EVVOSEMI®

THINK CHANGE DO

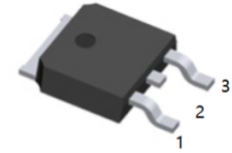IRLR8726

N-Channel MOSFET

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

Benefits

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

1.G   2.D   3.S

TO-252(DPAK) top view

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	86④	
I_D @ $T_C = 100°C$	Continuous Drain Current, V_{GS} @ 10V	61④	A
I_{DM}	Pulsed Drain Current ①	340	
P_D @$T_C = 25°C$	Maximum Power Dissipation ⑥	75	W
P_D @$T_C = 100°C$	Maximum Power Dissipation ⑥	38	
	Linear Derating Factor	0.5	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	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	
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) ⑤		50	°C/W
$R_{\theta JA}$	Junction-to-Ambient		110	

Notes

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

② Starting $T_J = 25°C$, L = 0.605mH, $R_G = 25\Omega$, $I_{AS} = 20A$.

③ Pulse width ≤ 400μs; duty cycle ≤ 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.
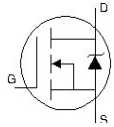
⑥ R_θ is measured at T_J approximately at 90°C

Rev:2023A2

1

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
$\Delta BV_{DSS}/\Delta T_J$	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
$\Delta V_{GS(th)}/\Delta T_J$	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
gfs	Forward Transconductance	73			S	V_{DS} = 15V, I_D = 20A
Q_g	Total Gate Charge		15	23		
Q_{gs1}	Pre-Vth Gate-to-Source Charge		3.7			V_{DS} = 15V
Q_{gs2}	Post-Vth Gate-to-Source Charge		1.9		nC	V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge		5.7			I_D = 20A
Q_{godr}	Gate Charge Overdrive		3.7			See Fig. 15
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} = 4.5V③
t_r	Rise Time		49			I_D = 20A
$t_{d(off)}$	Turn-Off Delay Time		15		ns	R_G = 1.8Ω
t_f	Fall Time		16			See Fig. 13
C_{iss}	Input Capacitance		2150			V_{GS} = 0V
C_{oss}	Output Capacitance		480		pF	V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance		205			f = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②		120	mJ
I_{AR}	Avalanche Current ①		20	A

Diode Characteristics

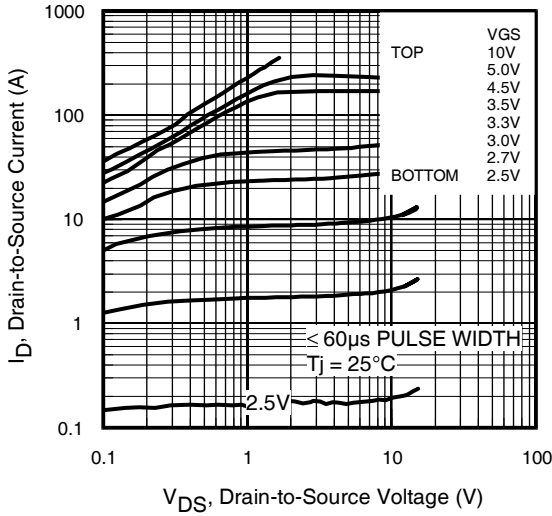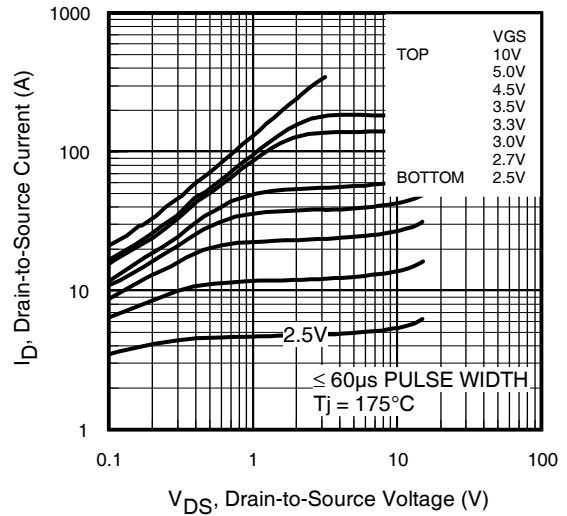|	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			86④	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①			340		
V_{SD}	Diode Forward Voltage			1.0	V	T_J = 25°C, I_S = 20A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery 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

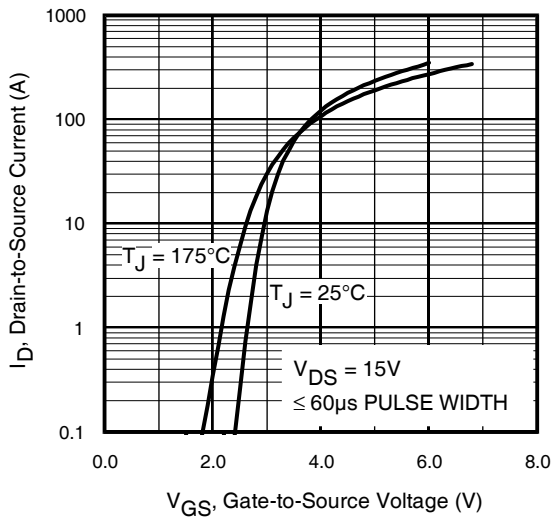**Fig 2.** Typical Output Characteristics

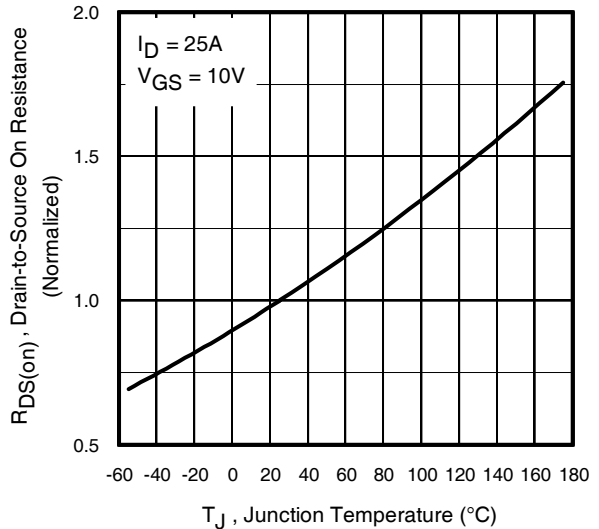**Fig 3.** Typical Transfer Characteristics

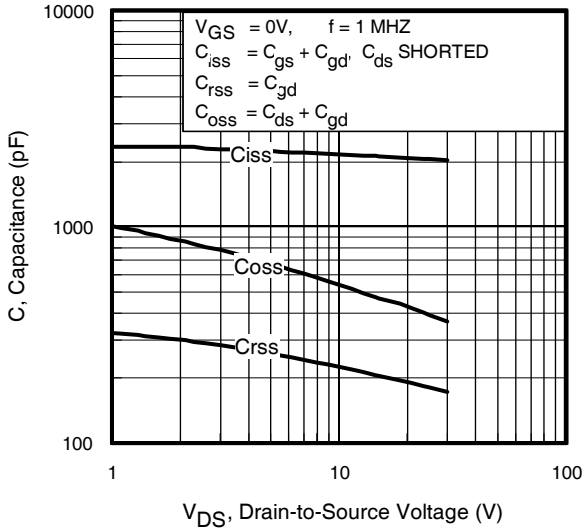**Fig 4.** Normalized On-Resistance
vs. Temperature

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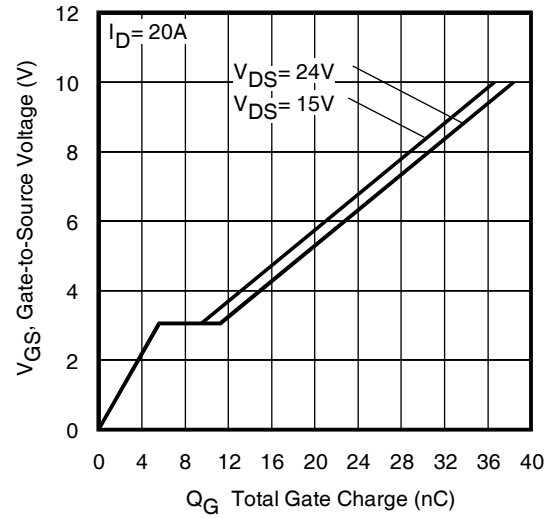Drain-to-Source Voltage
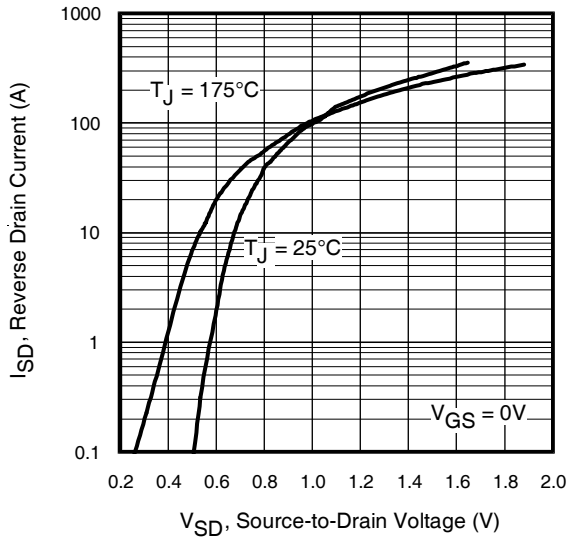

Fig 6. Typical Gate Charge vs.
Gate-to-Source Voltage
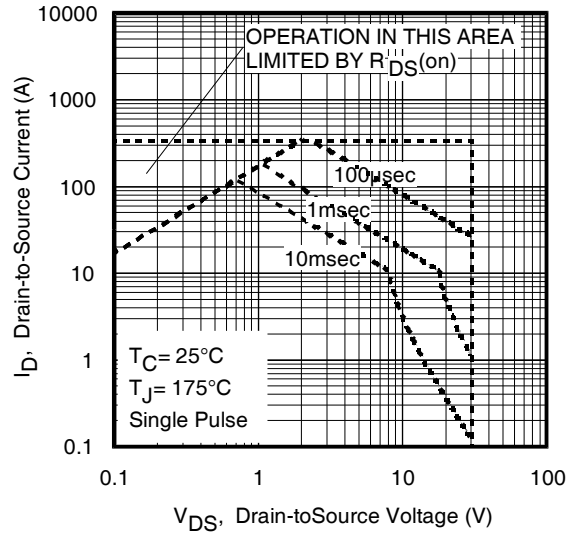

Fig 7. Typical Source-Drain Diode
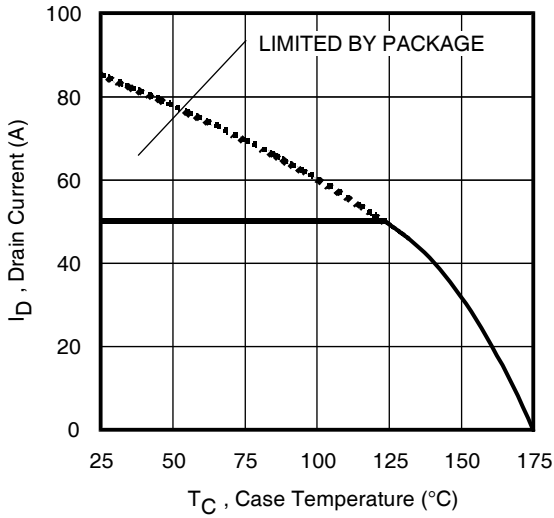Forward Voltage

Fig 8. Maximum Safe Operating Area

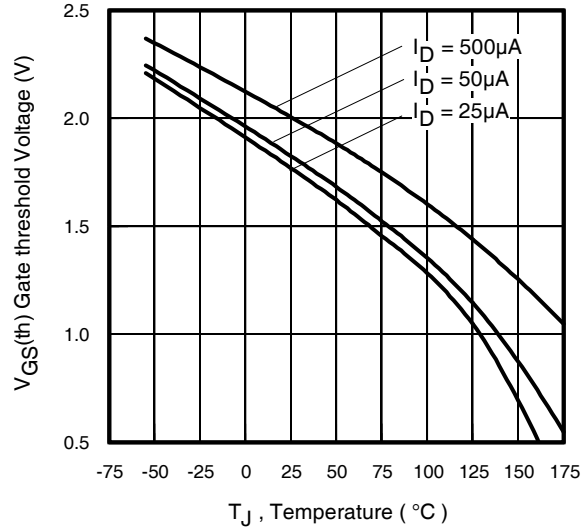**Fig 9.** Maximum Drain Current vs. Case Temperature

Fig 10. Threshold Voltage vs. Temperature

Ri (°C/W)	τι (sec)
0.014297	0.000003
0.373312	0.00009
1.010326	0.000973
0.602065	0.007272

Ci = τi/Ri

Notes:
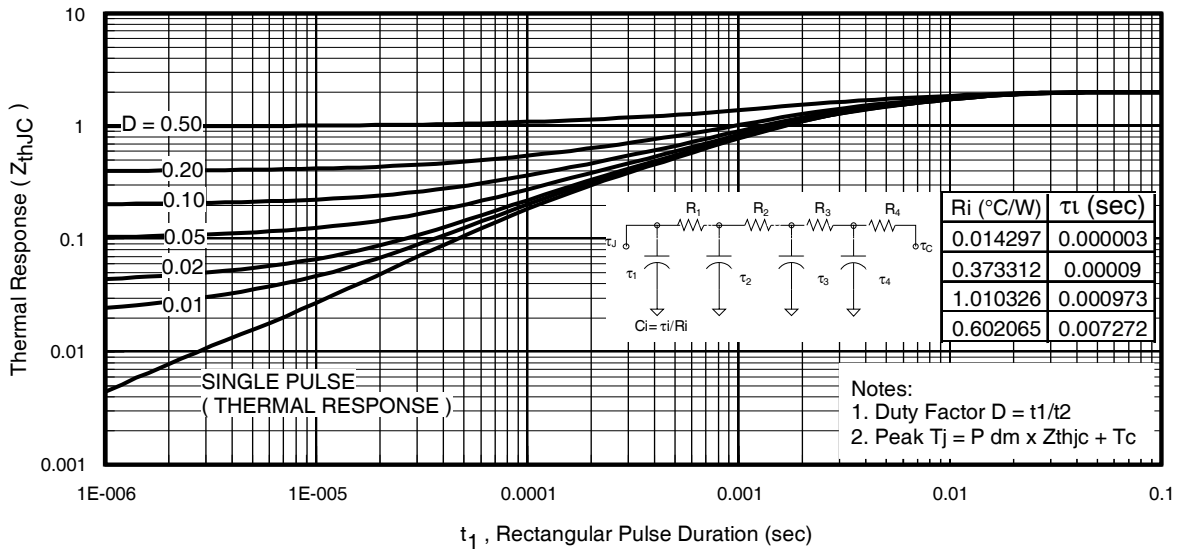1. Duty Factor D = t1/t2
2. Peak Tj = P dm x Zthjc + Tc

Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case
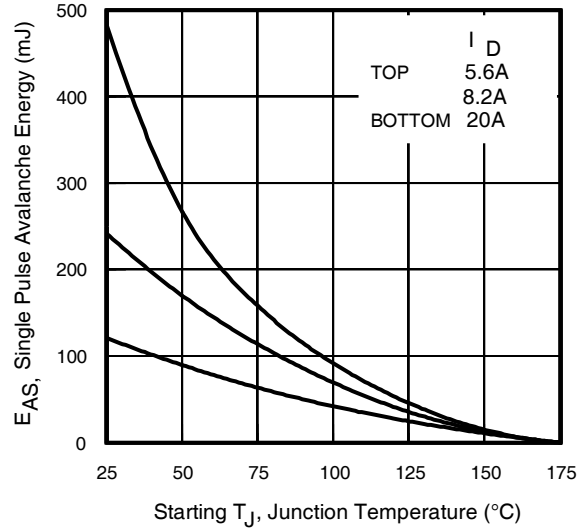
Fig 12a. Maximum Avalanche Energy
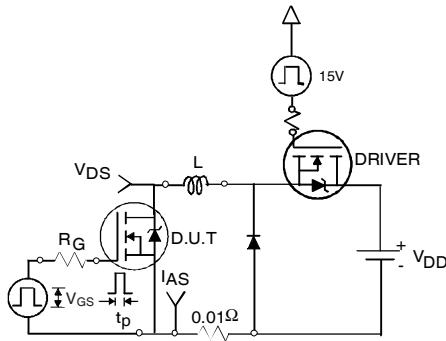Vs. Drain Current

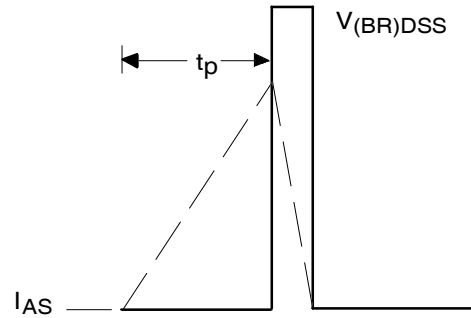**Fig 12b.** Unclamped Inductive Test Circuit

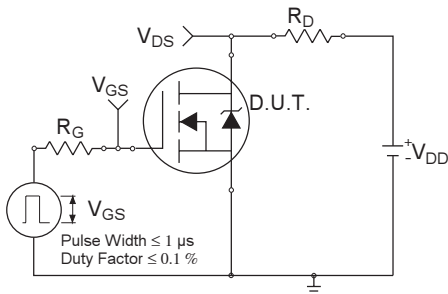**Fig 12c.** Unclamped Inductive Waveforms

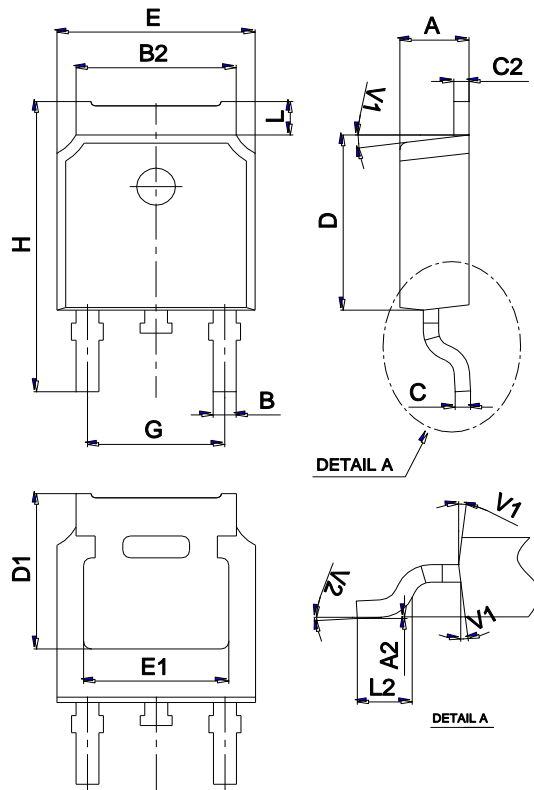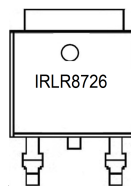**Fig 13a.** Switching Time Test Circuit

Fig 13b. Switching Time Waveforms

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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
IRLR8726TR	TO-252	2500	Tape and reel