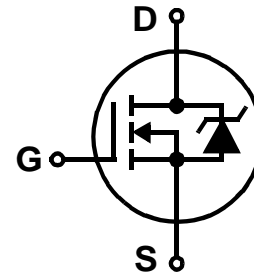


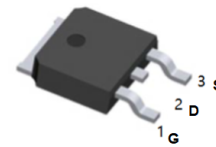
### Description

The D-PAK is designed for surface mounting using vapor phase, infrared, or wave soldering techniques. Power dissipation levels up to 1.5 watts are possible in typical surface mount applications.



### Features

- $V_{DS}$  (V) = 55V
- $I_D$  = 17A ( $V_{GS}$  = 10V)
- $R_{DS(ON)}$  = 75m $\Omega$  ( $V_{GS}$  = 10V)



TO-252(DPAK) top view

### Absolute Maximum Ratings

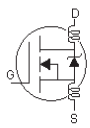
	Parameter	Max.	Units
$I_D$ @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	17	A
$I_D$ @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS}$ @ 10V	12	
$I_{DM}$	Pulsed Drain Current ①⑥	68	
$P_D$ @ $T_C = 25^\circ\text{C}$	Power Dissipation	45	W
	Linear Derating Factor	0.30	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy②⑥	71	mJ
$I_{AR}$	Avalanche Current①	10	A
$E_{AR}$	Repetitive Avalanche Energy①	4.5	mJ
$dv/dt$	Peak Diode Recovery $dv/dt$ ③⑥	5.0	V/ns
$T_J$	Operating Junction and	-55 to + 175	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds		

### Thermal Resistance

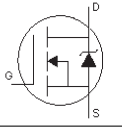
	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	---	3.3	°C/W
$R_{\theta JA}$	Case-to-Ambient (PCB mount)**	---	50	
$R_{\theta JA}$	Junction-to-Ambient	---	110	

\*\* When mounted on 1" square PCB (FR-4 or G-10 Material ).  
For recommended footprint and soldering techniques refer to application note #AN-994

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	55	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS/ΔT<sub>J</sub></sub>	Breakdown Voltage Temp. Coefficient	—	0.052	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	0.075	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A ④
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	—	4.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
g <sub>fs</sub>	Forward Transconductance	4.5	—	—	S	V <sub>DS</sub> = 25V, I <sub>D</sub> = 10A⑥
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	25	μA	V <sub>DS</sub> = 55V, V <sub>GS</sub> = 0V
		—	—	250		V <sub>DS</sub> = 44V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 150°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -20V
Q <sub>g</sub>	Total Gate Charge	—	—	20	nC	I <sub>D</sub> = 10A
Q <sub>gs</sub>	Gate-to-Source Charge	—	—	5.3		V <sub>DS</sub> = 44V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	—	7.6		V <sub>GS</sub> = 10V, See Fig. 6 and 13 ④⑥
t <sub>d(on)</sub>	Turn-On Delay Time	—	4.9	—	ns	V <sub>DD</sub> = 28V
t <sub>r</sub>	Rise Time	—	34	—		I <sub>D</sub> = 10A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	19	—		R <sub>G</sub> = 24Ω
t <sub>f</sub>	Fall Time	—	27	—		R <sub>D</sub> = 2.6Ω, See Fig. 10 ④
L <sub>D</sub>	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact⑤
L <sub>S</sub>	Internal Source Inductance	—	7.5	—		
C <sub>iss</sub>	Input Capacitance	—	370	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	140	—		V <sub>DS</sub> = 25V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	65	—		f = 1.0MHz, See Fig. 5

**Source-Drain Ratings and Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	17 ⑤	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	68		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 10A, V <sub>GS</sub> = 0V ④
t <sub>rr</sub>	Reverse Recovery Time	—	56	83	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 10A
Q <sub>rr</sub>	Reverse Recovery Charge	—	120	180	nC	di/dt = 100A/μs ④⑥
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- ② V<sub>DD</sub> = 25V, starting T<sub>J</sub> = 25°C, L = 1.0mH  
R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 10A. (See Figure 12)
- ③ I<sub>SD</sub> ≤ 10A, di/dt ≤ 280A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>,  
T<sub>J</sub> ≤ 175°C
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ This is applied for I-PAK, L<sub>S</sub> of D-PAK is measured between lead and center of die contact.
- ⑥ Uses IRFZ24N data and test conditions.

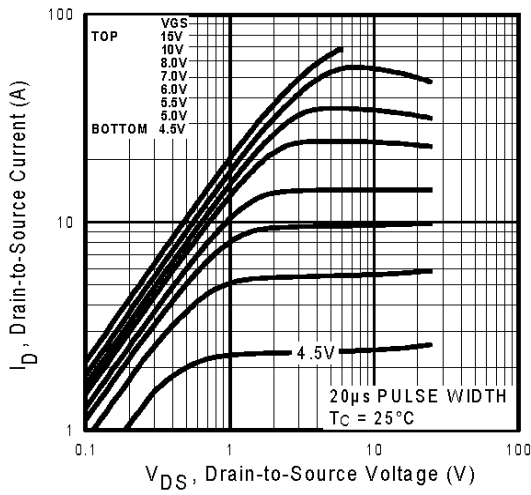


Fig 1. Typical Output Characteristics

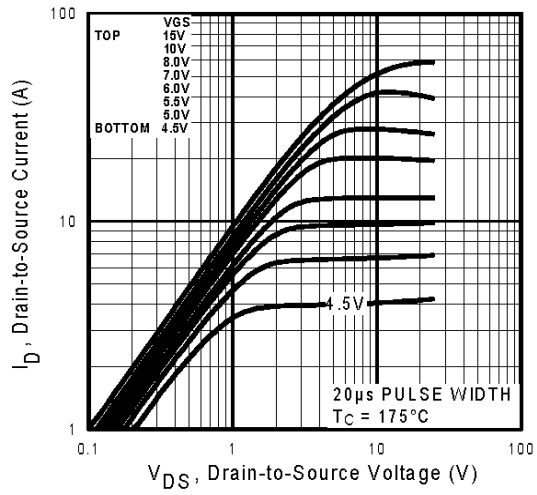


Fig 2. Typical Output Characteristics

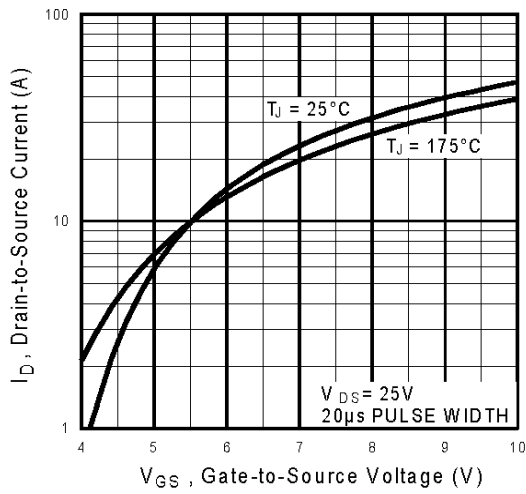


Fig 3. Typical Transfer Characteristics

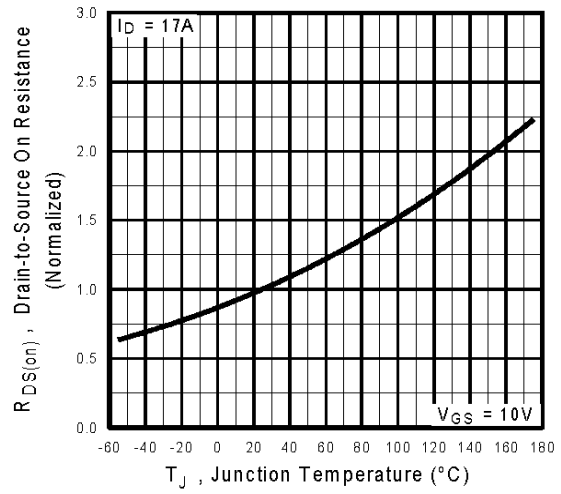


Fig 4. Normalized On-Resistance Vs. Temperature

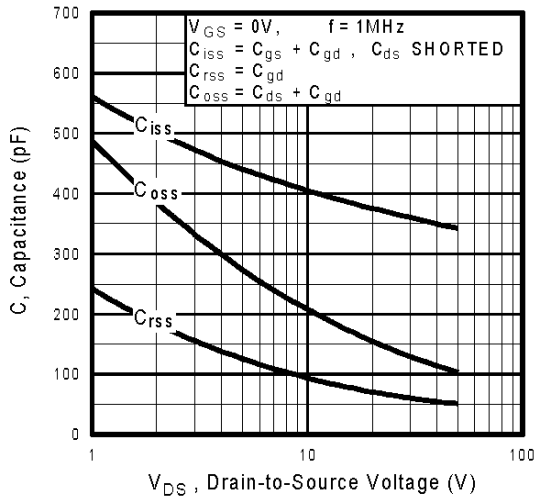


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

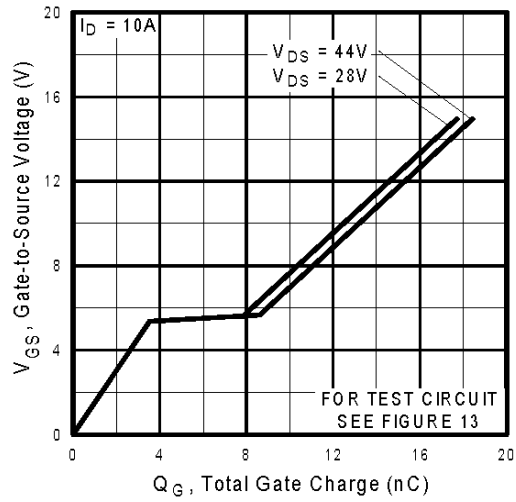


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

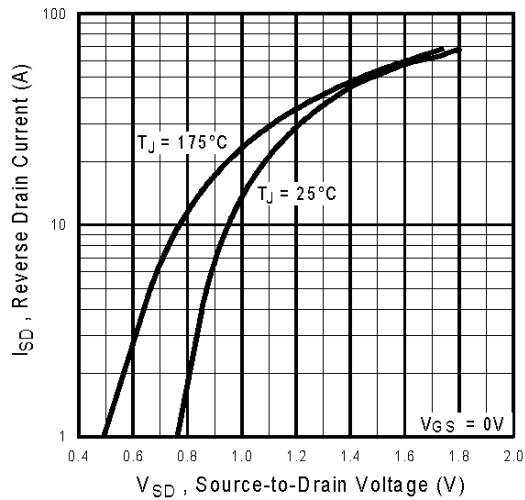


Fig 7. Typical Source-Drain Diode Forward Voltage

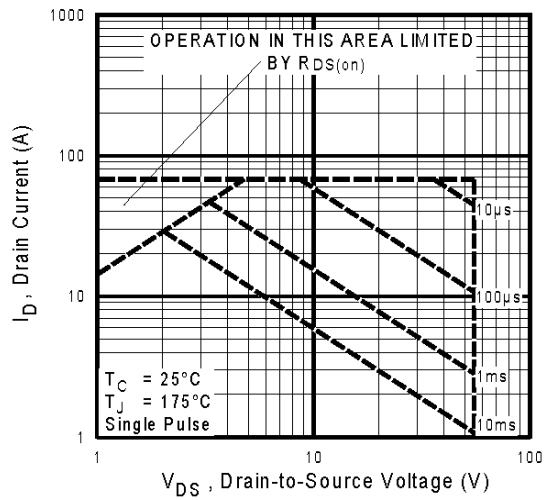
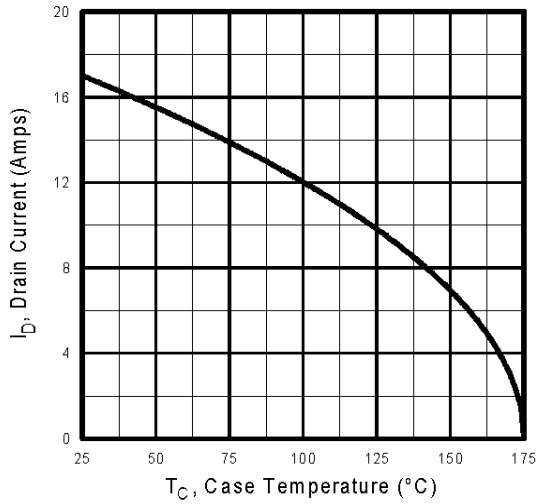
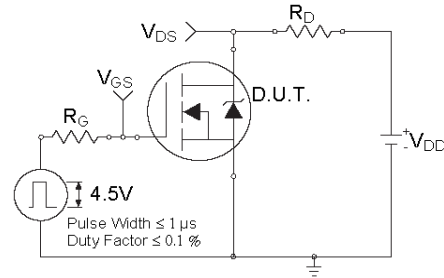


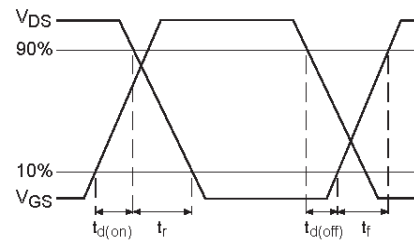
Fig 8. Maximum Safe Operating Area



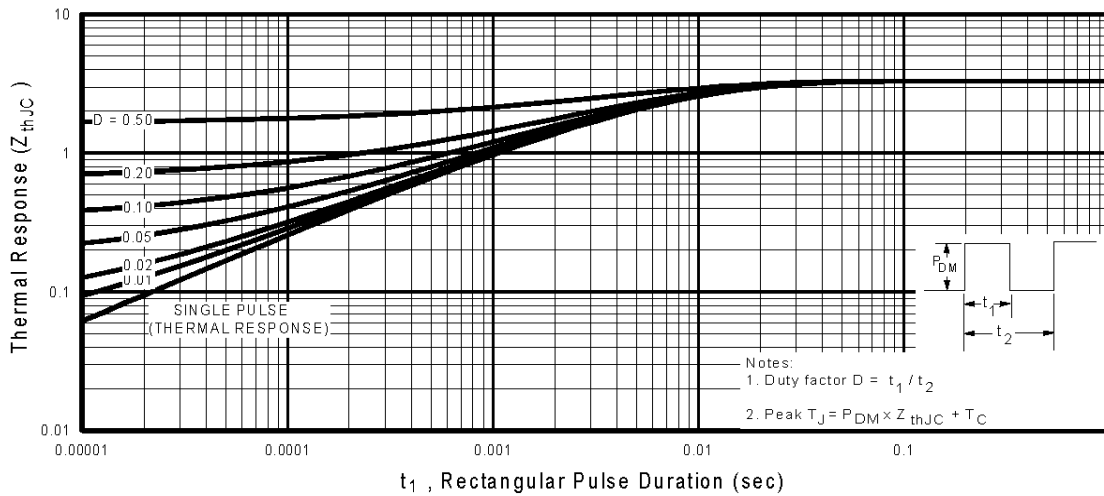
**Fig 9.** Maximum Drain Current Vs. Case Temperature



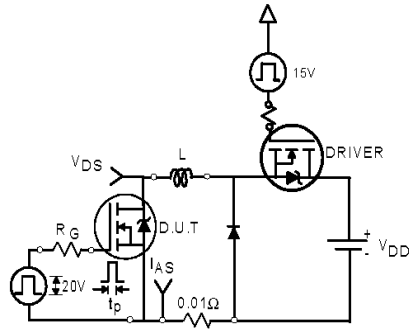
**Fig 10a.** Switching Time Test Circuit



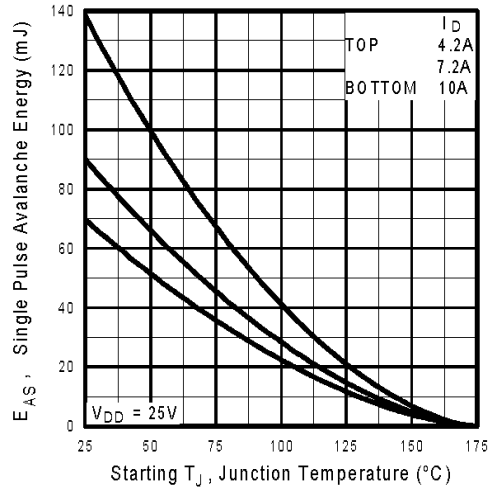
**Fig 10b.** Switching Time Waveforms



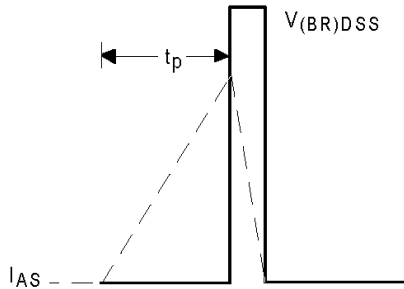
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case



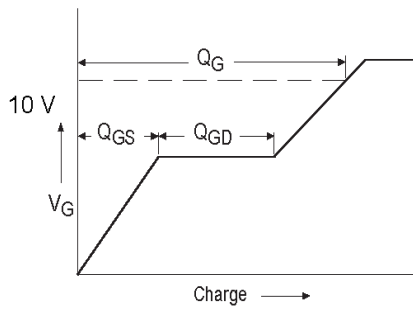
**Fig 12a.** Unclamped Inductive Test Circuit



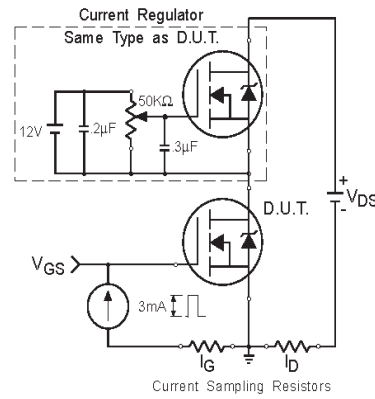
**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current



**Fig 12b.** Unclamped Inductive Waveforms

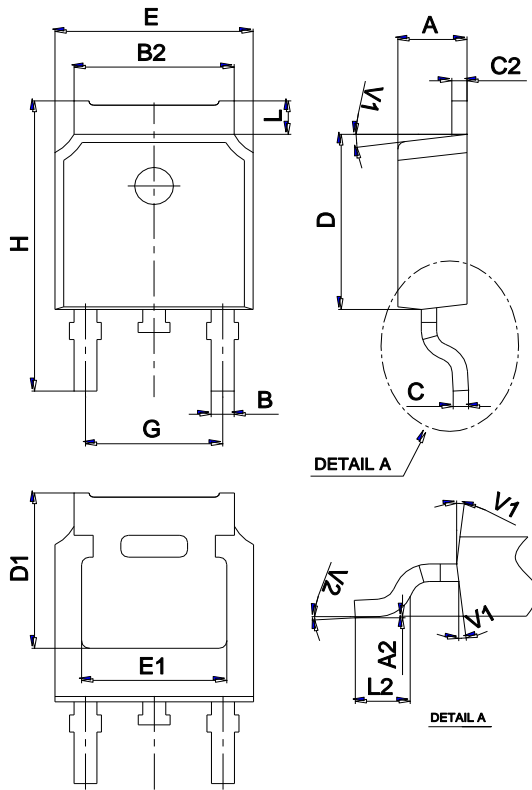


**Fig 13a.** Basic Gate Charge Waveform



**Fig 13b.** Gate Charge Test Circuit

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°

Ordering information

Order code	Package	Baseqty	Delivery mode
UMW IRFR024NTR	TO-252	2500	Tape and reel

单击下面可查看定价，库存，交付和生命周期等信息

[>>UMW\(友台半导体\)](#)