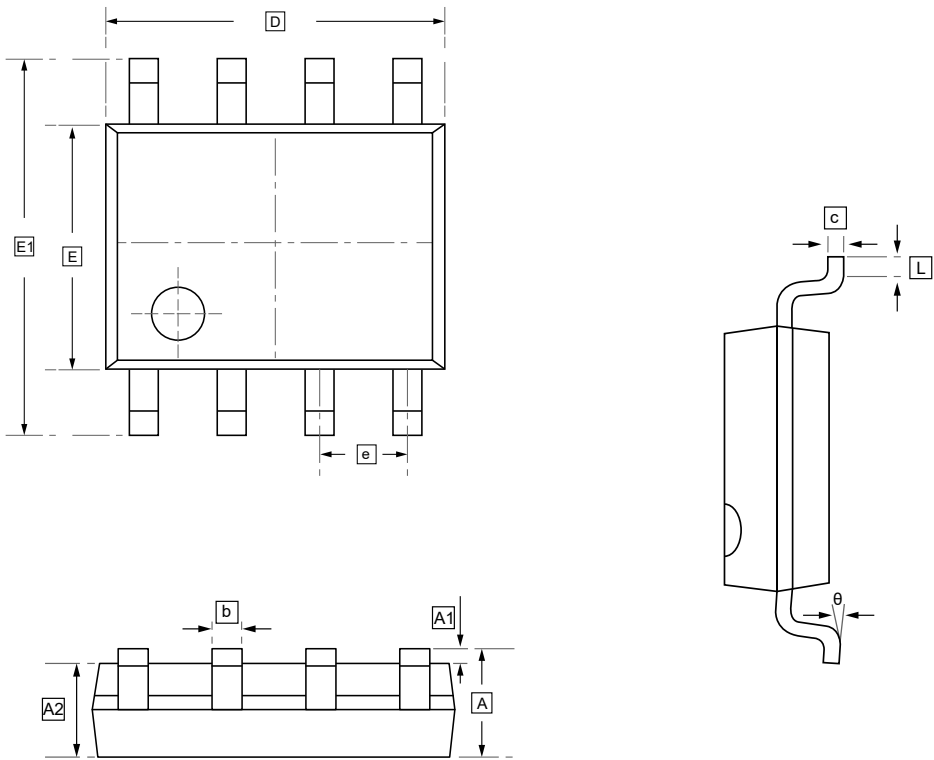


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



8.SOP-8 Package Outline Dimensions

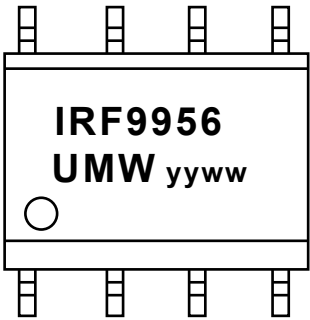


DIMENSIONS (mm are the original dimensions)

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 IRF9956TR	SOP-8	3000	Tape and reel



10.Disclaimer

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