UMW IRF7351TR

Dual N Channel MOSFET

1.Features

- $V_{DS\ (V)}$=60V
- I_D=8A
- $R_{DS(ON)}$<23mΩ(V_{GS}=10V)

2.Applications

- Synchronous Rectifier MOSFET for Isolated DC-DC Converters
- Low Power Motor Drive Systems

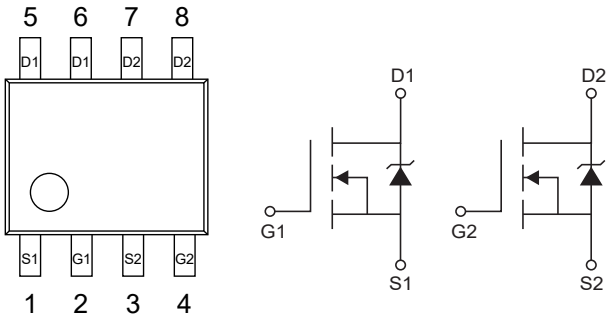
3.Benefits

- Ultra-Low Gate Impedance
- Fully Characterized Avalanche Voltage and Current
- 20V V_{GS} Max. Gate Rating

4.Pinning information

Pin	Symbol	Description
2,4	G1,G2	GATE
1,3	S1,S2	SOURCE
5,6,7,8	D1,D2	DRAIN

SOP-8



5.Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current, V_{GS}=10V	T_A=25°C	I_D	8	A
	T_A=70°C		6.4	
Pulsed Drain Current ①		I_{DM}	64	
Power Dissipation ④	T_A=25°C	P_D	2	W
	T_A=70°C		1.28	W
Linear Derating Factor			0.016	W/°C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

6.Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Drain Lead ⑤	$R_{\theta JL}$		20	°C/W
Junction-to-Ambient ④ ⑤	$R_{\theta JA}$		62.5	°C/W

7.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=1mA,Reference to 25°C		0.068		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8A ③		13.7	23	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=50μA	1		2	V
Gate Threshold Voltage Coefficient	g_{FS}	V_{DS}=V_{GS}, I_D=50μA		-8.2		mV/°C
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			20	μA
		V_{DS}=60V,V_{GS}=0V,T_J=125°C			250	μA
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=20V			100	nA
Gate-to-Source Reverse Leakage		V_{GS}=-20V			-100	nA
Forward Transconductance	g_{FS}	V_{DS}=25V, I_D=6.4A	18			S
Total Gate Charge	Q_g	V_{DS}=30V V_{GS}=10V I_D=6.4A See Fig. 17		24	36	nC
Pre-Vth Gate-to-Source Charge	Q_{gs1}			3.8		
Pre-Vth Gate-to-Source Charge	Q_{gs2}			1.2		
Gate-to-Drain Charge	Q_{gd}			7.2		
Gate Charge Overdrive	Q_{godr}			11.8		
Switch Charge (Qgs2 + Qgd)	Q_{sw}			8.4		
Output Charge	Q_{oss}	V_{DS}=16V,V_{GS}=0V		7.5		
Turn-Off Delay Time	$t_{D(on)}$	V_{DD} =30V, V_{GS}=10V ③ I_D=6.4A, R_g=1.8Ω		5.1		ns
Rise Time	t_r			5.9		
Turn-Off Delay Time	$t_{D(off)}$			17		
Fall Time	t_f			6.7		
Input Capacitance	C_{iss}	V_{GS}=0V V_{DS}=30V f=1.0MHz		1330		pF
Output Capacitance	C_{oss}			190		
Reverse Transfer Capacitance	C_{rss}			92		

Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			1.8	A
Pulsed Source Current (Body Diode) ①	I_{SM}				64	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=6.4A,V_{GS}=0V③			1.3	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=6.4A, V_{DD}=30V		20	30	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=300A/μs ③		61	92	nC

8.Thermal resist ance rating

Parameter	Symbol	Typ	Max	Units
Single Pulse Avalanche Energy ②	E_{AS}		325	mJ
Avalanche Current ①	I_{AR}		6.4	A

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J=25°C, L=16mH, R_G=25Ω, I_{AS}=6.4A.

③ Pulse width ≤ 400μs; duty cycle ≤ 2%.

④ When mounted on 1 inch square copper board.

⑤ R_θ is measured at T_J approximately 90°C

9.1Typical Characterisitics

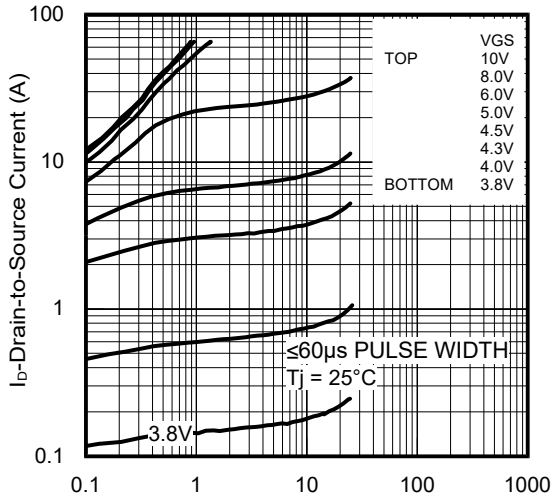


Fig 1. Typical Output Characteristics

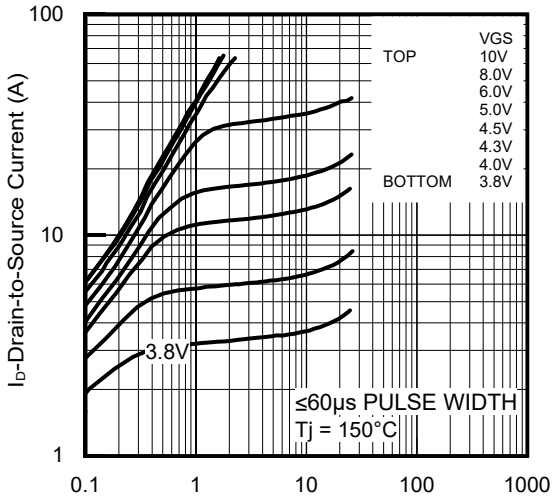


Fig 2. Typical Output Characteristics

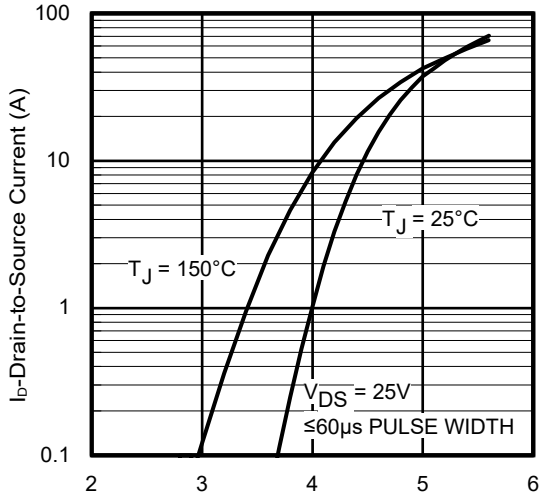


Fig 3. Typical Transfer Characteristics

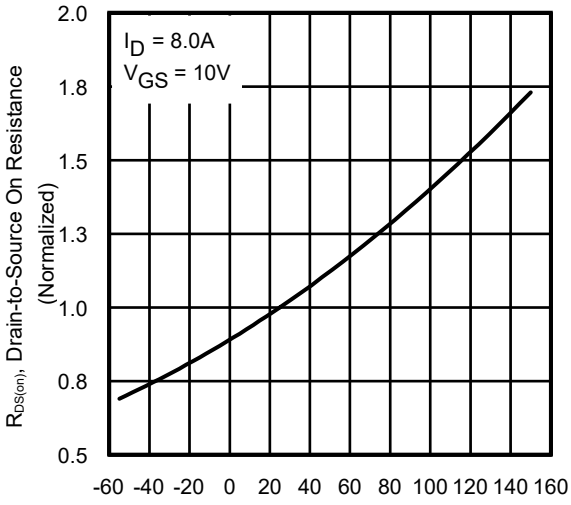
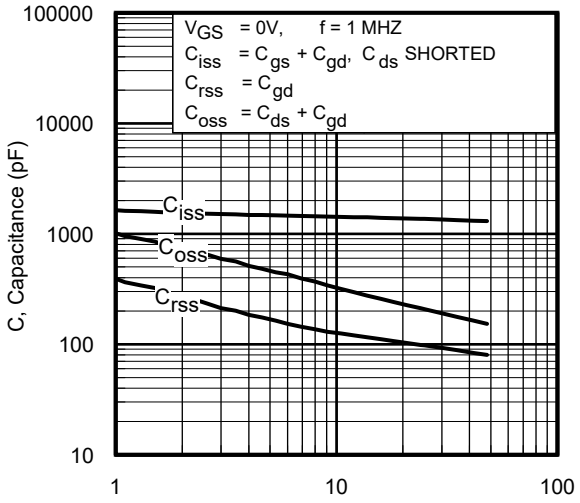


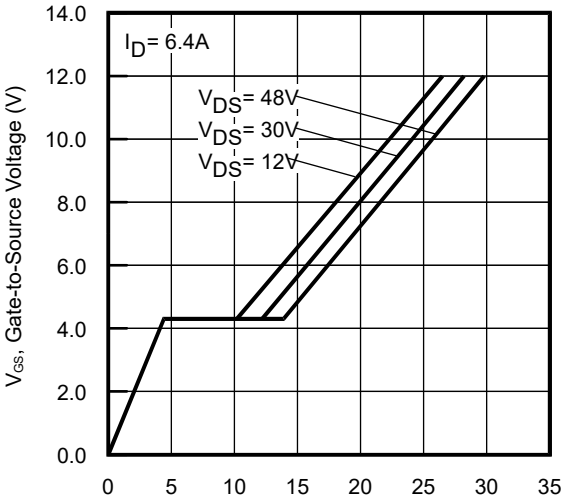
Fig 4. Nomalized On-ResistanceVs. Temperature

9.2Typical Characterisitics



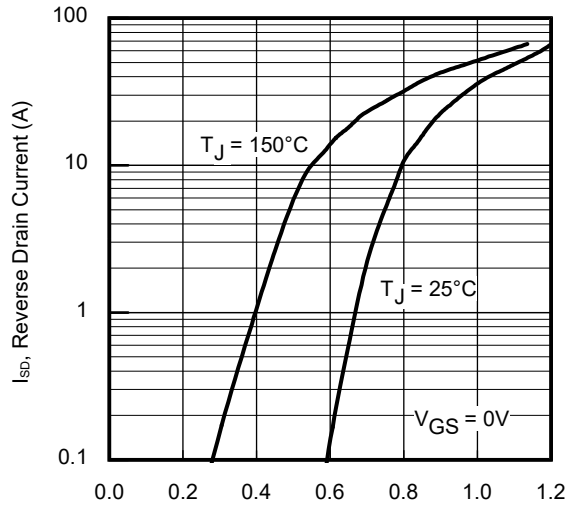
V_{DS} ,Drain-to-Source Voltage (V)

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage



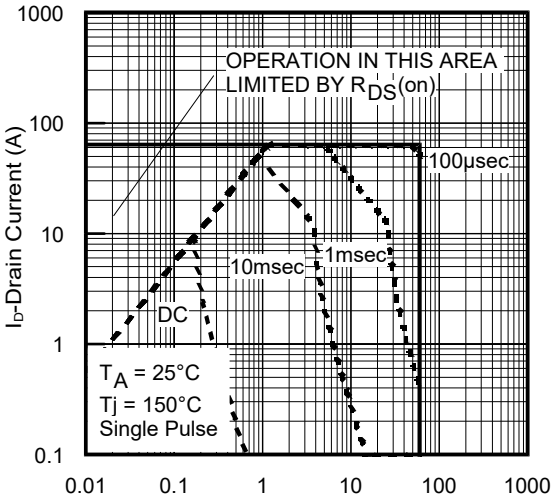
Q_G, Total Gate Charge (nC)

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage



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

Fig 7. Typical Source-Drain Diode Forward Voltage



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

Fig 8. Maximum Safe Operating Area

9.3Typical Characterisitics

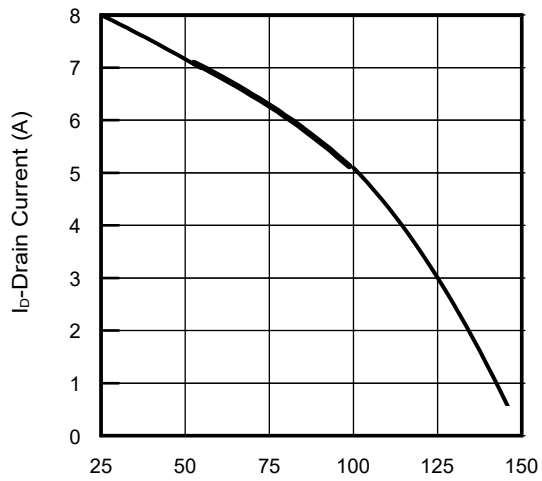


Fig 9. Maximum Drain Current vs. Case Temperature

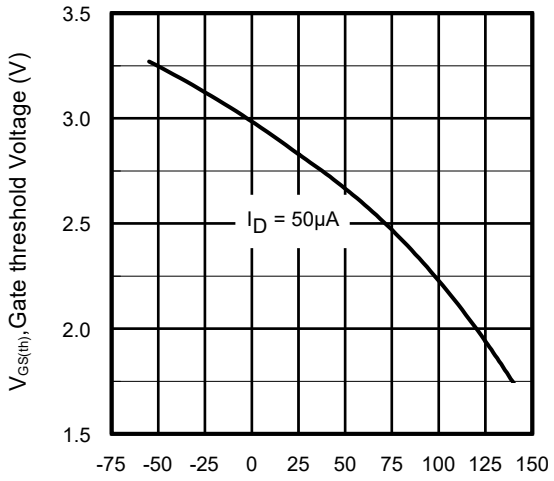


Fig 10. Threshold Voltage vs. Temperature

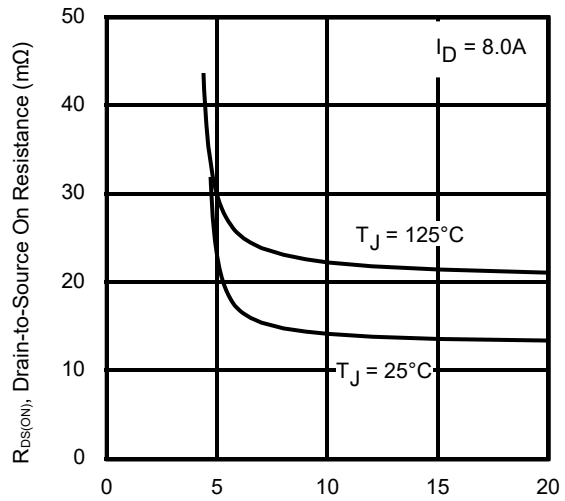


Fig 11. On-Resistance vs. Gate Voltage

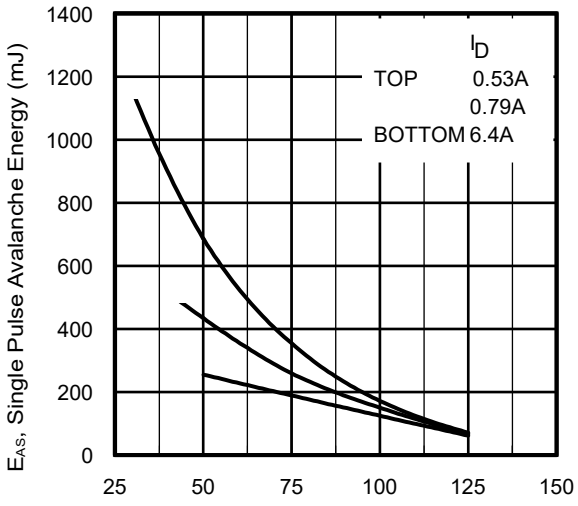


Fig 12. Maximum Avalanche EnergyVs. Drain Curent

9.4Typical Characterisitics

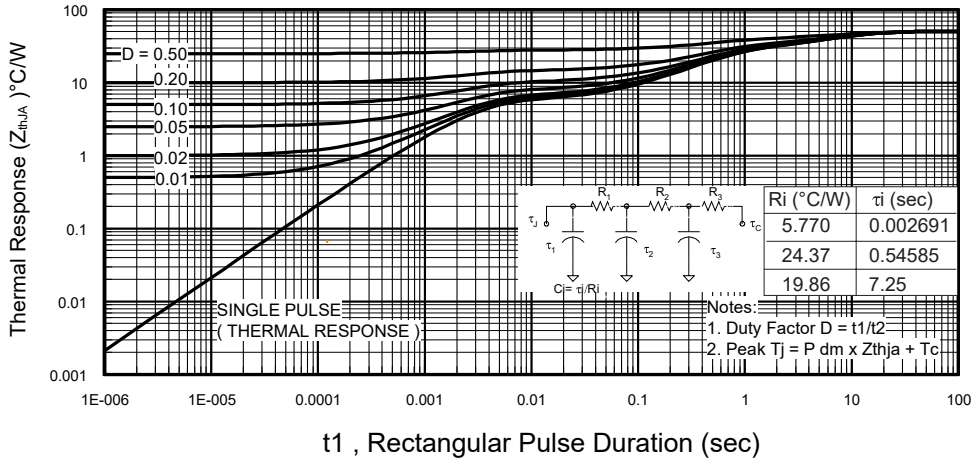


Figure 13: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

9.5Typical Characterisitics

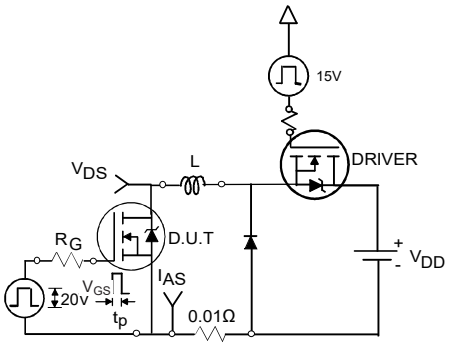


Fig 14a. Unclamped Inductive Test Circuit

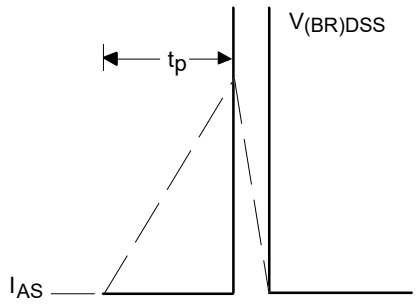


Fig 14b. Unclamped Inductive Waveforms

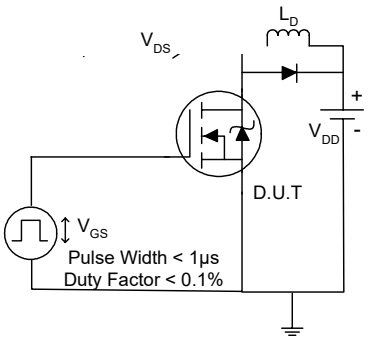


Fig 15a. Switching Time Test Circuit

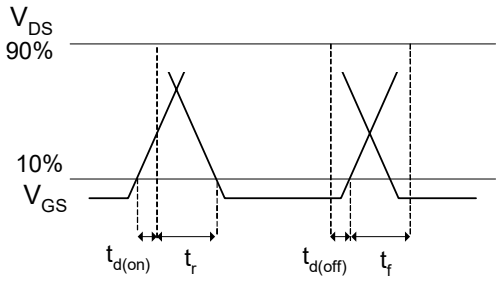


Fig 15b. Switching Time Waveforms

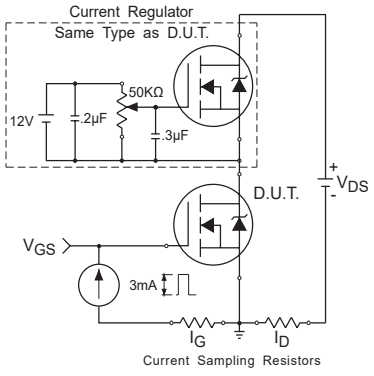


Fig 16a. Gate Charge Test Circuit

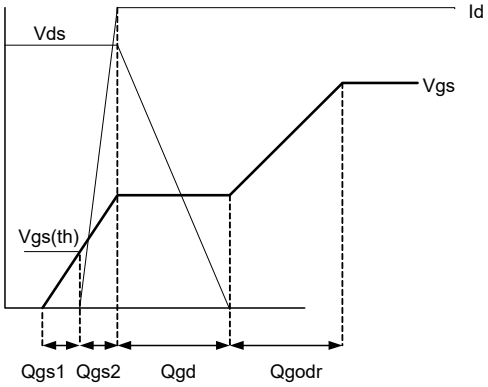
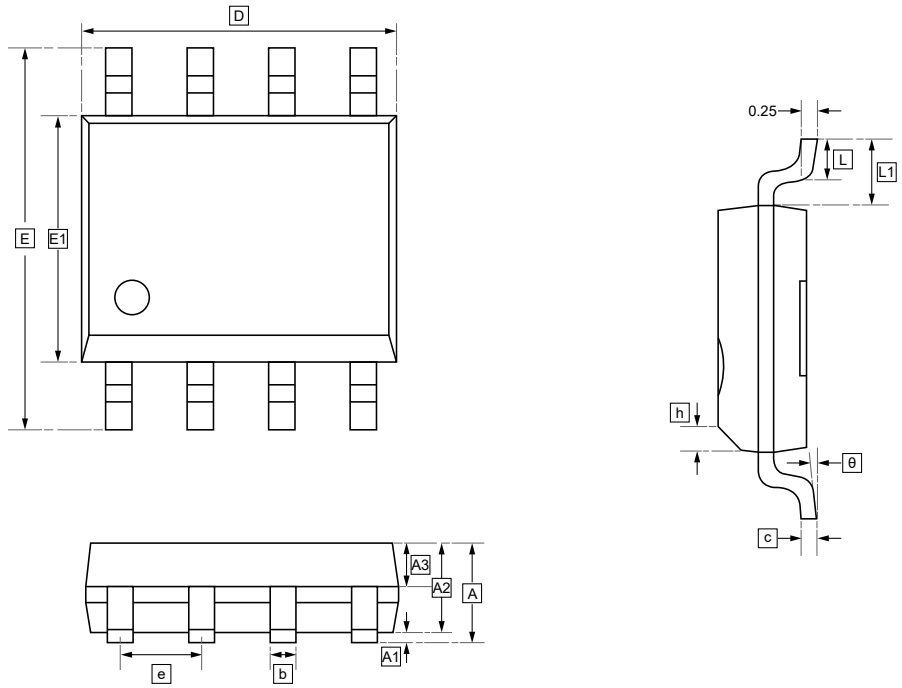


Fig 16b. Gate Charge Waveform

8.SOP-8 Package Outline Dimensions

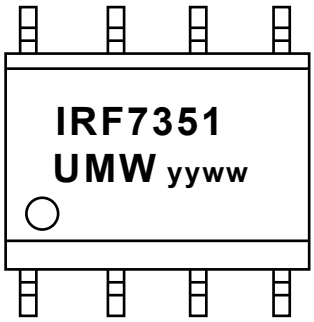


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°

11.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF7351TR	SOP-8	3000	Tape and reel

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