UMW IRF7343TR

55V N-Channel MOSFET
-55V P-Channel MOSFET

1.Description

The SOP-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications.

2.1Features

- GenerationVTechnology
- Ultra Low On-Resistance
- Surface Mount
- Fully Avalanche Rated
- Lead-Free

2.2Features(N-Ch)

- $V_{DS\ (V)}$=55V
- $R_{DS(ON)}$<50mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<65mΩ(V_{GS}=4.5V)

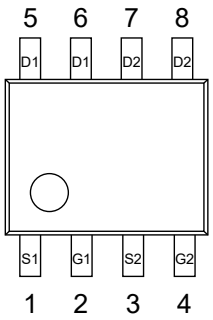
2.3Features(P-Ch)

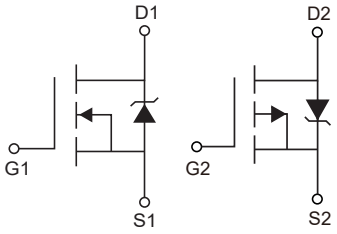
- $V_{DS\ (V)}$=-55V
- $R_{DS(ON)}$<90mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<100mΩ(V_{GS}=4.5V)

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

Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V_{DS}	55	-55	V
Continuous Drain Current (V_{GS}=10V)	T_A= 25°C	I_D	4.7	-3.4	A
	T_A=70°C		3.8	-2.7	A
Pulsed Drain Current ①		I_{DM}	38	-27	A

Maximum Power Dissipation ⑤	T_A= 25°C	P_D	2	2	W
	T_A=70°C		1.3	1.3	W
Single Pulse Avalanche Energy ③		E_{AS}	72	114	mJ
Avalanche Current		I_{AR}	4.7	-3.4	A
Repetitive Avalanche Energy		E_{AR}	0.2	0.2	mJ
Gate-to-Source Voltage		V_{GS}	±20	±20	V
Peak Diode Recovery dv/dt ②		dv/dt	5	-5	V/ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	°C

5.Thermal Characteristics

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

6.Electrical Characteristics T_J=25°C

Parameter	Symbol		Conditions	Min	Typ	Max	Units
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	N-Ch	I_D=250μA, V_{GS}=0V	55			V
		P-Ch	I_D=-250μA, V_{GS}=0V	-55			V
Breakdown Voltage Temp Coefficient Current	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	N-Ch	I_D=1mA,Reference to 25°C		0.059		V/°C
		P-Ch	I_D=-1mA,Reference to 25°C		0.054		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	N-Ch	V_{GS}=10V, I_D=4.7A ④		43	50	mΩ
		N-Ch	V_{GS}=4.5V, I_D=3.8A ④		56	65	mΩ
		P-Ch	V_{GS}=-10V, I_D=-3.4A ④		0.095	0.105	Ω
		P-Ch	V_{GS}=-4.5V, I_D=-2.7A ④		0.15	0.17	Ω
Gate Threshold Voltage	$V_{GS(th)}$	N-Ch	V_{DS}=V_{GS}, I_D=250μA	1			V
		P-Ch	V_{DS}=V_{GS}, I_D=-250μA	-1			V
Forward Transconductance	g_{fs}	N-Ch	V_{GS}=10V, I_D=4.5A ④	7.9			S
		P-Ch	V_{GS}=-10V, I_D=-3.1A ④	3.3			S
Drain-to-Source Leakage Current	I_{DSS}	N-Ch	V_{DS}=55V, V_{GS}=0V			2	μA
			V_{DS}=-55V, V_{GS}=0V			-2	μA
		P-Ch	V_{DS}=55V, V_{GS}=0V, T_J=55°C			25	μA
			V_{DS}=-55V, V_{GS}=0V, T_J=55°C			-25	μA
Gate-to-Source ForwardLeakage	I_{GSS}	N-P	V_{GS}=±20V			±100	nA
Total Gate Charge	Q_g	N-Ch	N-Ch: ④ I_D=4.5A, V_{DS}=44V, V_{GS}=10V P-Ch: I_D=-3.1A,V_{DS}=-44V,V_{GS}=-10V		24	36	nC
		P-Ch			26	38	nC
Gate-to-Source Charge	Q_{gs}	N-Ch			2.3	3.4	nC
		P-Ch			3	4.5	nC
Gate-to-Drain ("Miller") Charge	Q_{gd}	N-Ch			7	10	nC
		P-Ch			8.4	13	nC
Turn-On Delay Time	$t_{D(on)}$	N-Ch	N-Ch: ④ V_{DD}=28A, I_D=1A R_G=6Ω, R_D=16Ω		8.3	12	ns
		P-Ch			14	22	ns
Rise Time	t_r	N-Ch			10	15	ns
		P-Ch			10	15	ns

Tum-Off Delay Time	$t_{D(off)}$	N-Ch	P-Ch: ④ V_{DD}=-28A, I_D=-1A R_G=6Ω, R_D=16Ω		32	48	ns
		P-Ch			43	64	ns
Fall Time	t_f	N-Ch			13	20	ns
		P-Ch			22	32	ns
Input Capacitance	C_{iss}	N-P	N-Ch: V_{GS}=0V, V_{DS}=25V, f=1MHz P-Ch: V_{GS}=0V, V_{DS}=-25V, f=1MHz		740		pF
		N-P			690		pF
Output Capacitance	C_{oss}	N-Ch			190		pF
		P-Ch			210		pF
ReverseTransferCapacitance	C_{rss}	N-Ch			71		pF
		P-Ch			86		pF
Continuous Source Current (Body Diode)	I_S	N-Ch				2	A
		P-Ch				-2	A
Pulsed Source Current (Body Diode) ①	I_{SM}	N-Ch				38	A
		P-Ch				-27	A
Diode Forward Voltage	V_{SD}	N-Ch	T_J=25°C, I_S=2A,V_{GS}=0V ③		0.7	1.2	V
		P-Ch	T_J=25°C, I_S=-2A,V_{GS}=0V ③		-0.8	-1.2	V
Reverse Recovery Time	t_{rr}	N-Ch	N-Ch: T_J=25°C I_F=2A, di/dt =100A/μs P-Ch: T_J=25°C I_F=-2A, di/dt=100A/μs ④		60	90	ns
		P-Ch			54	80	ns
Reverse Recovery Charge	Q_{rr}	N-Ch			120	170	nC
		P-Ch			85	130	nC

Notes:

① Repetitive rating; pulse width limited bymax.junction temperature.(See fig. 22)

② N-Channel I_{SD}≤4.7A, di/dt ≤220A/μs, V_{DD}≤$V_{(BR)DSS}$, T_J≤ 150°C.

P-Channel I_{SD}≤ -3.4A, di/dt ≤-150Aμs, V_{DD}≤$V_{(BR)DSS}$, T_J≤ 150°C.

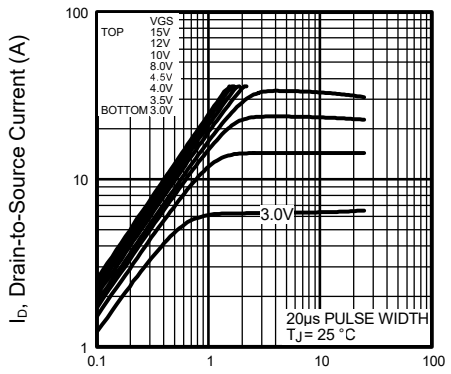
③ N-Channel Starting T_J=25°C, L=6.5mH, R_G=25Ω, I_{AS}= 4.7A.

P-Channel Starting T_J= 25°C, L=20mH, R_G=25Ω, I_{AS}= -3.4A.

④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

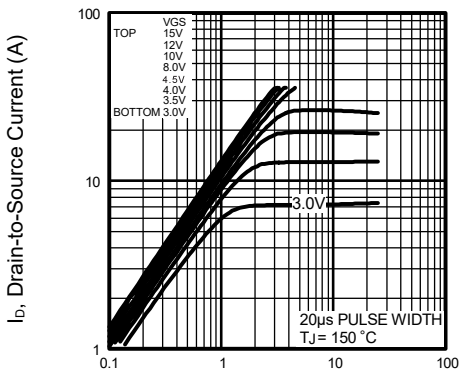
⑤ Surface mounted on FR-4 board, t≤ 10sec.

7.1Typical Characterisitics (N-Channel)



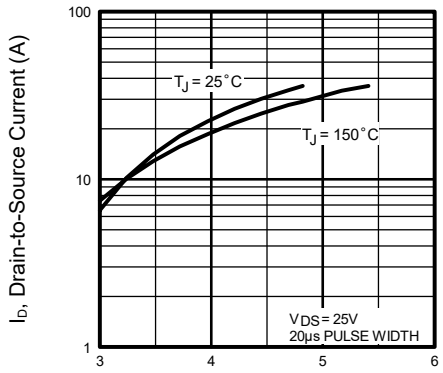
V_{DS},Drain-to-Source Voltage (V)

Figure 1: Typical Output Characteristics



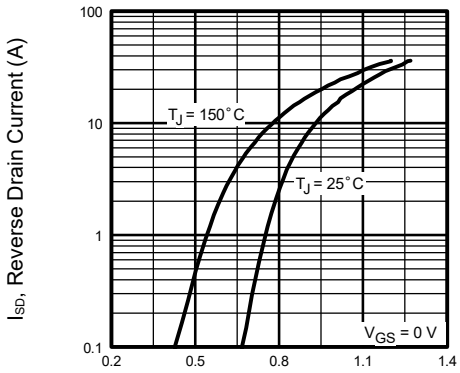
V_{DS},Drain-to-Source Voltage (V)

Figure 2: Typical Output Characteristics



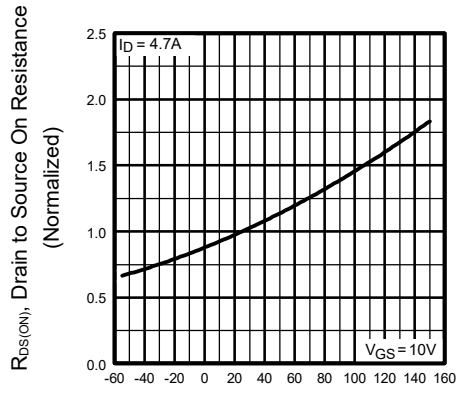
V_{GS},Gate-to-Source Voltage (V)

Figure 3: Typical Output Characteristics



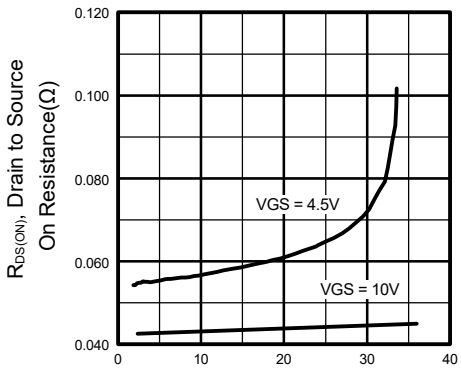
V_{SD},Source to Drain Voltage (V)

Figure 4: Typical Source-Drain Diode Forward Voltage



T_J,Junction Temperature (°C)

Figure 5: Normalized On-Resistance VS. Temperature



I_D,Drain Current (A)

Figure 6: Typical On-Resistance Vs. DrainCurrent

7.2Typical Characterisitics (N-Channel)

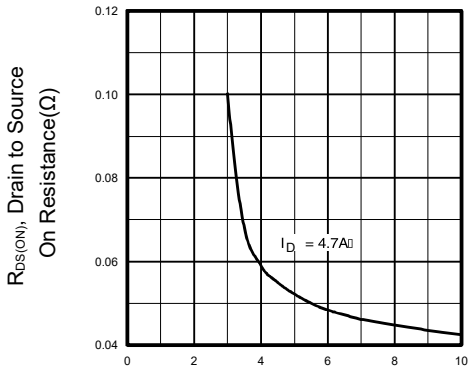


Figure 7: Typical On-Resistance Vs. GateVoltage

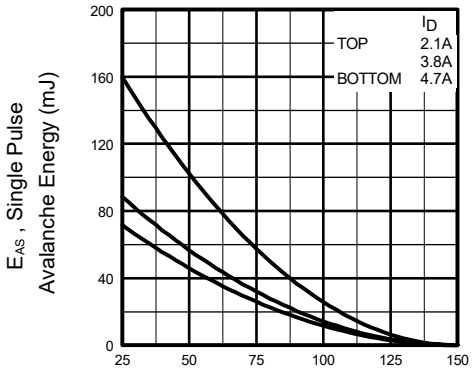


Figure 8: Maximum Avalanche EnergyVs. Drain Curent

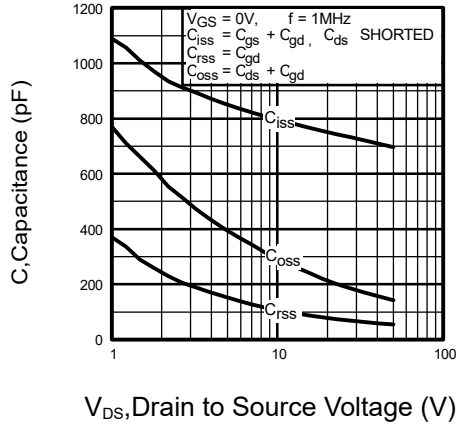


Figure 9: Typical Capacitance Vs. Drain-to-Source Voltage

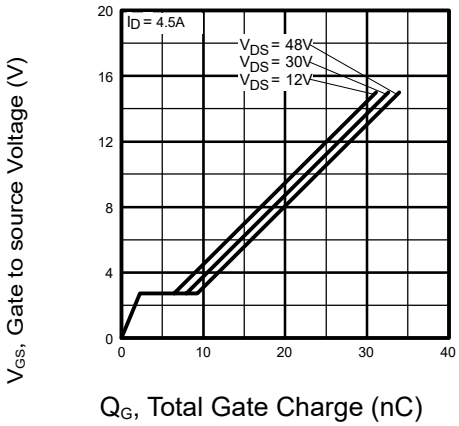


Figure 10: Typical Gate Charge Vs. Gate-to-Source Voltage

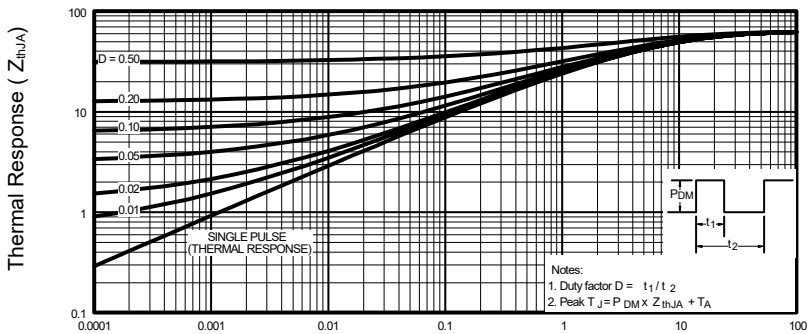


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

7.3Typical Characterisitics (P-Channel)

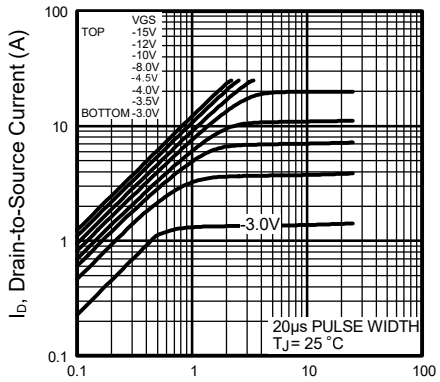


Figure 12: Typical Output Characteristics

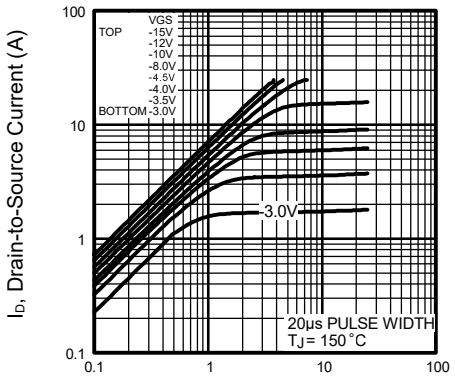


Figure 13: Typical Output Characteristics

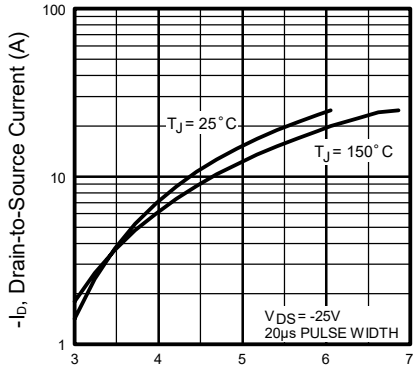


Figure 14: Typical Output Characteristics

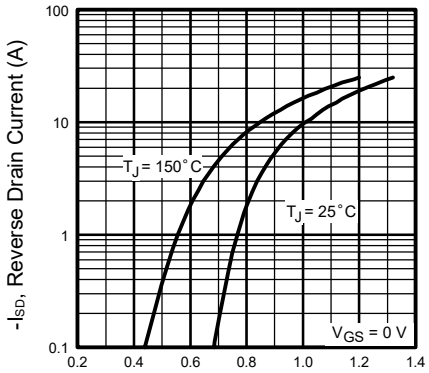


Figure 15: Typical Source-Drain Diode Forward Voltage

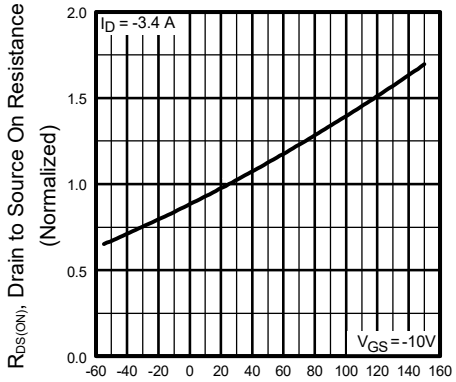


Figure 16: Normalized On-Resistance VS. Temperature

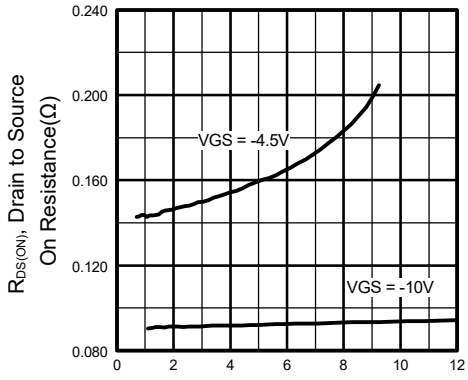


Figure 17: Typical On-Resistance Vs. DrainCurrent

7.4Typical Characterisitics (P-Channel)

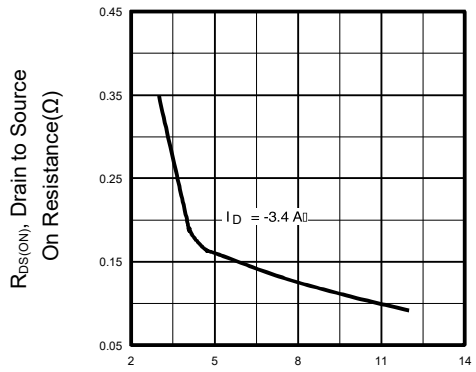


Figure 18: Typical On-Resistance Vs. GateVoltage

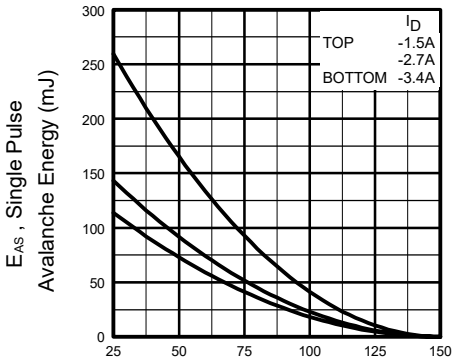


Figure 19: Maximum Avalanche EnergyVs. Drain Curent

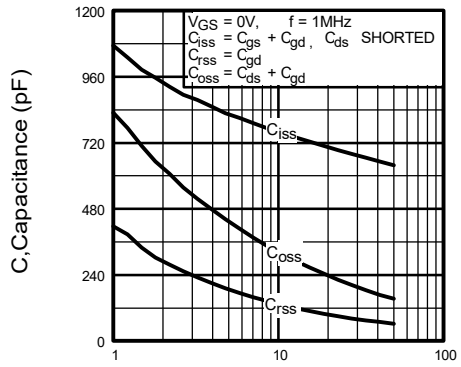


Figure 20: Typical Capacitance Vs. Drain-to-Source Voltage

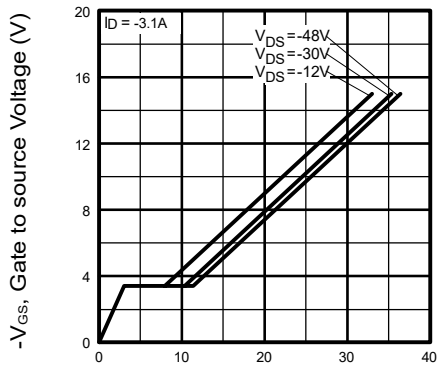


Figure 21: Typical Gate Charge Vs. Gate-to-Source Voltage

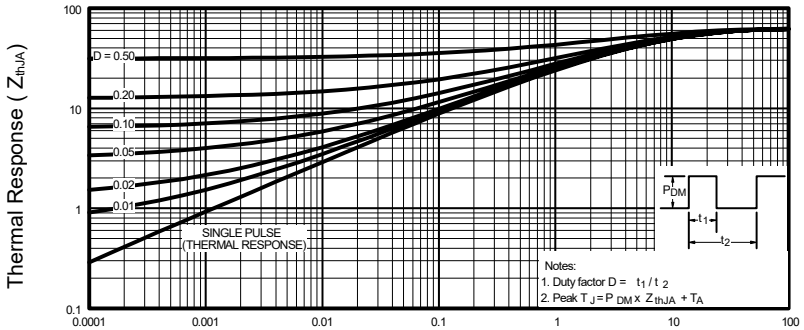
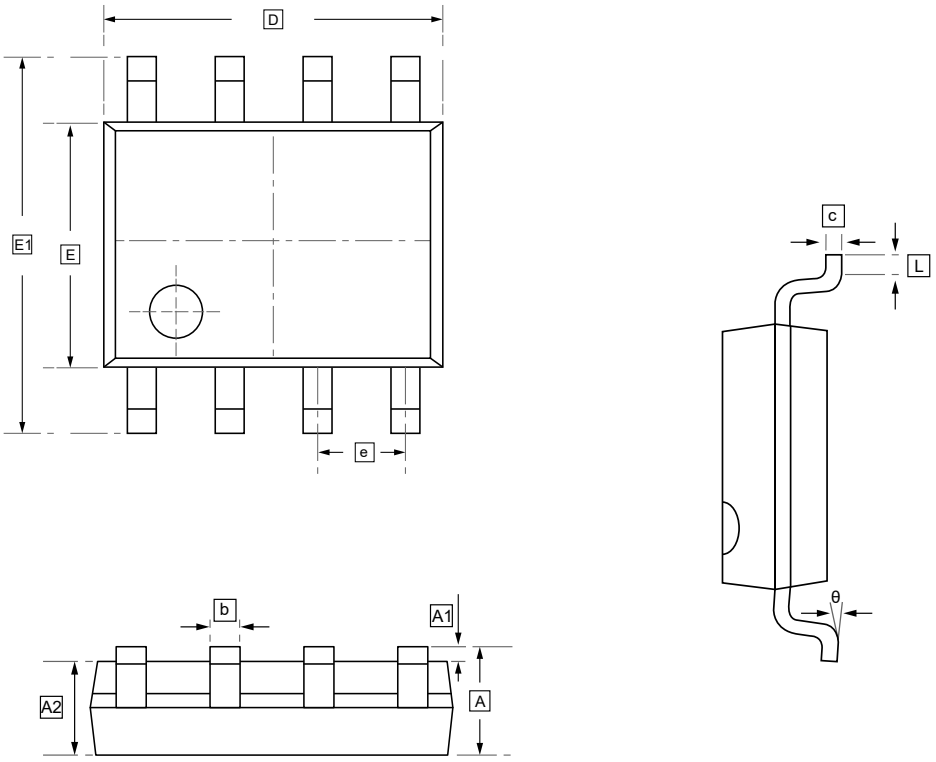


Figure 22: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

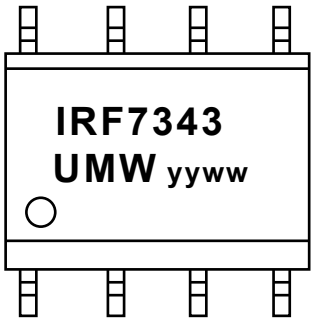
8.SOP-8 Package Outline Dimensions



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 IRF7343TR	SOP-8	3000	Tape and reel

10.Disclaimer

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