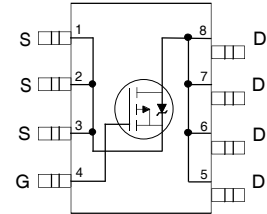


## Description

The SOP-8 package is designed for vapor phase, infra red, or wave soldering techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.



## Features

- $V_{DS(V)} = -30V$
- $I_D = -4.6A (V_{GS} = -10V)$
- $R_{DS(ON)} < 70m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 130m\Omega (V_{GS} = -4.5V)$
- Advanced Process Technology
- Ultra Low On-resistance
- Surface Mount
- Fast Switching
- Lead-free

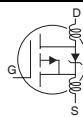
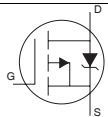
## Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	-4.6	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	-3.7	
$I_{DM}$	Pulsed Drain Current ①	-15	
$P_D @ T_C = 25^\circ C$	Power Dissipation	2.5	W
	Linear Derating Factor	0.020	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
dv/dt	Peak Diode Recovery dv/dt ②	-3.0	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			50	°C/W

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	---	---	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	---	-0.024	---	V/°C	Reference to $25^\circ\text{C}$ , $I_D = -1\text{mA}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance			70	mΩ	$V_{GS} = -10V, I_D = -4.6A$ ③
				130		$V_{GS} = -4.5V, I_D = -2.0A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	---	-3.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
$g_{fs}$	Forward Transconductance	---	6.6	---	S	$V_{DS} = -15V, I_D = -4.6A$ ③
$I_{DSS}$	Drain-to-Source Leakage Current	---	---	-1.0	μA	$V_{DS} = -24V, V_{GS} = 0V$
		---	---	-5.0		$V_{DS} = -15V, V_{GS} = 0V, T_J = 70^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	---	---	-100	nA	$V_{GS} = -20V$
	Gate-to-Source Reverse Leakage	---	---	100		$V_{GS} = 20V$
$Q_g$	Total Gate Charge	---	27	40	nC	$I_D = -4.6A$
$Q_{gs}$	Gate-to-Source Charge	---	5.2	---		$V_{DS} = -15V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	---	7.5	---		$V_{GS} = -10V$ ③
$t_{d(on)}$	Turn-On Delay Time	---	14	30	ns	$V_{DD} = -15V$
$t_r$	Rise Time	---	21	60		$I_D = -1.0A$
$t_{d(off)}$	Turn-Off Delay Time	---	97	150		$R_G = 6.0\Omega$
$t_f$	Fall Time	---	71	100		$R_D = 10\Omega$ ③
$L_D$	Internal Drain Inductance		2.5		nH	Between lead, 6mm (0.25in.) from package and center of die contact 
$L_S$	Internal Source Inductance	---	4.0			
$C_{iss}$	Input Capacitance	---	870		pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	---	720			$V_{DS} = -10V$
$C_{riss}$	Reverse Transfer Capacitance	---	220	---		$f = 1.0\text{MHz}$
$I_S$	Continuous Source Current (Body Diode)	---	---	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	---	---	-15		
$V_{SD}$	Diode Forward Voltage	---	---	-1.2	V	$T_J = 25^\circ\text{C}, I_S = -1.25A, V_{GS} = 0V$ ③
$t_{rr}$	Reverse Recovery Time	---	70	100	ns	$T_J = 25^\circ\text{C}, I_F = -4.6A$
$Q_{rr}$	Reverse Recovery Charge	---	100	180	nC	$di/dt = 100A/\mu s$ 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  $I_{SD} \leq -4.6A, di/dt \leq 90A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$
- ③ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ④ Surface mounted on FR-4 board,  $t \leq 10\text{sec}$ .

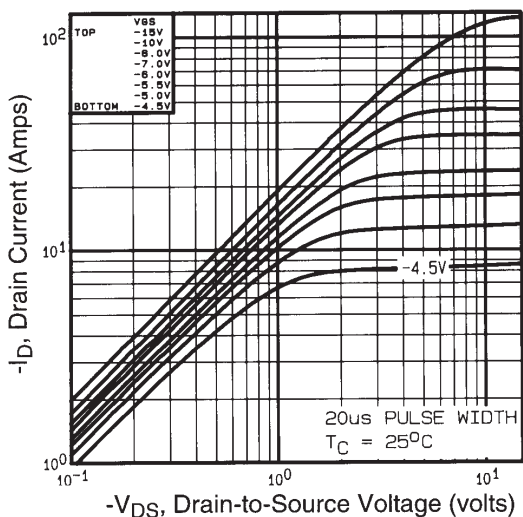


Fig 1. Typical Output Characteristics,

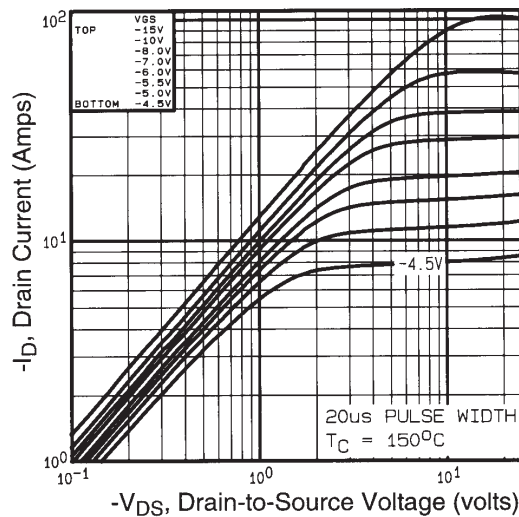


Fig 2. Typical Output Characteristics,

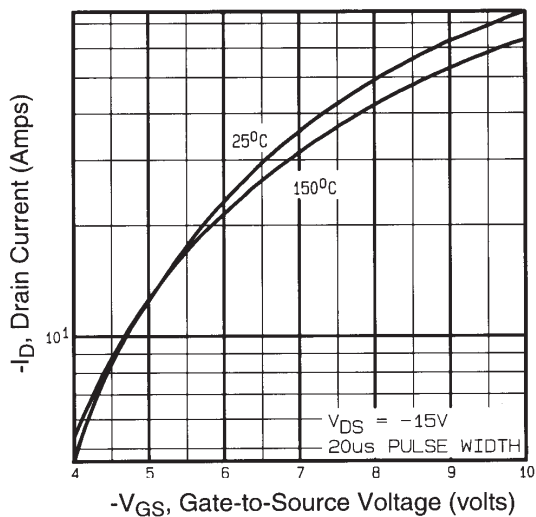


Fig 3. Typical Transfer Characteristics

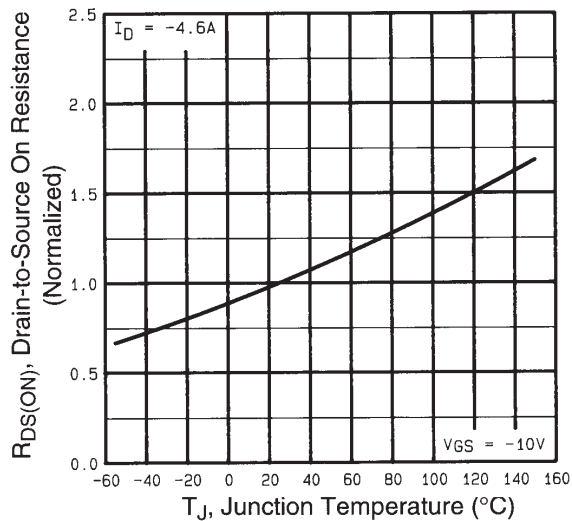
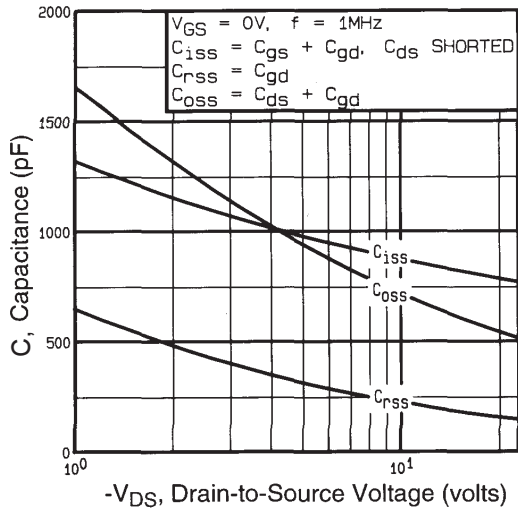
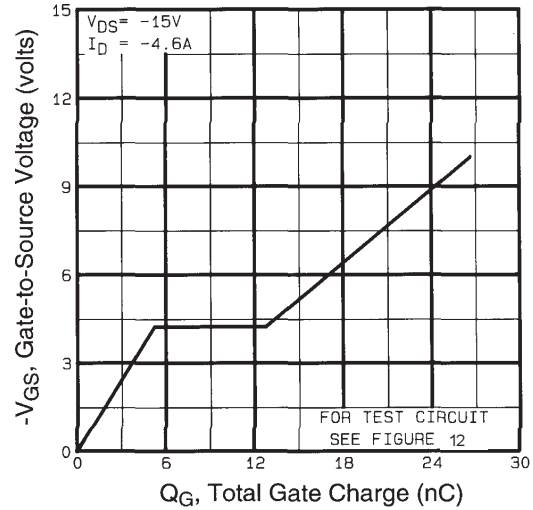


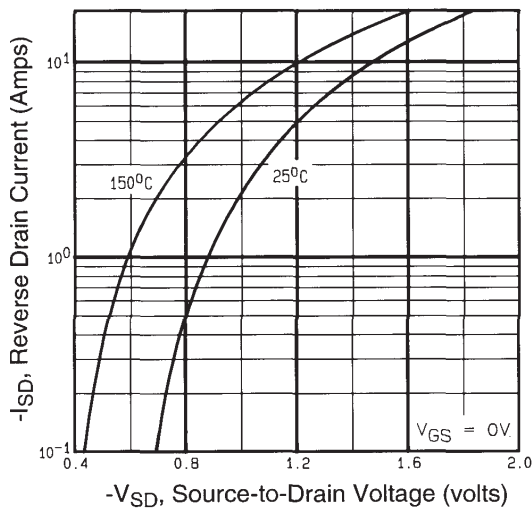
Fig 4. Normalized On-Resistance Vs. Temperature



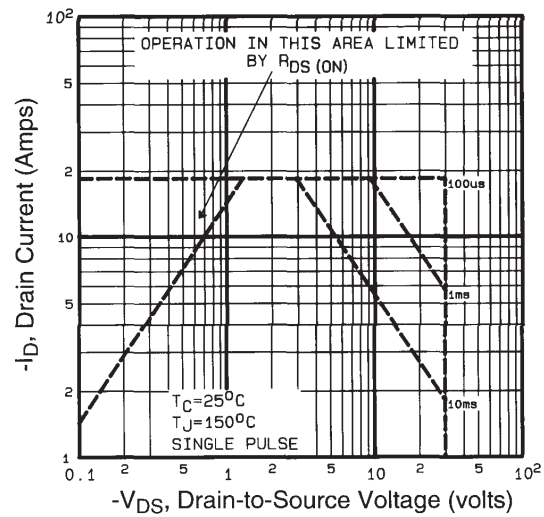
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



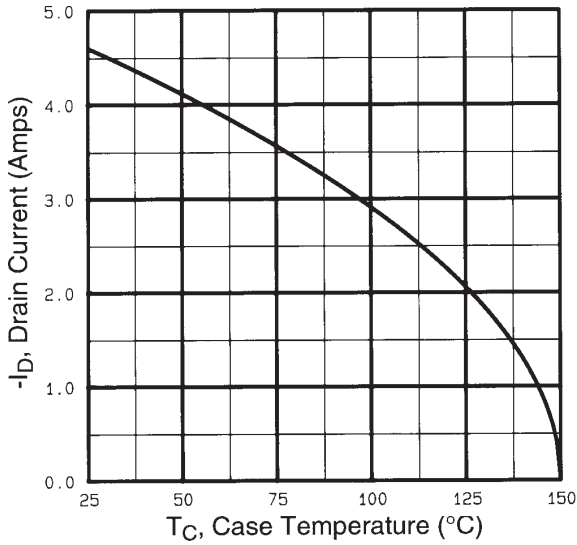
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



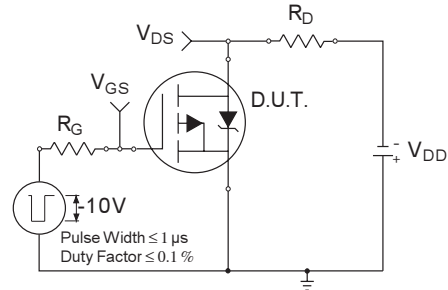
**Fig 7.** Typical Source-Drain Diode Forward Voltage



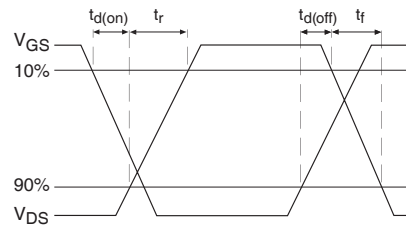
**Fig 8.** Maximum Safe Operating Area



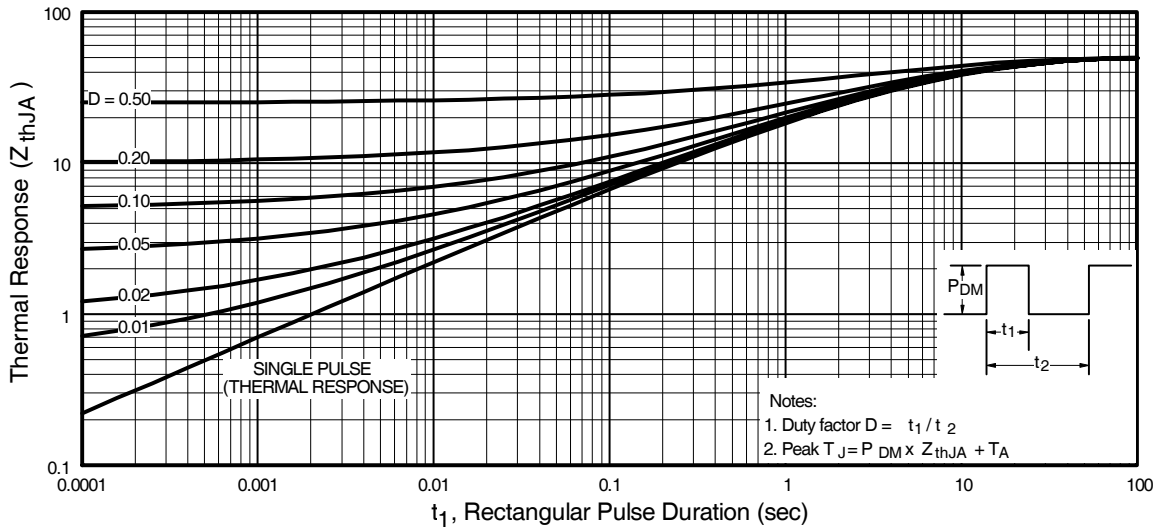
**Fig 9.** Maximum Drain Current Vs. Case Temperature



**Fig 10a.** Switching Time Test Circuit



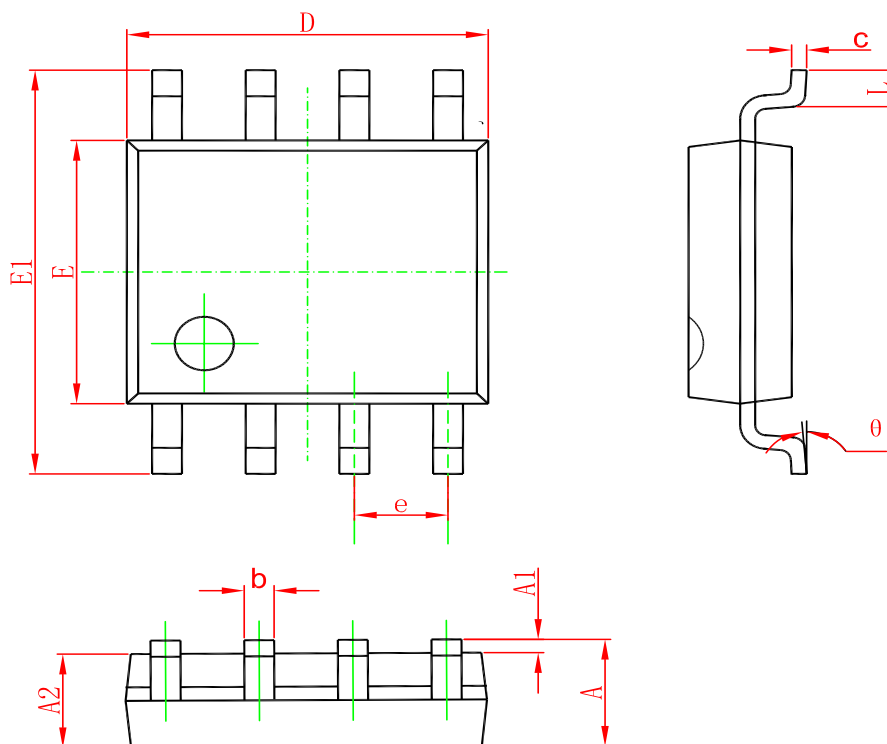
**Fig 10b.** Switching Time Waveforms



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

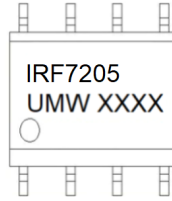
PACKAGE OUTLINE DIMENSIONS

SOP-8



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 IRF7205TR	SOP-8	3000	Tape and reel