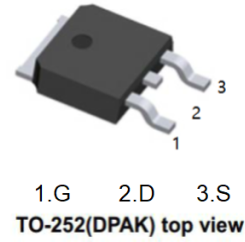


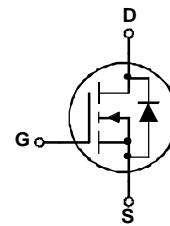
Applications

- High Frequency Synchronous Buck Converters for Computer Processor Power



Benefits

- Very Low RDS(on) at 4.5V V_{GS}
- Ultra-Low Gate Impedance
- Fully Characterized Avalanche Voltage and Current
- V_{DS}(V) = 30V
- R_{DS(ON)} < 3.3mΩ (V_{GS} = 10V)
- Q_g = 34nC



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°C	Continuous Drain Current, V _{GS} @ 10V	161 [Ⓓ]	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	113 [Ⓓ]	
I _{DM}	Pulsed Drain Current [Ⓢ]	620	
P _D @ T _C = 25°C	Maximum Power Dissipation [Ⓢ]	140	W
P _D @ T _C = 100°C	Maximum Power Dissipation [Ⓢ]	71	
	Linear Derating Factor	0.95	W/°C
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 _{θJC}	Junction-to-Case		1.05	°C/W
R _{θJA}	Junction-to-Ambient (PCB Mount) [Ⓢ]		50	
R _{θJA}	Junction-to-Ambient		110	

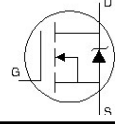
Static @ T_J = 25°C (unless otherwise specified)

	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		19		mV/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance		2.6	3.3	mΩ	V _{GS} = 10V, I _D = 15A ③
			3.2	4.0		V _{GS} = 4.5V, I _D = 12A ③
V _{GS(th)}	Gate Threshold Voltage	1.0		2.5	V	V _{DS} = V _{GS} , I _D = 250μA
ΔV _{GS(th)} /ΔT _J	Gate Threshold Voltage Coefficient		-5.4		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	37			S	V _{DS} = 15V, I _D = 12A
Q _g	Total Gate Charge		34	50	nC	V _{DS} = 15V V _{GS} = 4.5V I _D = 12A See Fig. 16
Q _{gs1}	Pre-V _{th} Gate-to-Source Charge		9.1			
Q _{gs2}	Post-V _{th} Gate-to-Source Charge		2.5			
Q _{gd}	Gate-to-Drain Charge		12			
Q _{godr}	Gate Charge Overdrive		10			
Q _{sw}	Switch Charge (Q _{gs2} + Q _{gd})		15			
Q _{oss}	Output Charge		21		nC	V _{DS} = 15V, V _{GS} = 0V
t _{d(on)}	Turn-On Delay Time		25		ns	V _{DD} = 15V, V _{GS} = 4.5V ③ I _D = 12A Clamped Inductive Load
t _r	Rise Time		42			
t _{d(off)}	Turn-Off Delay Time		34			
t _f	Fall Time		19			
C _{iss}	Input Capacitance		4380		pF	V _{GS} = 0V V _{DS} = 15V f = 1.0MHz
C _{oss}	Output Capacitance		940			
C _{rss}	Reverse Transfer Capacitance		430			

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy ②		1440	mJ
I _{AR}	Avalanche Current ①		12	A
E _{AR}	Repetitive Avalanche Energy ①		14	mJ

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)			161 ④	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①			620		
V _{SD}	Diode Forward Voltage			1.0	T _J = 25°C, I _S = 12A, V _{GS} = 0V ③	
t _{rr}	Reverse Recovery Time		39	59	ns	T _J = 25°C, I _F = 12A, V _{DD} = 15V
Q _{rr}	Reverse Recovery Charge		36	54	nC	di/dt = 100A/μs ③
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

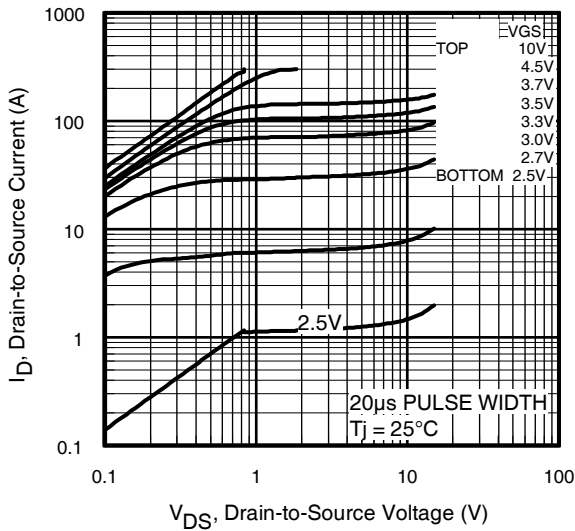


Fig 1. Typical Output Characteristics

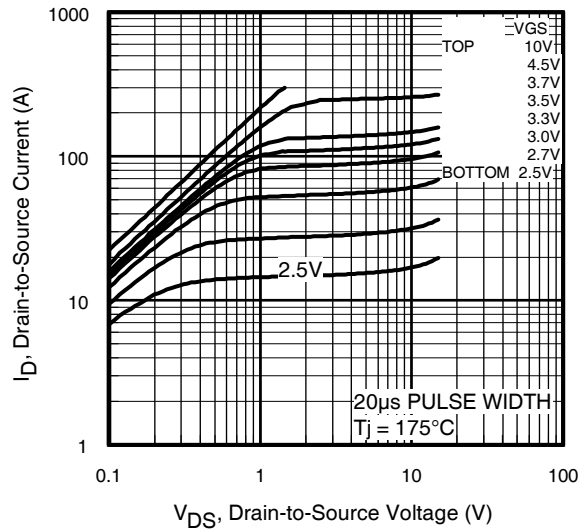


Fig 2. Typical Output Characteristics

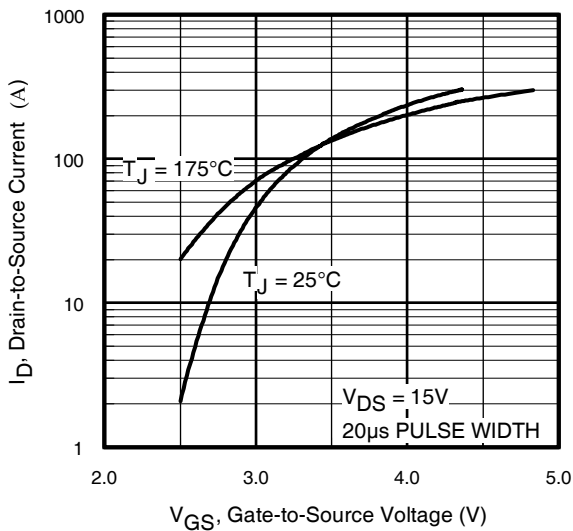


Fig 3. Typical Transfer Characteristics

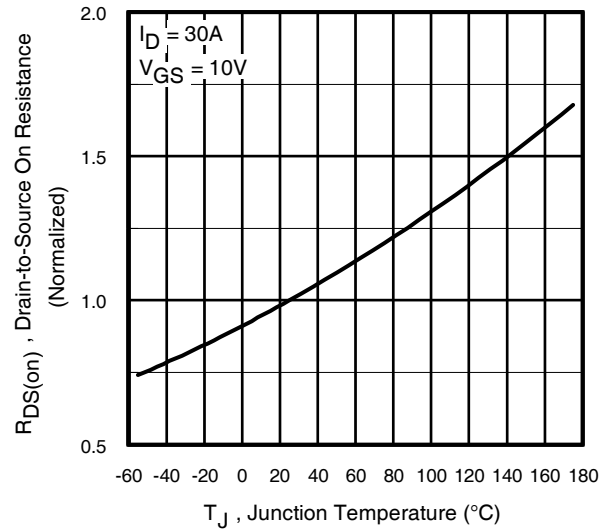


Fig 4. Normalized On-Resistance vs. Temperature

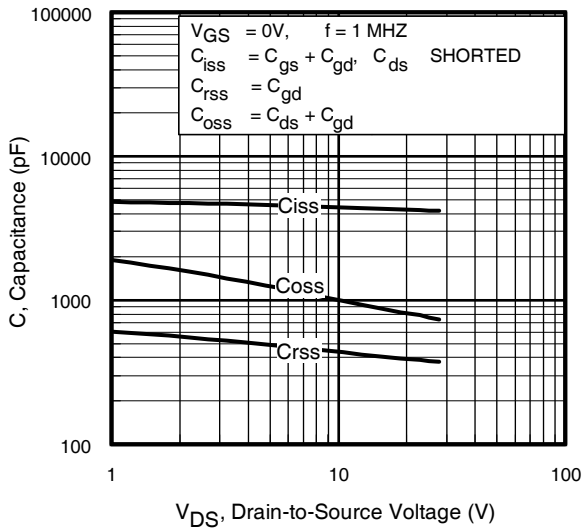


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

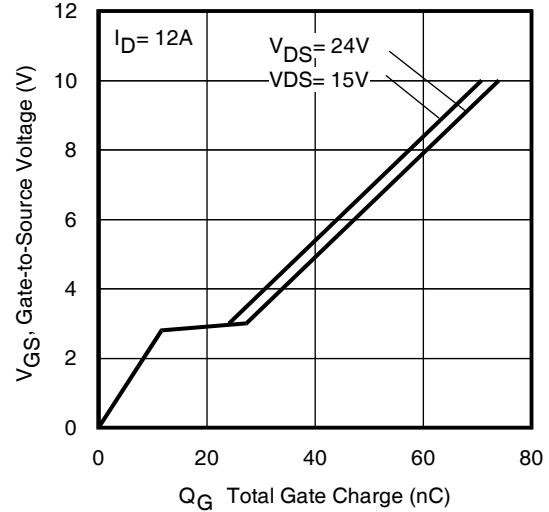


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

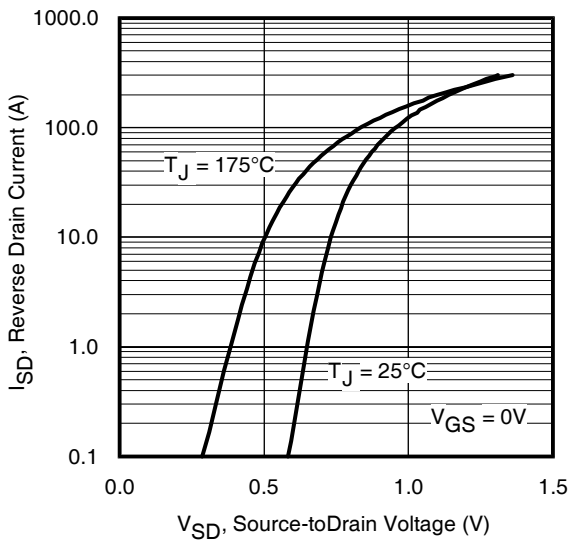


Fig 7. Typical Source-Drain Diode Forward Voltage

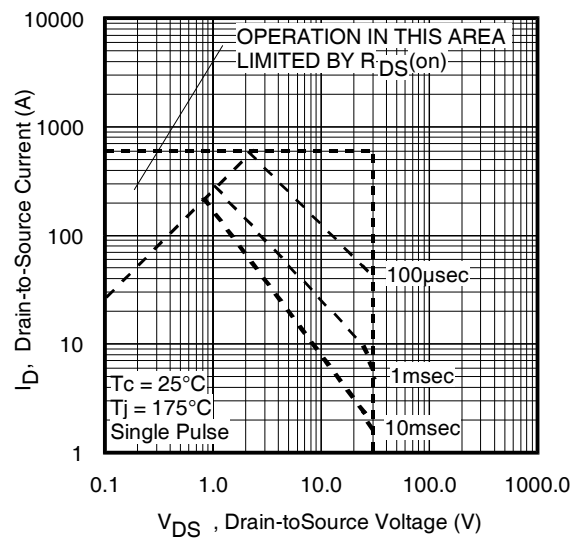


Fig 8. Maximum Safe Operating Area

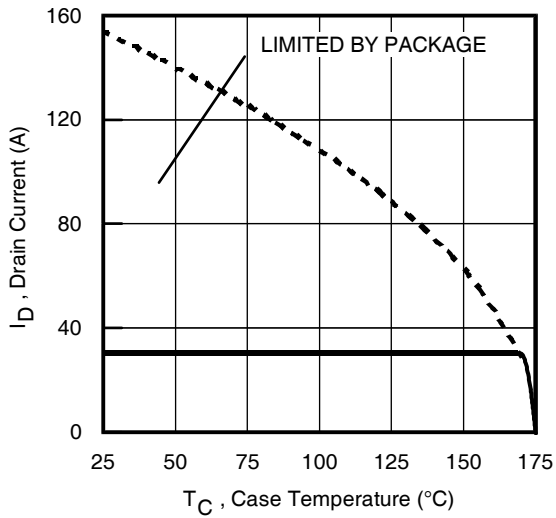


Fig 9. Maximum Drain Current vs. Case Temperature

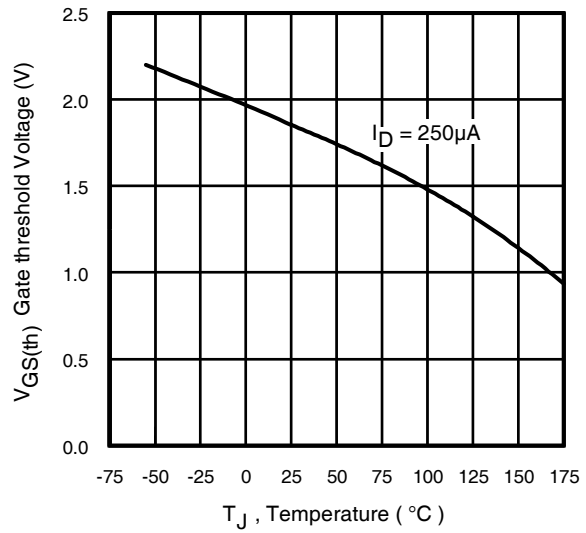


Fig 10. Threshold Voltage vs. Temperature

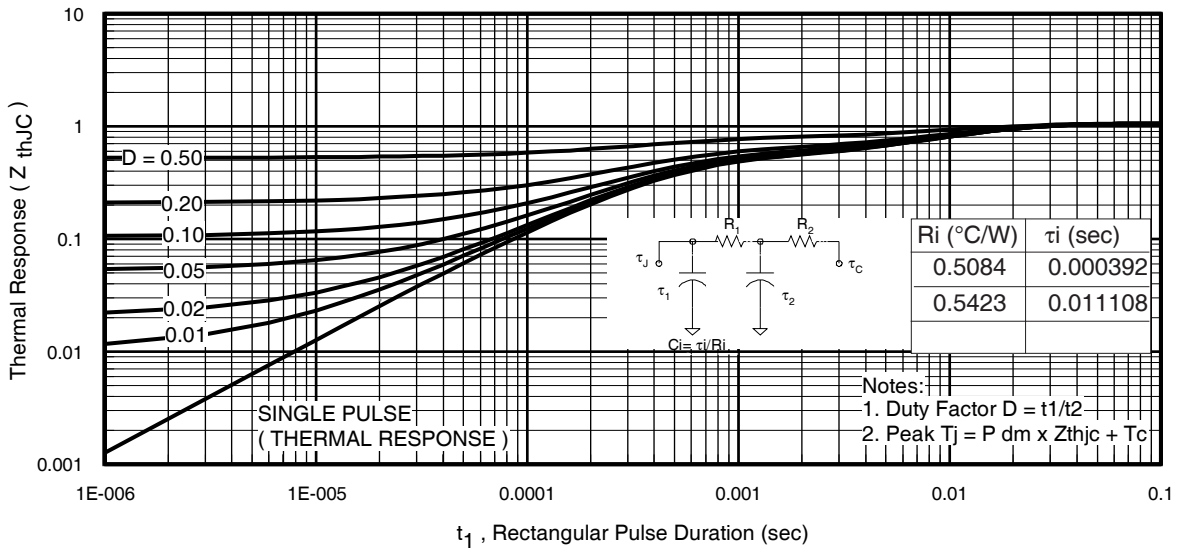


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

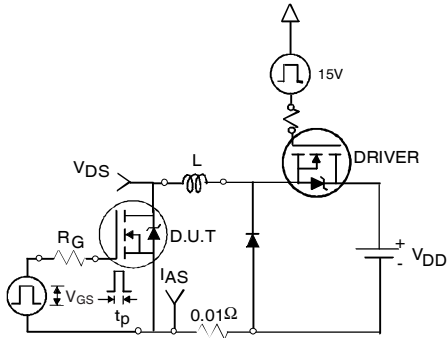


Fig 12a. Unclamped Inductive Test Circuit

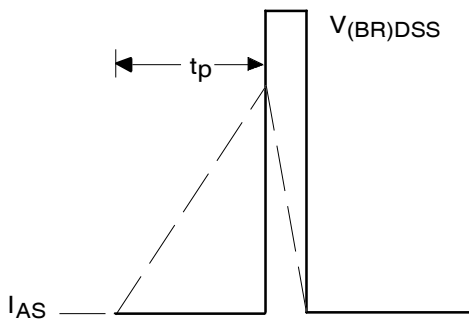


Fig 12b. Unclamped Inductive Waveforms

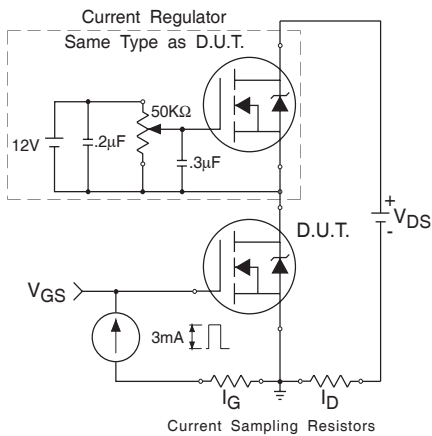


Fig 13. Gate Charge Test Circuit

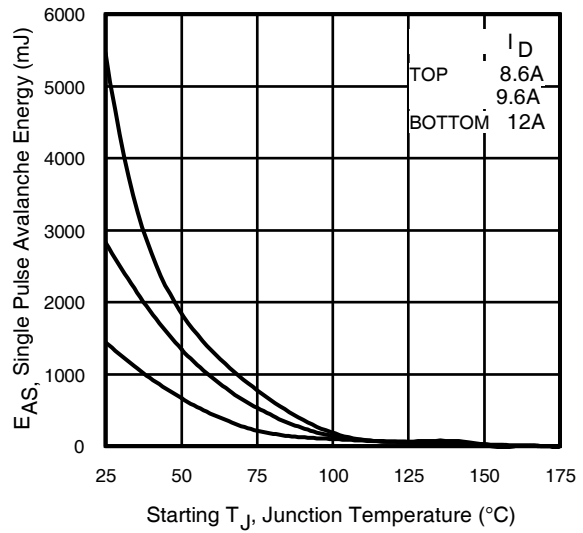


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

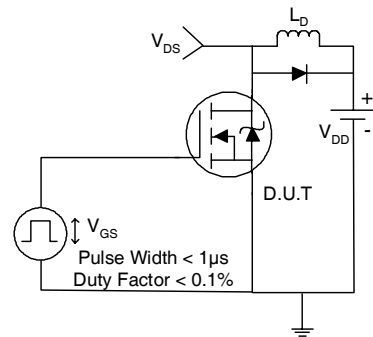


Fig 14a. Switching Time Test Circuit

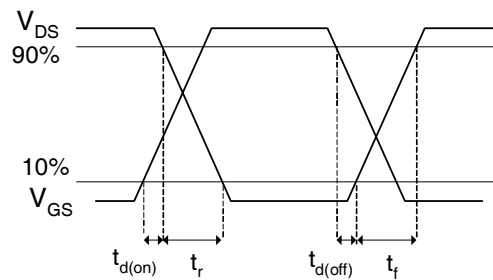
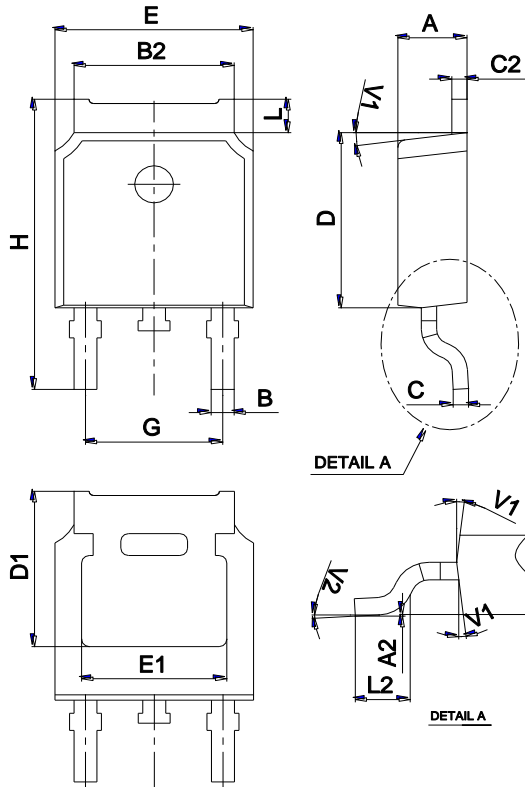


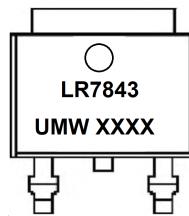
Fig 14b. Switching Time Waveforms

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 IRLR7843TR	TO-252	2500	Tape and reel