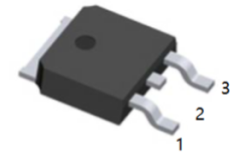


Features

- $V_{DS} (V) = 30V$
- $R_{DS(ON)} < 5.8m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 8 m\Omega$ ($V_{GS} = 4.5V$)

Applications

- High Frequency Synchronous Buck Converters for Computer Processor Power
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use



1.G 2.D 3.S
TO-252(DPAK) top view

Benefits

- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Ultra-Low Gate Impedance
- Fully Characterized Avalanche Voltage and Current

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	86 ^④	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	61 ^④	
I_{DM}	Pulsed Drain Current ^①	340	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation ^⑥	75	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation ^⑥	38	
	Linear Derating Factor	0.5	W/ $^\circ C$
T_J	Operating Junction and	-55 to + 175	$^\circ C$
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 ^⑥		2.0	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) ^⑤		50	
$R_{\theta JA}$	Junction-to-Ambient		110	

Notes

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ C$, $L = 0.605mH$, $R_G = 25\Omega$, $I_{AS} = 20A$.
- ③ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ④ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 50A.
- ⑤ When mounted on 1" square PCB (FR-4 or G-10 Material).For recommended footprint and soldering techniques refer to application note #AN-994.
- ⑥ R_θ is measured at T_J approximately at $90^\circ C$

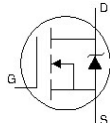
Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	30			V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient		20		mV/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance		4.0	5.8	mΩ	V _{GS} = 10V, I _D = 25A ③
			5.8	8.0		V _{GS} = 4.5V, I _D = 20A ③
V _{GS(th)}	Gate Threshold Voltage	1.35	1.80	2.35	V	V _{DS} = V _{GS} , I _D = 50μA
ΔV _{GS(th)} /ΔT _J	Gate Threshold Voltage Coefficient		-8.6		mV/°C	
I _{DSS}	Drain-to-Source Leakage Current			1.0	μA	V _{DS} = 24V, V _{GS} = 0V
				150		V _{DS} = 24V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Forward Leakage			100	nA	V _{GS} = 20V
	Gate-to-Source Reverse Leakage			-100		V _{GS} = -20V
g _{fs}	Forward Transconductance	73			S	V _{DS} = 15V, I _D = 20A
Q _g	Total Gate Charge		15	23		V _{DS} = 15V V _{GS} = 4.5V I _D = 20A See Fig. 15
Q _{gs1}	Pre-V _{th} Gate-to-Source Charge		3.7			
Q _{gs2}	Post-V _{th} Gate-to-Source Charge		1.9			
Q _{gd}	Gate-to-Drain Charge		5.7			
Q _{godr}	Gate Charge Overdrive		3.7			
Q _{sw}	Switch Charge (Q _{gs2} + Q _{gd})		7.6			
Q _{oss}	Output Charge		10		nC	V _{DS} = 15V, V _{GS} = 0V
R _G	Gate Resistance		2.0	3.5	Ω	
t _{d(on)}	Turn-On Delay Time		12			V _{DD} = 15V, V _{GS} = 4.5V ③ I _D = 20A R _G = 1.8Ω See Fig. 13
t _r	Rise Time		49			
t _{d(off)}	Turn-Off Delay Time		15		ns	
t _f	Fall Time		16			
C _{iss}	Input Capacitance		2150			V _{GS} = 0V V _{DS} = 15V f = 1.0MHz
C _{oss}	Output Capacitance		480		pF	
C _{rss}	Reverse Transfer Capacitance		205			

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy ②		120	mJ
I _{AR}	Avalanche Current ①		20	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)			86 ④	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①			340		
V _{SD}	Diode Forward Voltage			1.0	V	T _J = 25°C, I _S = 20A, V _{GS} = 0V ③
t _{rr}	Reverse Recovery Time		24	36	ns	T _J = 25°C, I _F = 20A, V _{DD} = 15V
Q _{rr}	Reverse Recovery Charge		52	78	nC	di/dt = 300A/μs ③

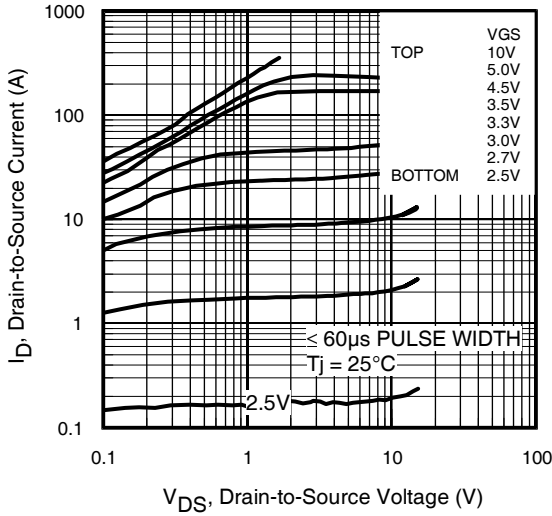


Fig 1. Typical Output Characteristics

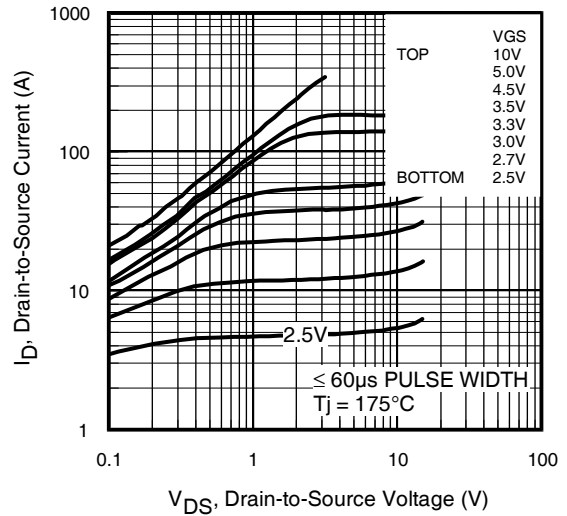


Fig 2. Typical Output Characteristics

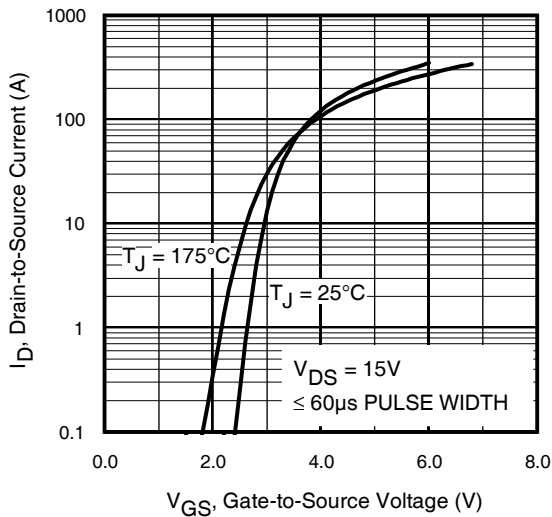


Fig 3. Typical Transfer Characteristics

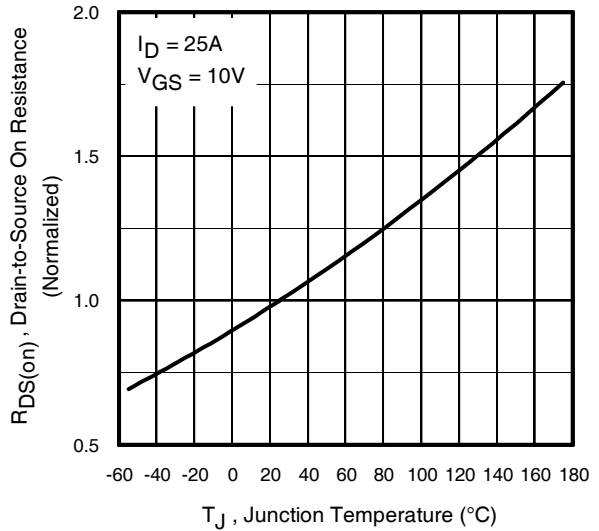


Fig 4. Normalized On-Resistance vs. Temperature

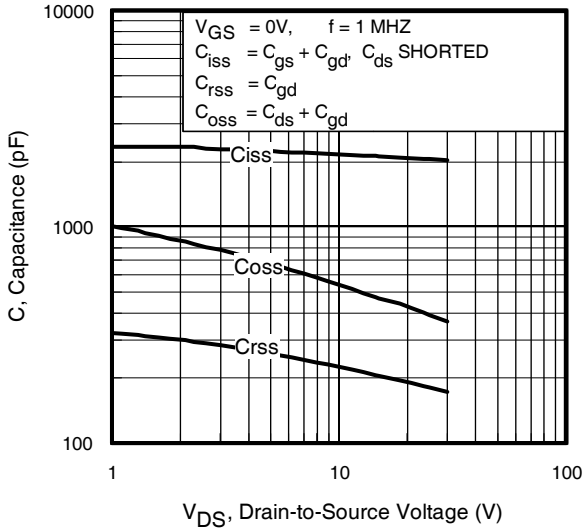


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

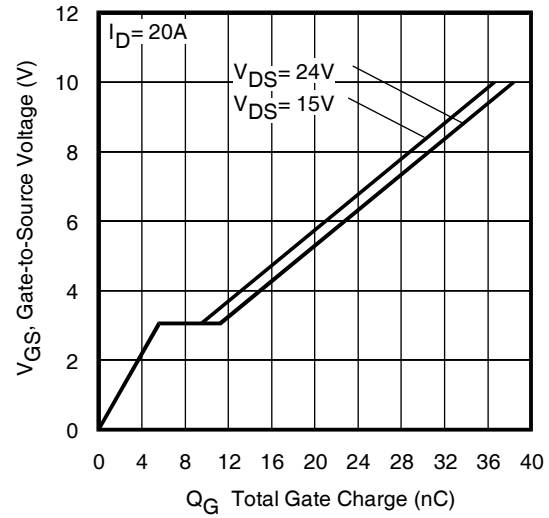


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

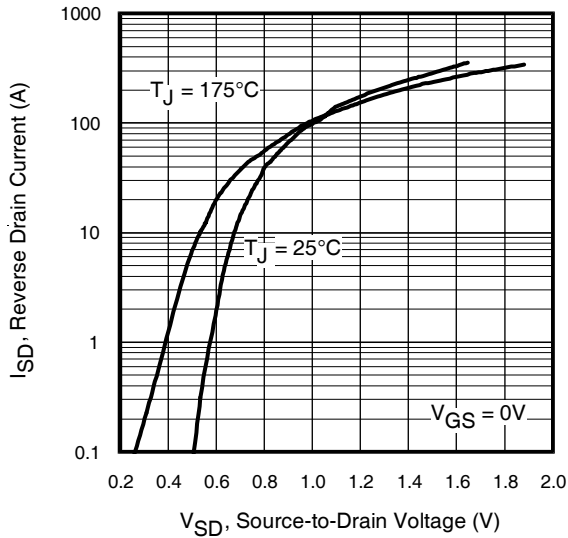


Fig 7. Typical Source-Drain Diode Forward Voltage

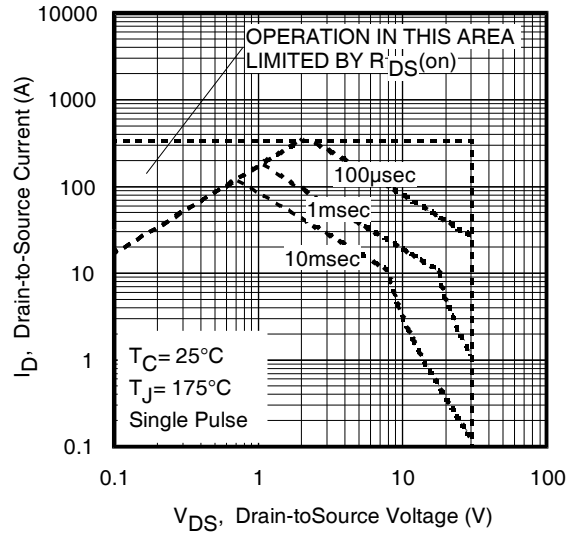


Fig 8. Maximum Safe Operating Area

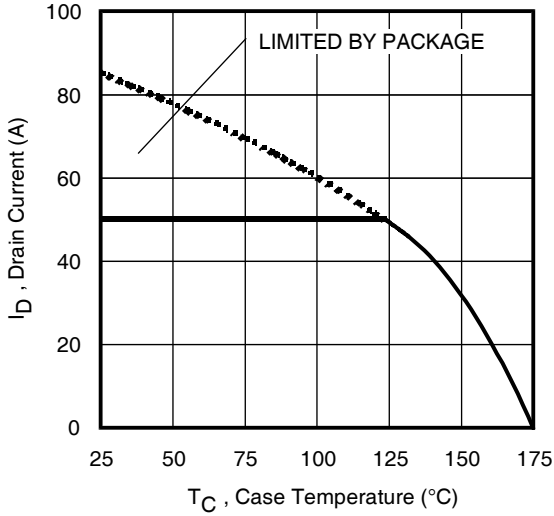


Fig 9. Maximum Drain Current vs. Case Temperature

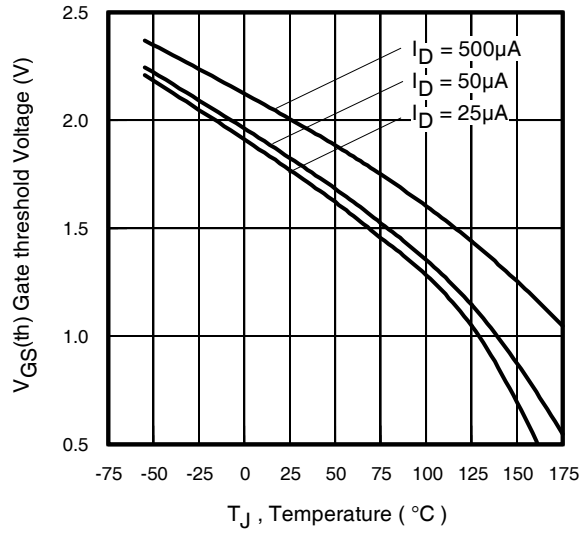


Fig 10. Threshold Voltage vs. Temperature

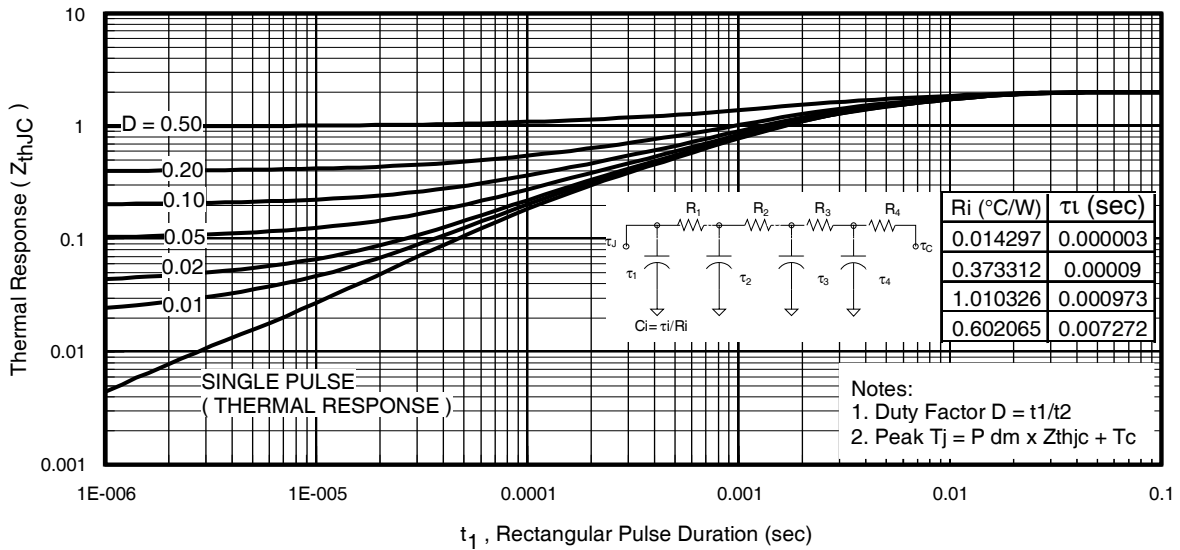


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

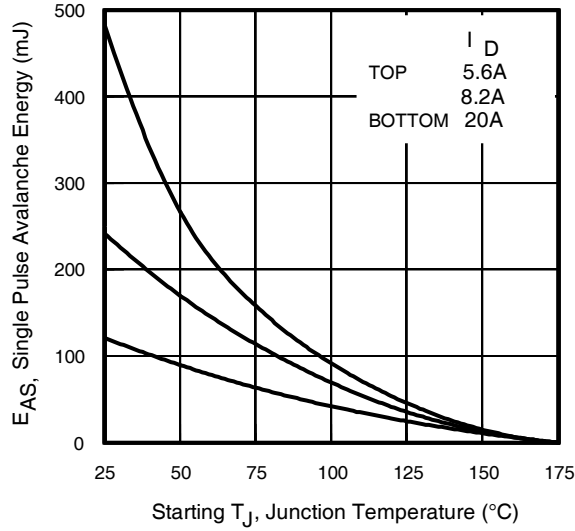


Fig 12a. Maximum Avalanche Energy Vs. Drain Current

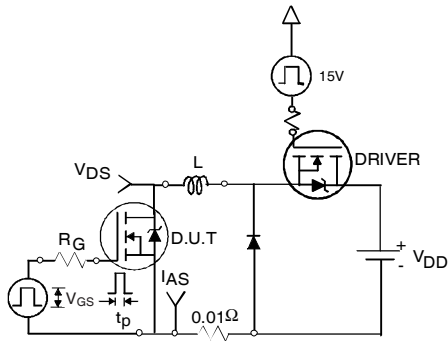


Fig 12b. Unclamped Inductive Test Circuit

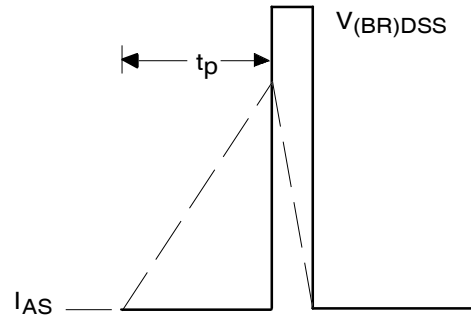


Fig 12c. Unclamped Inductive Waveforms

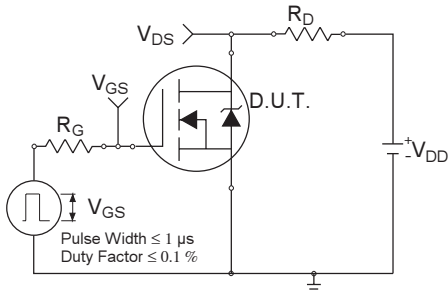


Fig 13a. Switching Time Test Circuit

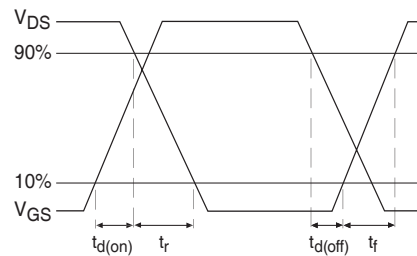
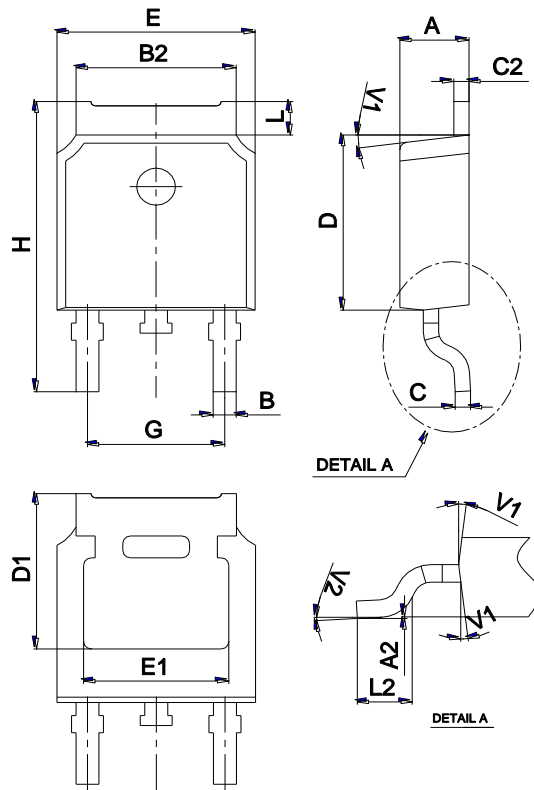


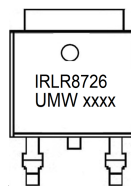
Fig 13b. Switching Time Waveforms

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRLR8726TR	TO-252	2500	Tape and reel