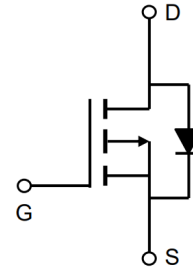


Description

The IRFR5505TR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = -60V$ $I_D = -10 A$

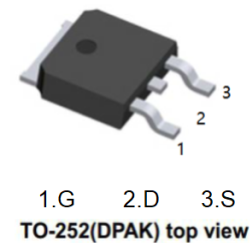
$R_{DS(ON)} < 110 m\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-10	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-8	A
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-9	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-6.5	A
I_{DM}	Pulsed Drain Current ²	-36	A
EAS	Single Pulse Avalanche Energy ³	25	mJ
I_{AS}	Avalanche Current	-26.6	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	3.0	W
$P_D@T_A=25^\circ C$	Total Power Dissipation ⁴	2	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	42	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	3.6	$^\circ C/W$

Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-60			V
ΔBV _{DSS} / ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA		-0.03		V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-8A		80	110	mΩ
		V _{GS} =-4.5V, I _D =-5A		95	157	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	1.5	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		4.56			mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-48V, V _{GS} =0V, T _J =25°C			1	uA
		V _{DS} =-48V, V _{GS} =0V, T _J =55°C			5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-12A		15.4		S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		13.5		Ω
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-48V, V _{GS} =-4.5V, I _D =-10A		9.86		nC
Q _{gs}	Gate-Source Charge		3.08			
Q _{gd}	Gate-Drain Charge		2.95			
T _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-1A		28.8		ns
T _r	Rise Time		19.8			
T _{d(off)}	Turn-Off Delay Time		60.8			
T _f	Fall Time		7.2			
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz		800		pF
C _{oss}	Output Capacitance		97.3			
C _{riss}	Reverse Transfer Capacitance		70			
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current			-18	A
I _{SM}	Pulsed Source Current ^{2,5}				-36	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C			-1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-26.6A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

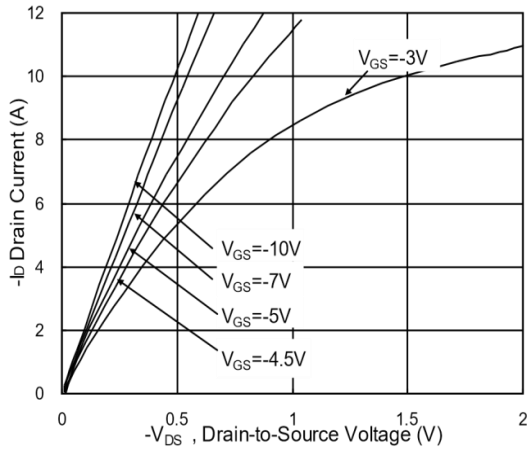


Fig.1 Typical Output Characteristics

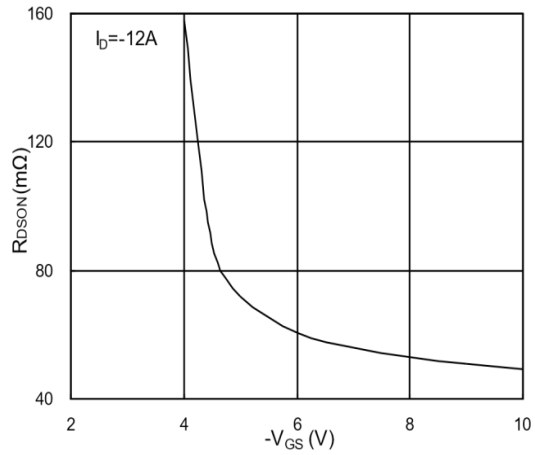


Fig.2 On-Resistance v.s Gate-Source

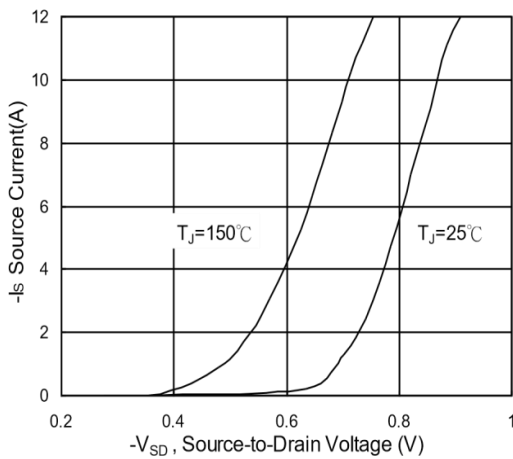


Fig.3 Forward Characteristics of Reverse

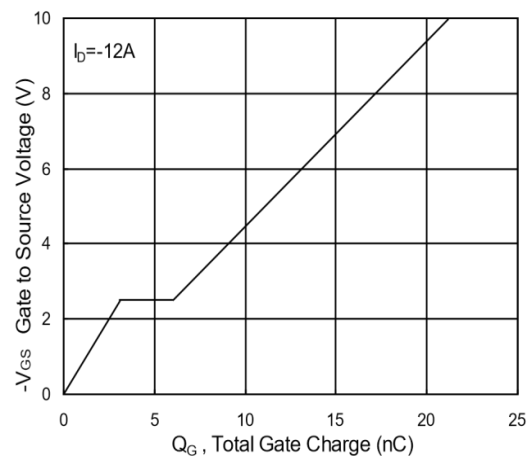


Fig.4 Gate-Charge Characteristics

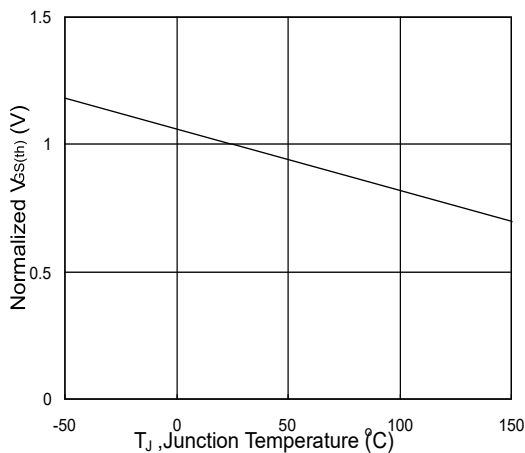


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

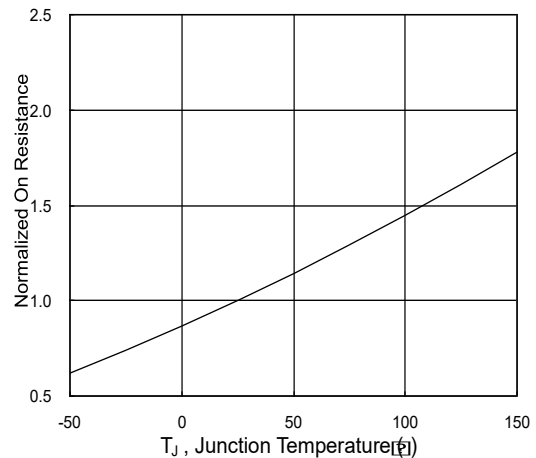


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

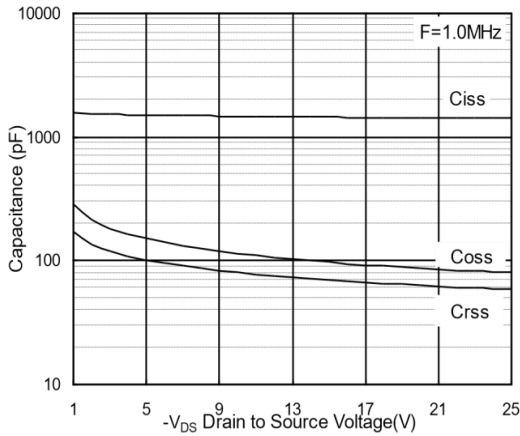


Fig.7 Capacitance

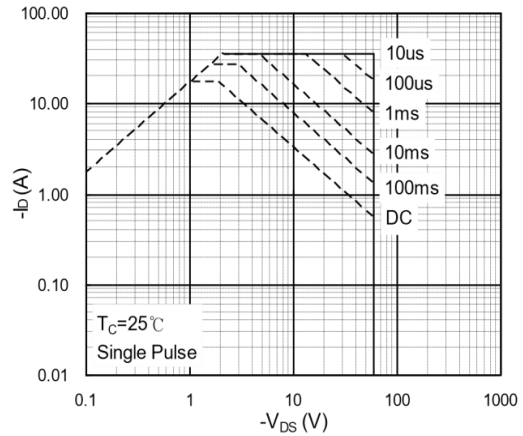


Fig.8 Safe Operating Area

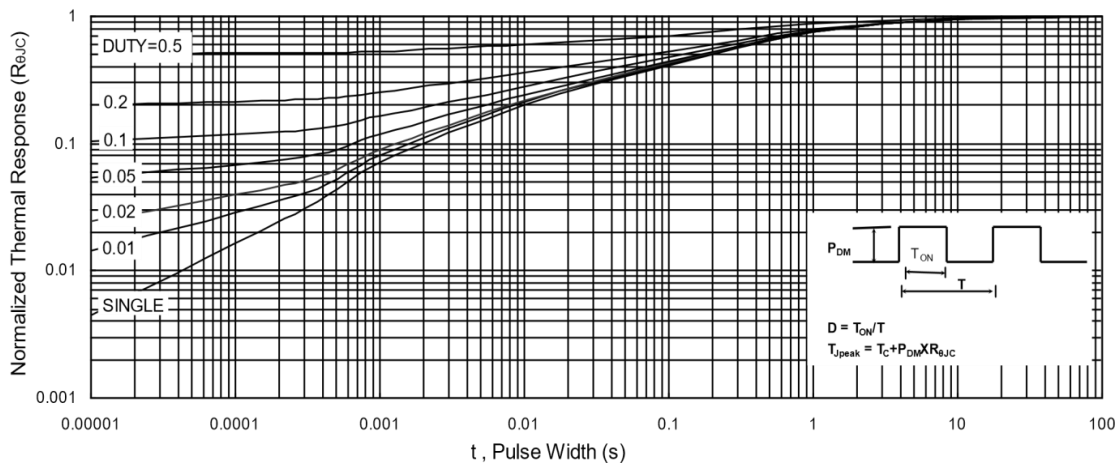


Fig.9 Normalized Maximum Transient Thermal Impedance

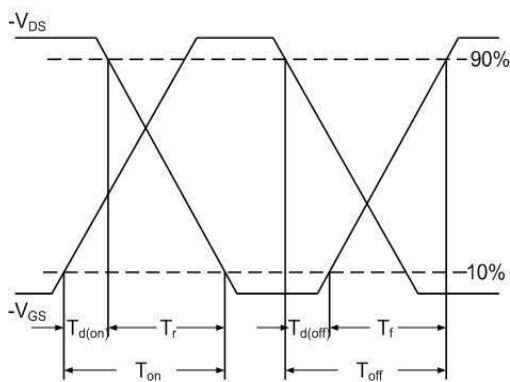


Fig.10 Switching Time Waveform

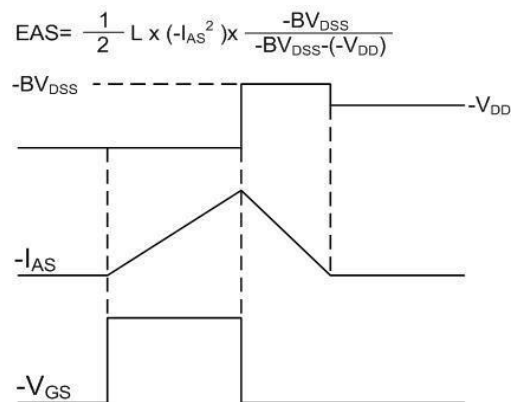
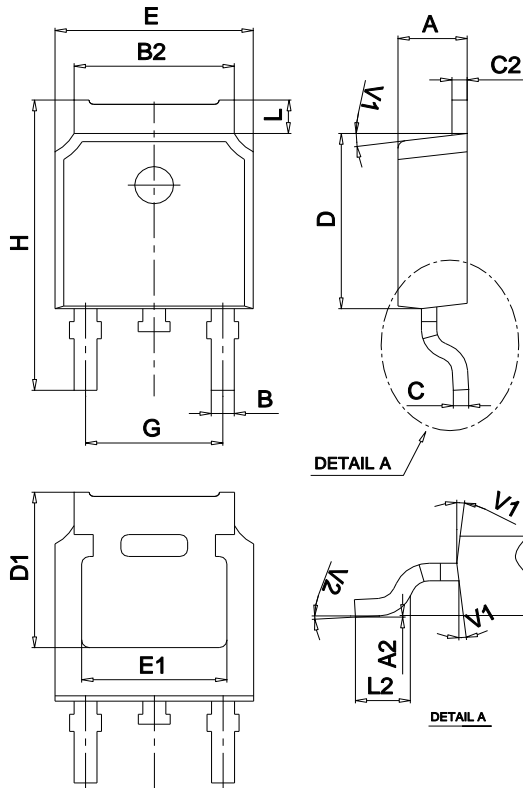


Fig.11 Unclamped Inductive Waveform

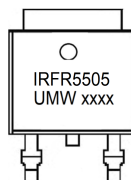
$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$

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 IRFR5505TR	TO-252	2500	Tape and reel

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[DMN2990UFB-7B](#) [SSM3K35CT,L3F](#) [IPLK60R1K0PFD7ATMA1](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPWS65R035CFD7AXKSA1](#)
[MCQ7328-TP](#) [SSM3J143TU,LXHF](#) [DMN12M3UCA6-7](#) [PJMF280N65E1_T0_00201](#) [PJMF380N65E1_T0_00201](#)
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