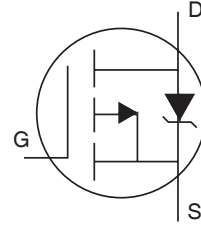


Features

- V_{DS} (V) = -55V
- I_D = -31A (V_{GS} = -10V)
- $R_{DS(ON)}$ < 60m Ω (V_{GS} = -10V)



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V⑤	-31	A
I_D @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V⑤	-22	
I_{DM}	Pulsed Drain Current ①⑤	-110	
P_D @ $T_A = 25^\circ\text{C}$	Power Dissipation	3.8	W
P_D @ $T_C = 25^\circ\text{C}$	Power Dissipation	110	W
	Linear Derating Factor	0.71	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy②⑤	280	mJ
I_{AR}	Avalanche Current①	-16	A
E_{AR}	Repetitive Avalanche Energy①	11	mJ
dv/dt	Peak Diode Recovery dv/dt ③⑤	-5.8	V/ns
T_J	Operating Junction and	-55 to + 175	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

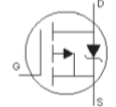
Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case		1.4	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mounted,steady-state)**		40	

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-55			V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		-0.034		V/°C	Reference to 25°C , $I_D = -1mA$ ⑤
$R_{DS(on)}$	Static Drain-to-Source On-Resistance			60	mΩ	$V_{GS} = -10V, I_D = -16A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-1.1	-2	-3.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
g_{fs}	Forward Transconductance	8.0			S	$V_{DS} = -25V, I_D = -16A$ ⑤
I_{DSS}	Drain-to-Source Leakage Current			-25	μA	$V_{DS} = -55V, V_{GS} = 0V$
				-250		$V_{DS} = -44V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
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			63	nC	$I_D = -16A$
Q_{gs}	Gate-to-Source Charge			13		$V_{DS} = -44V$
Q_{gd}	Gate-to-Drain ("Miller") Charge			29		$V_{GS} = -10V$, See Fig. 6 and 13 ④⑤
$t_{d(on)}$	Turn-On Delay Time		14		ns	$V_{DD} = -28V$
t_r	Rise Time		66			$I_D = -16A$
$t_{d(off)}$	Turn-Off Delay Time		39			$R_G = 6.8\Omega$
t_f	Fall Time		63			$R_D = 1.6\Omega$, See Fig. 10 ④⑤
L_S	Internal Source Inductance		7.5		nH	Between lead, and center of die contact
C_{iss}	Input Capacitance		1200		pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance		520			$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance		250			$f = 1.0MHz$, See Fig. 5⑤

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			-31	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①			-110		
V_{SD}	Diode Forward Voltage			-1.3	V	$T_J = 25^\circ\text{C}, I_S = -16A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time		71	110	ns	$T_J = 25^\circ\text{C}, I_F = -16A$
Q_{rr}	Reverse Recovery Charge		170	250	nC	$di/dt = -100A/\mu s$ ④⑤
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. (See fig. 11)

② $V_{DD} = -25V$, Starting $T_J = 25^\circ\text{C}$, $L = 2.1mH$, $R_G = 25\Omega$, $I_{AS} = -16A$. (See Figure 12)

③ $I_{SD} \leq -16A$, $di/dt \leq -280A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$

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

⑤ Uses IRF5305 data and test conditions

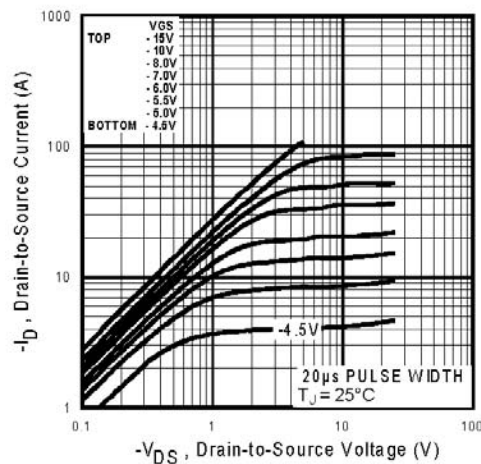


Fig 1. Typical Output Characteristics

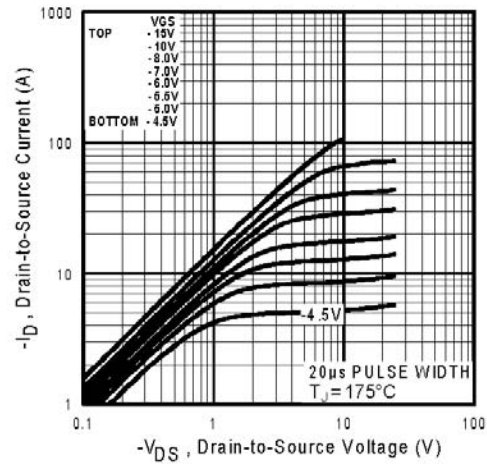


Fig 2. Typical Output Characteristics

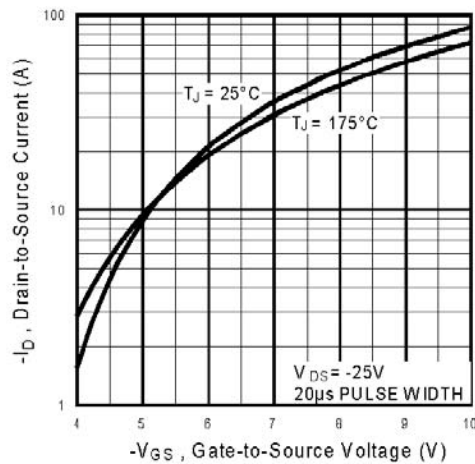


Fig 3. Typical Transfer Characteristics

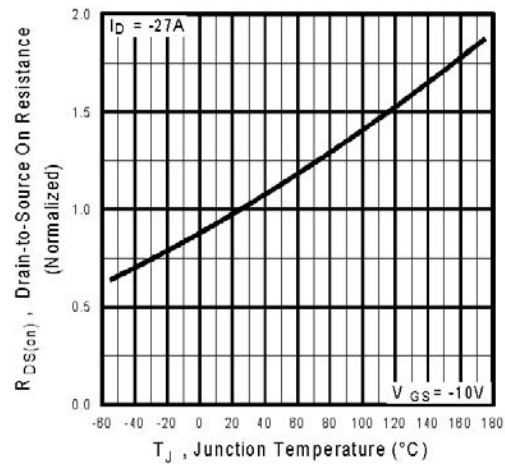


Fig 4. Normalized On-Resistance
Vs. Temperature

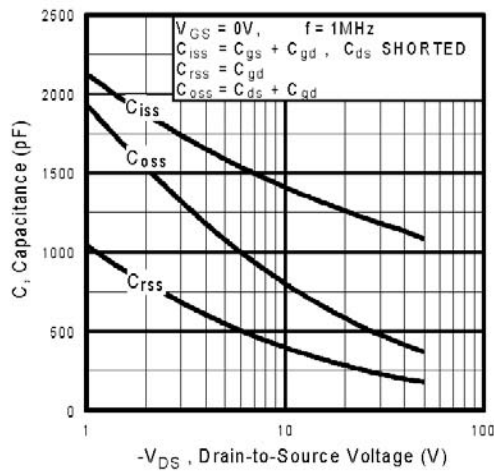


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

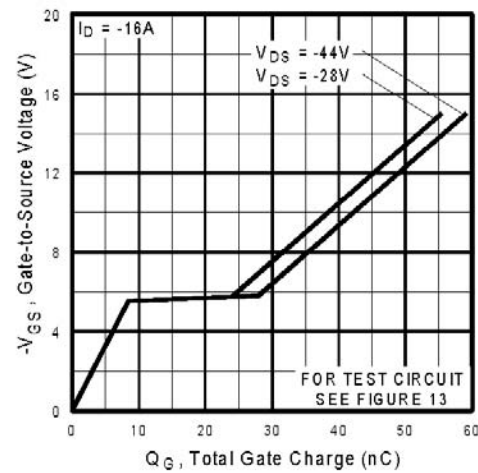


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

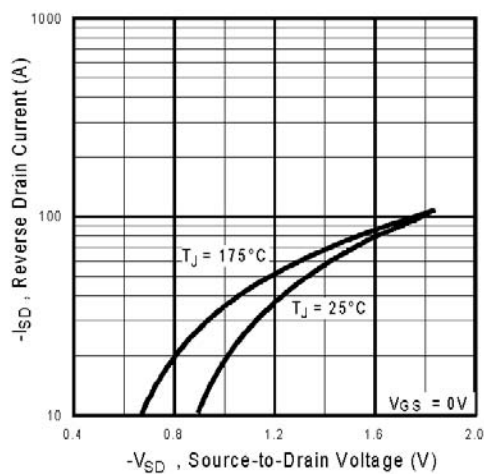


Fig 7. Typical Source-Drain Diode Forward Voltage

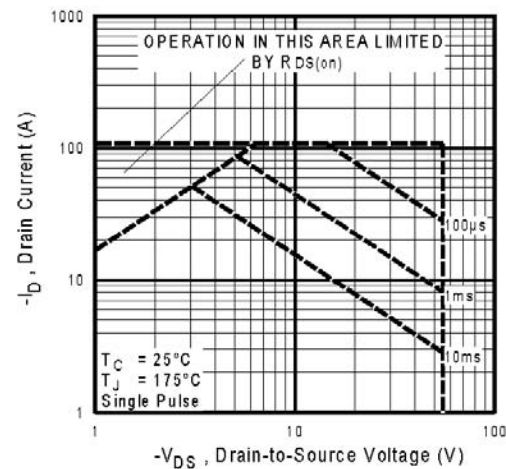


Fig 8. Maximum Safe Operating Area

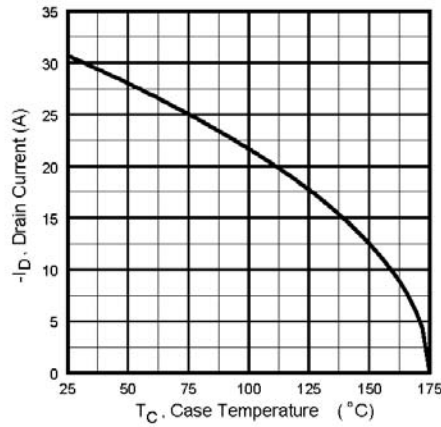


Fig 9. Maximum Drain Current Vs. Case Temperature

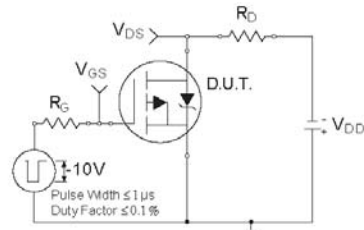


Fig 10a. Switching Time Test Circuit

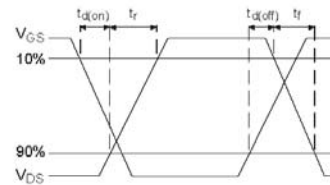


Fig 10b. Switching Time Waveforms

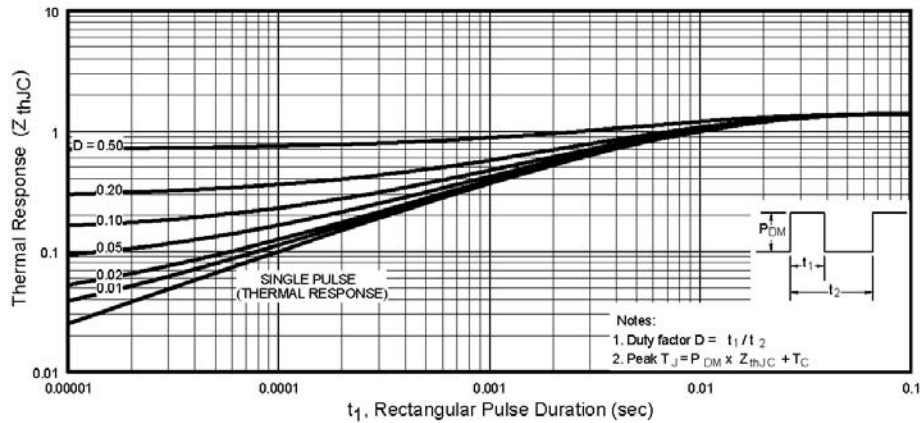


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

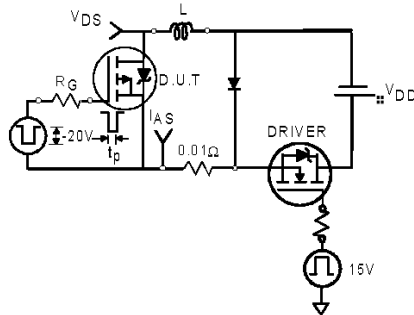


Fig 12a. Unclamped Inductive Test Circuit

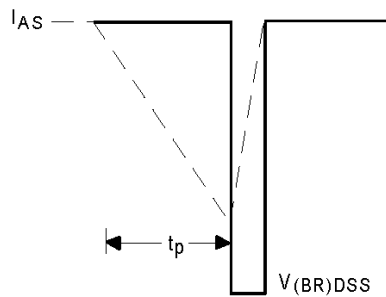


Fig 12b. Unclamped Inductive Waveforms

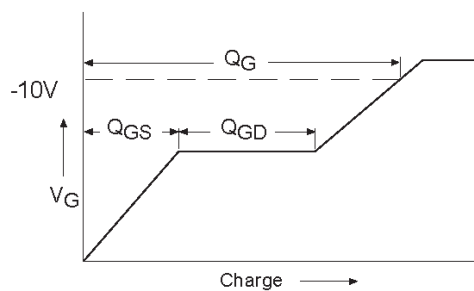


Fig 13a. Basic Gate Charge Waveform

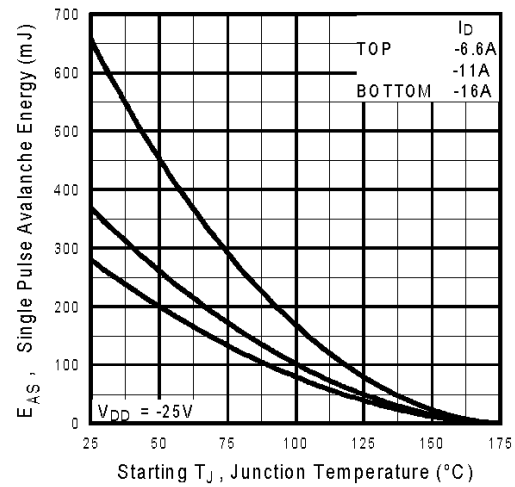


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

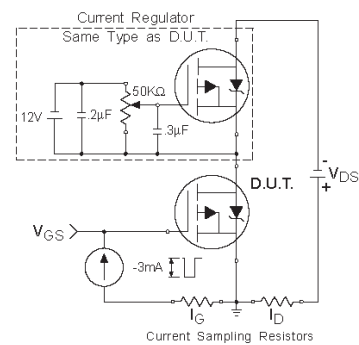
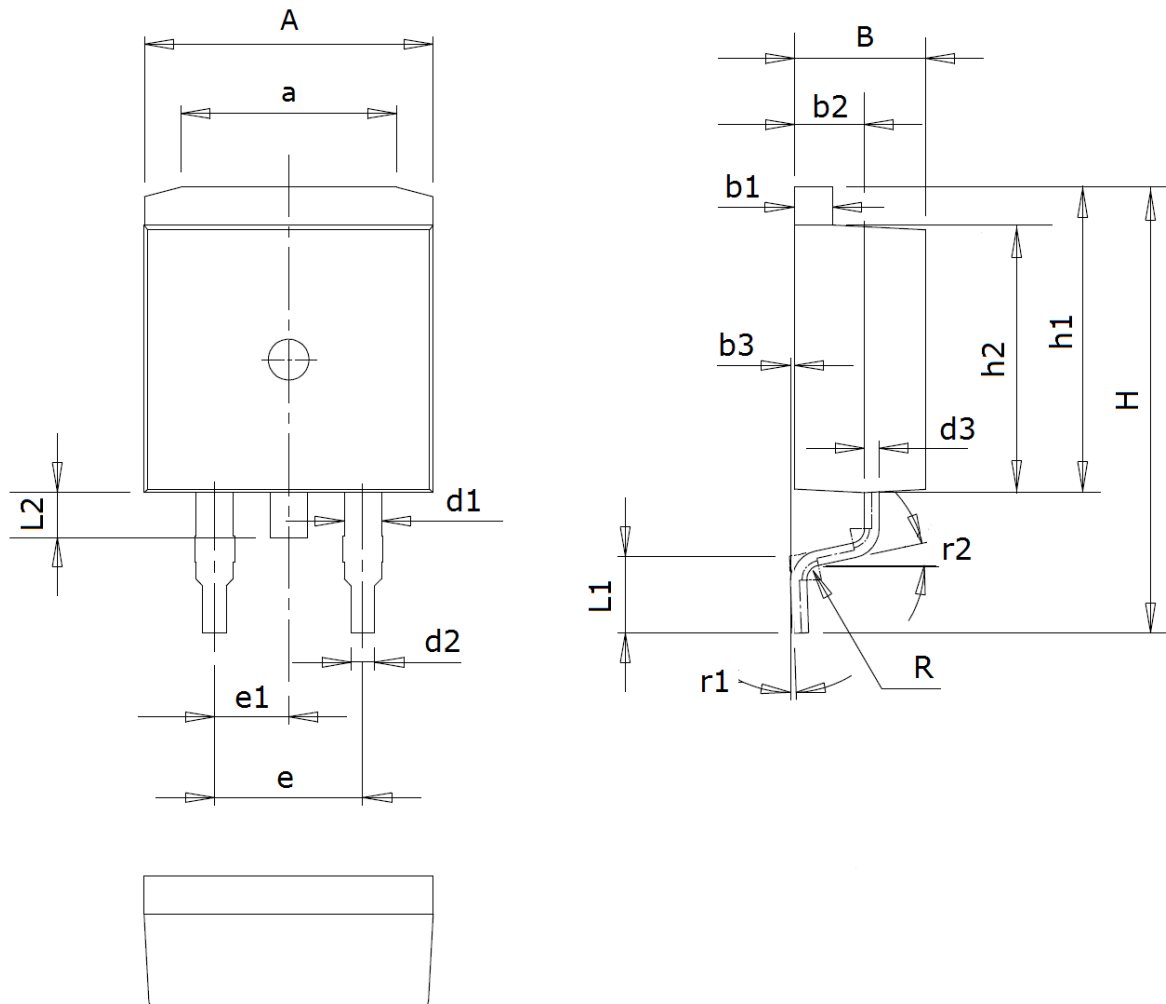


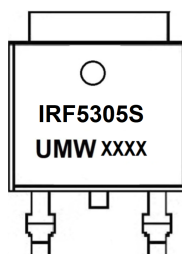
Fig 13b. Gate Charge Test Circuit

Package Mechanical Data TO-263



Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	9.7~10.3	d2	0.7~0.9	L1	2.4~2.9
a	7.0~7.8	d3	0.4~0.6	L2	1.3~1.8
B	4.3~4.7	e	5.08 (typ)	R	0.5(typ)
b1	1.25~1.35	e1	2.54 (typ)	r1	0~8°
b2	2.2~2.6	H	14.8~15.6	r2	12° (typ)
b3	0~0.2	h1	10.2~10.7		
d1	1.2~1.4	h2	8.9~9.4		

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRF5305STRL	TO-263	800	Tape and reel