

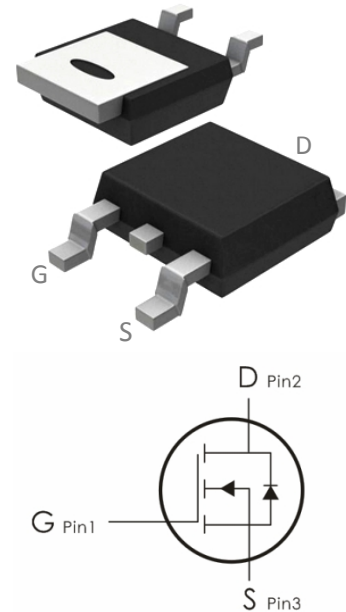
Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=60V, I_D=55A, R_{DS(on)} < 12m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



Absolute Maximum Ratings: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 25	V
I_D	Continuous Drain Current $T_C=25^\circ\text{C}$	55	A
	Continuous Drain Current $T_C=100^\circ\text{C}$	36	
E_{AS}	Single Pulse Avalanche Energy ^{note2}	59	mJ
I_{DM}	Pulsed Drain Current ^{note1}	220	A
P_D	Power Dissipation $T_C=25^\circ\text{C}$	63	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.4	$^\circ\text{C}/\text{W}$

Package Marking and Ordering Information:

Part NO.	Marking	Package
IRFR3505-DO	FR3505	TO-252

Electrical Characteristics: ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =60V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 25V, V _{DS} =0V	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	2	3	4	V
R _{DS(ON)}	Drain-Source On Resistance ^{note3}	V _{GS} =10V, I _D =30A	---	8	12	m Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	2045	---	pF
C _{Oss}	Output Capacitance		---	170	---	
C _{rss}	Reverse Transfer Capacitance		---	151	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{GS} =10V ,V _{DS} =30V, R _L =1.5Ω, R _{GEN} =3Ω	---	10	---	ns
t _r	Rise Time		---	8	---	ns
t _{d(off)}	Turn-Off Delay Time		---	18	---	ns
t _f	Fall Time		---	5	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =20A	---	16	---	nC
Q _{gs}	Gate-Source Charge		---	5.6	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	3.6	---	nC
Drain-Source Diode Characteristics						
I _S	Maximum Continuous Drain to Source Diode Forward Current		---	---	55	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		---	---	220	A
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =30A	---	---	1.2	V
t _{rr}	Body Diode Revrse Recovery Time	I _F =20A, dI/t=50A/ μ s	---	18	---	ns

Qrr	Body Diode Revrse Recovery Charge	$I_F=20A, dI/t=50A/\mu s$	---	58	---	nc
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Notes:

1. Reptive Rating: Pulse Width Limited by Maximu Junction Temperature
2. EAS conditon : $T_J=25^\circ C, V_D=30V, G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=15.3A$
3. Pulse Tst: Pulse Width $\leq 30\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics: ($T_A=25^\circ C$ unless otherwise noted)

Figure1: Output Characteristics

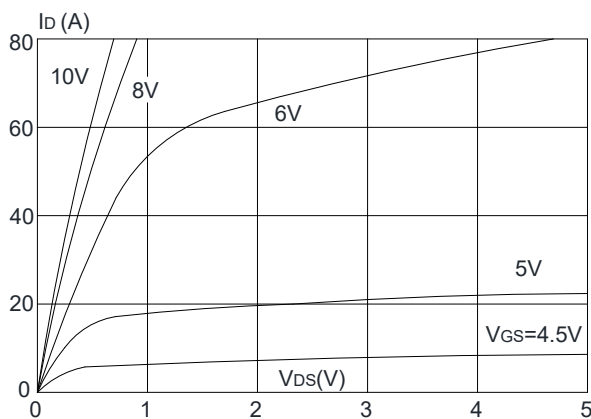


Figure 2: Typical Transfer Characteristics

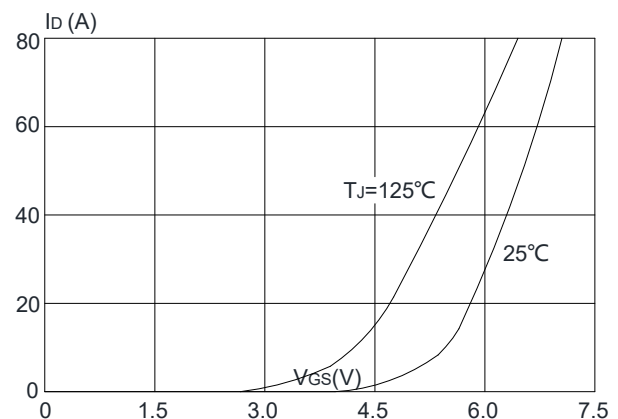


Figure 3: On-resistance vs. Drain Current

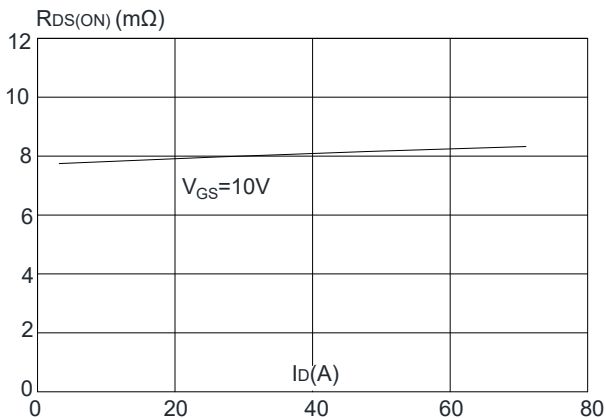


Figure 4: Body Diode Characteristics

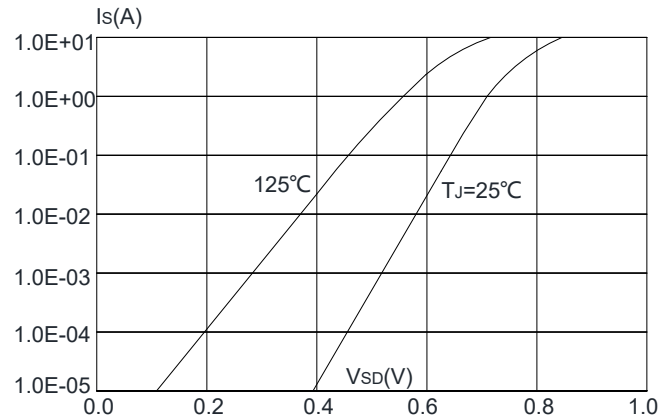


Figure 5: Gate Charge Characteristics

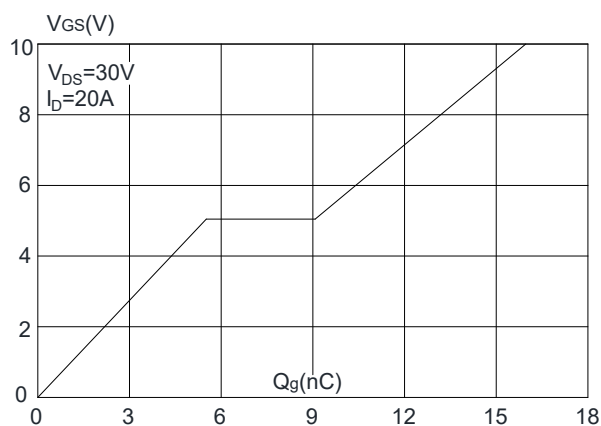


Figure 6: Capacitance Characteristics

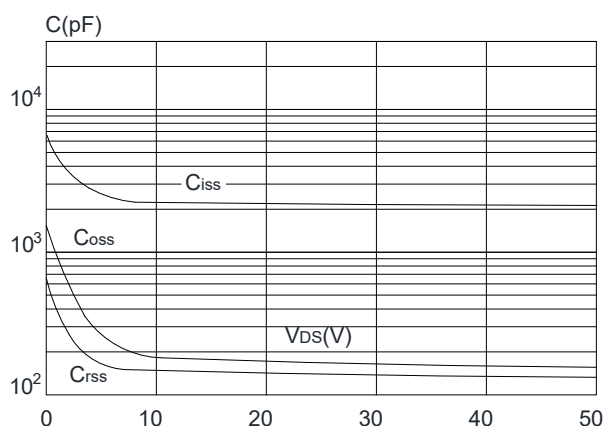


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

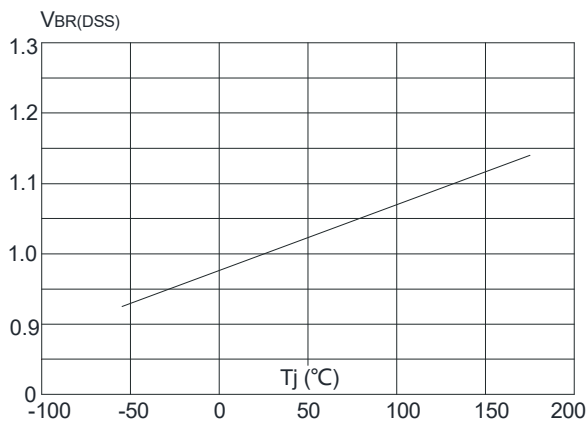


Figure 8: Normalized on Resistance vs. Junction Temperature

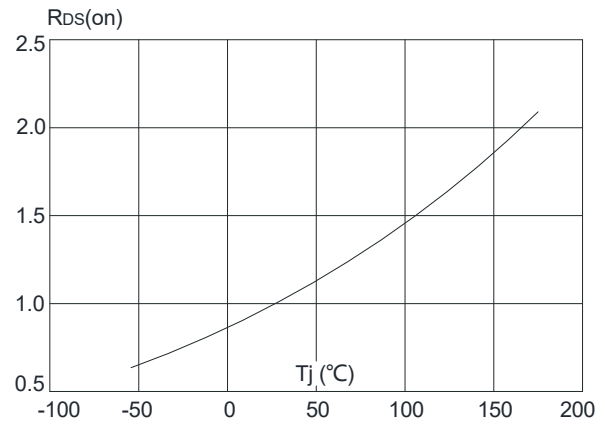


Figure 9: Maximum Safe Operating Area

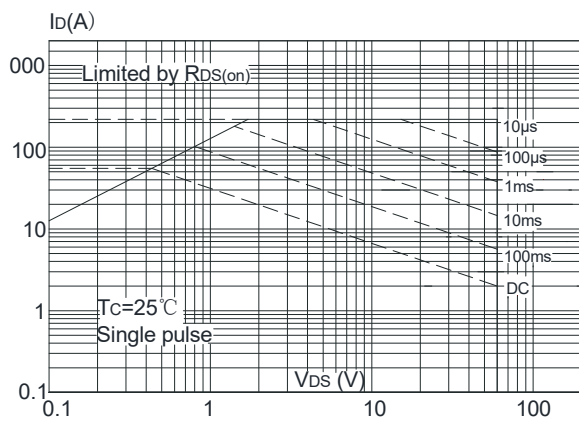


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

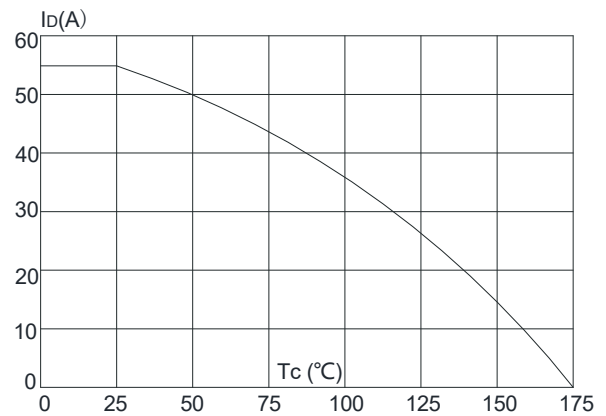


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

