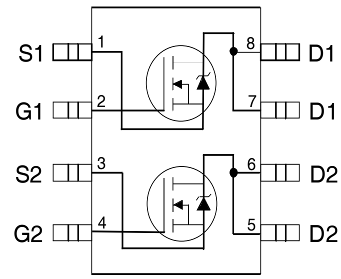
Features

- V_{DS} (V)=50V
- $R_{DS(ON)}$ < 30m Ω (V_{GS} = 10V)
- $R_{DS(ON)}$ < 40 m Ω (V_{GS} = 4.5V)
- Adavanced Process Technology
- Ultra Low On-Resistance
- Surface Mount
- Dynamic dv/dt Rating
- Fast Switching
- Lead-Free



Top View

Description

The SOP-8 has been modified through a customized leadframe for enhanced thermal characteristics and dual-die capability making it ideal in a variety of power applications.With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red. or wave soldering technigues Power dissipation of greater than 0.8W is possible in a typical pcB mount application.

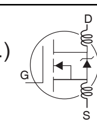
Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	3.0	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	2.3	
I_{DM}	Pulsed Drain Current ①	10	
P_D @T_A = 25°C	Power Dissipation	2.0	W
	Linear Derating Factor	0.016	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery dv/dt ②	4.5	V/nS
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

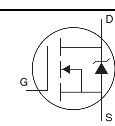
Thermal Resistance Ratings

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④			62.5	°C/W

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	50			V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.049		V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance		21	30	mΩ	V_{GS} = 10V, I_D = 3.0A ③
			32	40		V_{GS} = 4.5V, I_D = 1.5A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0		3.0	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance		3.8		S	V_{DS} = 15V, I_D = 3.0A ③
I_{DSS}	Drain-to-Source Leakage Current			2.0	μA	V_{DS} = 40V, V_{GS} = 0V
				25		V_{DS} = 40V, V_{GS} = 0V, T_J = 55 °C
I_{GSS}	Gate-to-Source Forward Leakage			100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage			-100		V_{GS} = - 20V
Q_g	Total Gate Charge		12	30	nC	I_D = 2.0A
Q_{gs}	Gate-to-Source Charge		1.2			V_{DS} = 25V
Q_{gd}	Gate-to-Drain ("Miller") Charge		3.5			V_{GS} = 10V ③
$t_{d(on)}$	Turn-On Delay Time		9.0	20	ns	V_{DD} = 25V
t_r	Rise Time		8.0	20		I_D = 1.0A
$t_{d(off)}$	Turn-Off Delay Time		45	70		R_G = 6.0Ω
t_f	Fall Time		25	50		R_D = 25Ω ③
L_D	Internal Drain Inductance		4.0		nH	Between lead,6mm(0.25in.) from package and center of die contact 
L_S	Internal Source Inductance		6.0			
C_{iss}	Input Capacitance		290		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		140			V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance		37			f = 1.0MHz

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			2.0	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①			12		
V_{SD}	Diode Forward Voltage			1.2	V	T_J = 25°C, I_S = 1.5A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time		70	100	ns	T_J = 25°C, I_F = 1.5A
Q_{rr}	Reverse RecoveryCharge		110	170	nC	di/dt = 100A/μs ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

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

② $I_{SD} \leq$ 1.8A, di/dt $\leq$ 90A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C

③ Pulse width $\leq$ 300μs; duty cycle $\leq$ 2%.

④ Surface mounted on FR-4 board, t $\leq$ 10sec.

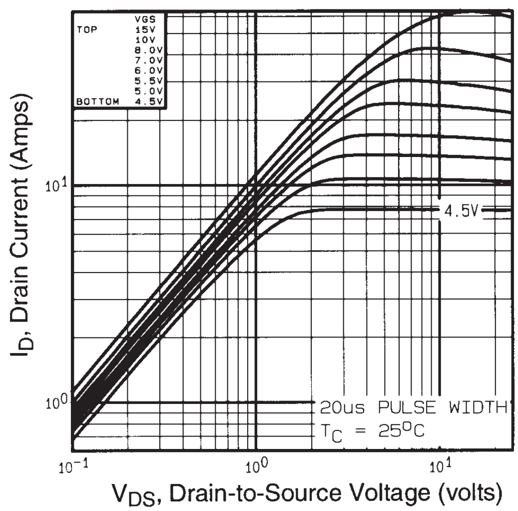


Fig 1. Typical Output Characteristics,

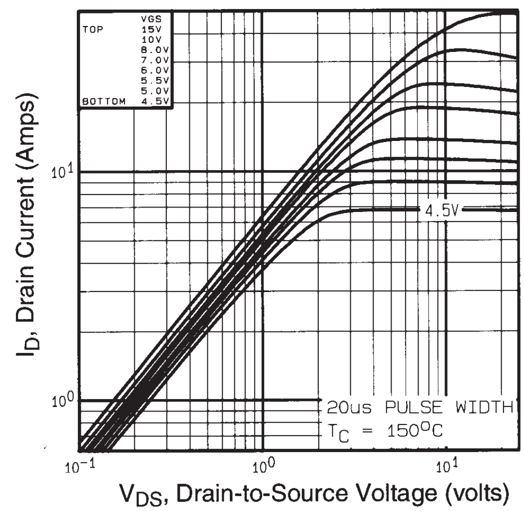


Fig 2. Typical Output Characteristics,

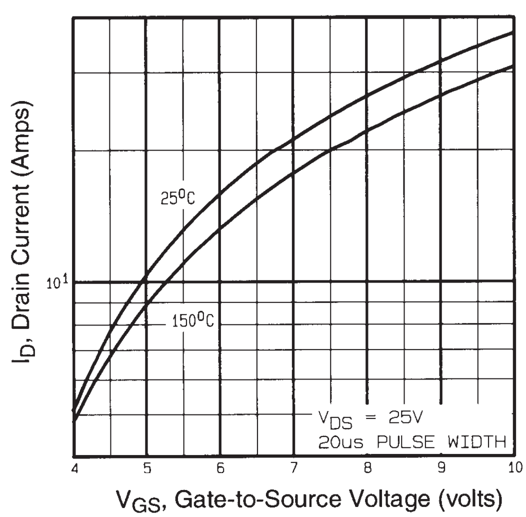


Fig 3. Typical Transfer Characteristics

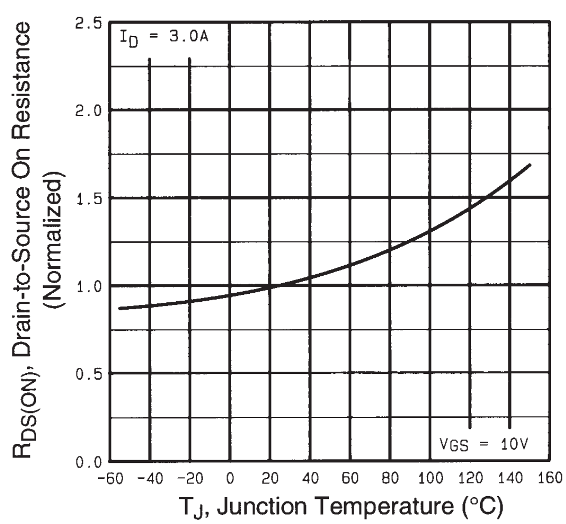


Fig 4. Normalized On-Resistance
Vs. Temperature

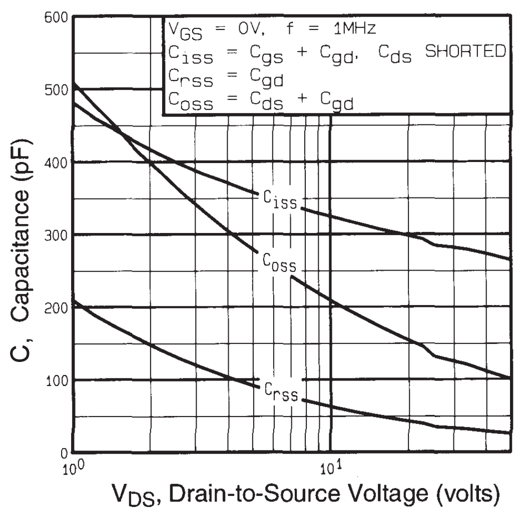


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

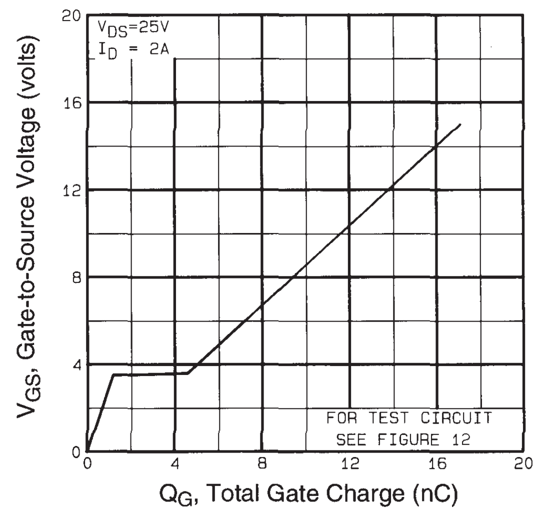


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

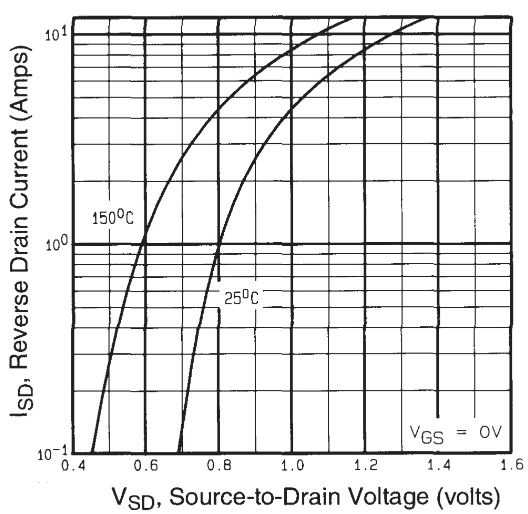


Fig 7. Typical Source-Drain Diode Forward Voltage

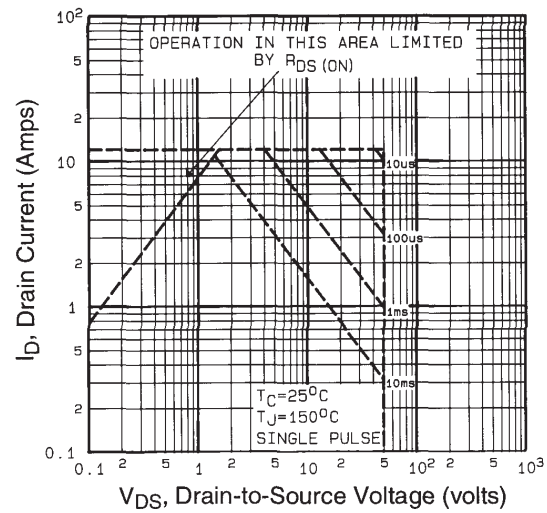


Fig 8. Maximum Safe Operating Area

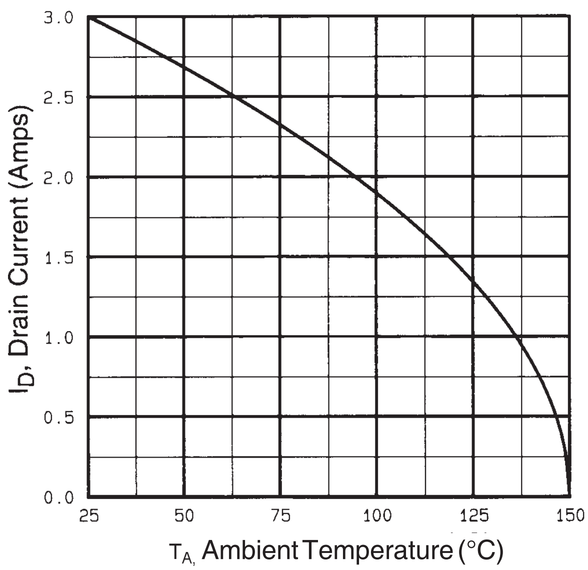


Fig 9. Maximum Drain Current Vs. Ambient Temperature

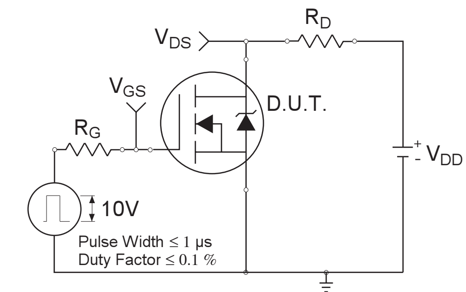


Fig 10a. Switching Time Test Circuit

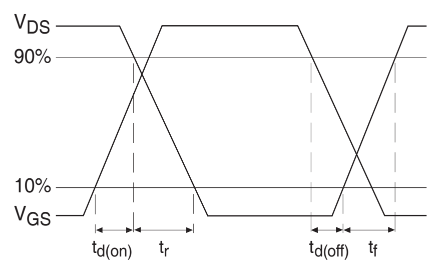


Fig 10b. Switching Time Waveforms

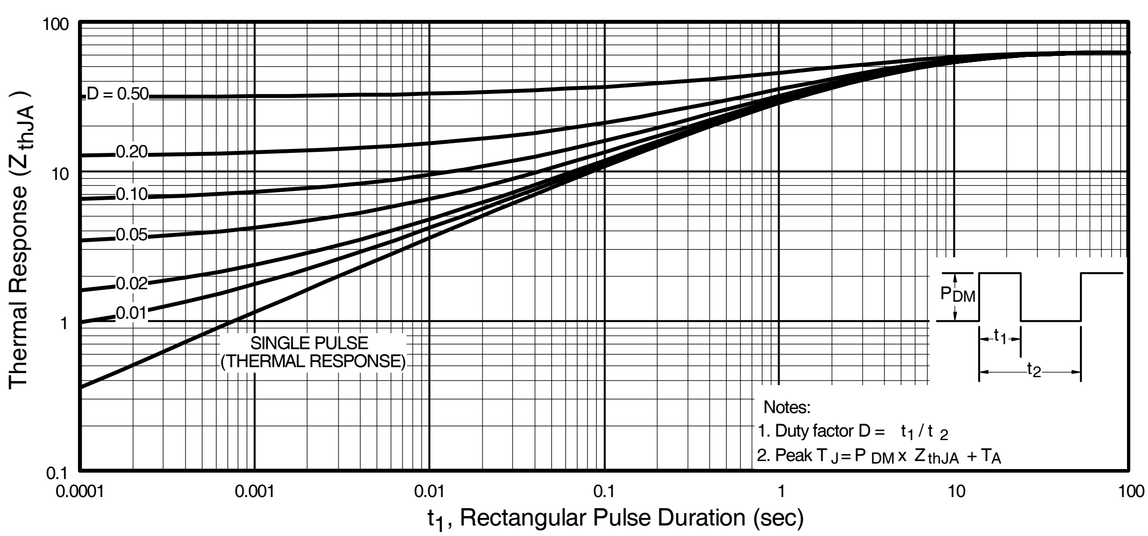


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

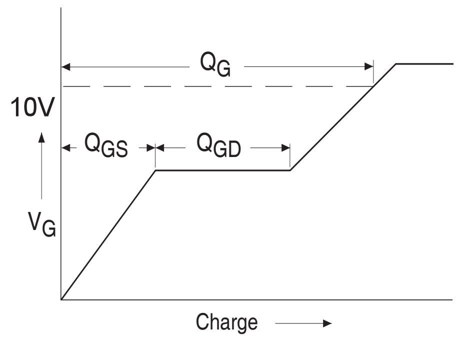


Fig 12a. Basic Gate Charge Waveform

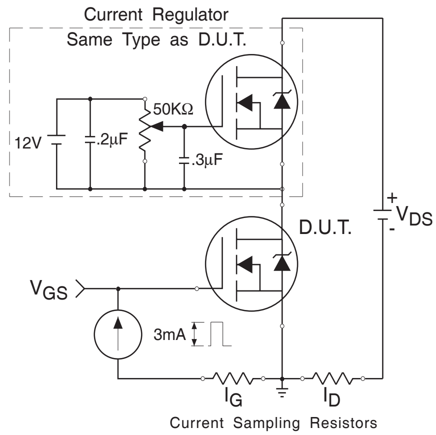
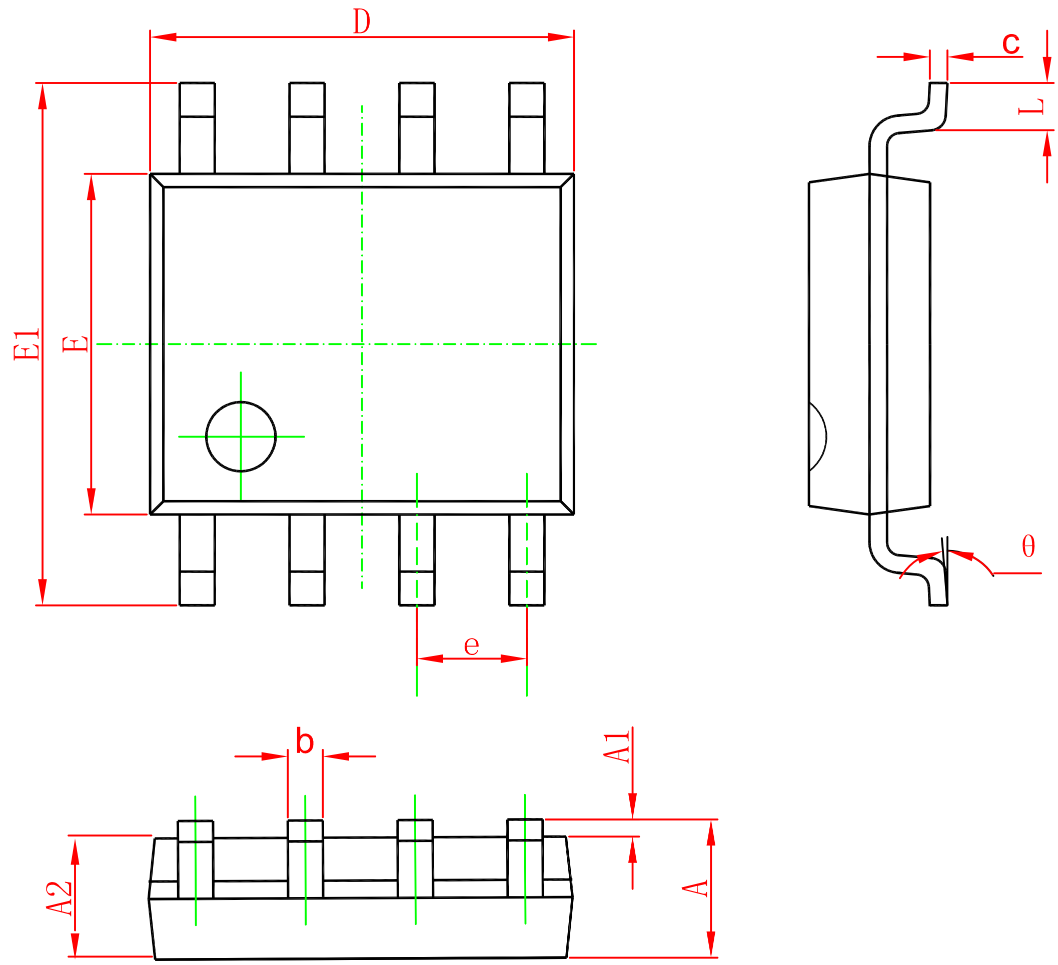
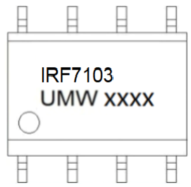


Fig 12b. Gate Charge Test Circuit



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRF7103TR	SOP-8	3000	Tape and reel