

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	IRFR3707Z
▶ Overseas	Part Number	IRFR3707Z
▶ Equivalent	Part Number	IRFR3707Z

EV is the abbreviation of name EVVO

30V N -Channel MOSFET

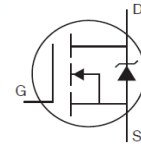
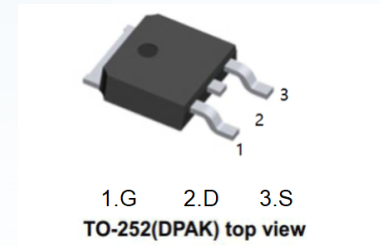
Applications

- High Frequency Synchronous Buck Converters for Computer Processor Power

Benefits

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

- $V_{DSS} = 30V$
- $R_{DS(on)} \text{ max} = 9.5m\Omega$
- $Q_g = 9.6nC$



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain -to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	56④	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	39④	
I_{DM}	Pulsed Drain Current ①	220	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	50	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	25	W
	Linear Derating Factor	0.33	W/ $^\circ C$
T_J	Operating Junction and	-55 to + 175	$^\circ C$
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case		3.0	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) ⑤		50	
$R_{\theta JA}$	Junction-to-Ambient		110	

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

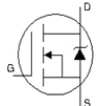
30V N -Channel MOSFET

	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	30			V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient			0.023	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance		7.5	9.5	mΩ	V _{GS} = 10V, I _D = 15A ③
			10	12.5		V _{GS} = 4.5V, I _D = 12A ③
V _{GS(th)}	Gate Threshold Voltage	1.0	1.70	2.50	V	V _{DS} = V _{GS} , I _D = 25μA
ΔV _{GS(th)} /ΔT _J	Gate Threshold Voltage Temp. Coefficient		-5.0		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 Trans conductance	71			S	V _{DS} = 15V, I _D = 12A
Q _g	Total Gate Charge		9.6	14	nC	V _{DS} = 15V V _{GS} = 4.5V I _D = 12A See Fig. 16
Q _{gs1}	Pre-V _{th} Gate-to-Source Charge		2.6			
Q _{gs2}	Post-V _{th} Gate-to-Source Charge		0.90			
Q _{gd}	Gate-to-Drain Charge		3.5			
Q _{godr}	Gate Charge Overdrive		2.6			
Q _{sw}	Switch Charge (Q _{gs2} + Q _{gd})		4.4			
Q _{oss}	Output Charge		5.8		nC	V _{DS} = 15V, V _{GS} = 0V
t _{d(on)}	Turn-On Delay Time		8.0		ns	V _{DD} = 16V, V _{GS} = 4.5V ③ I _D = 12A Clamped Inductive Load
t _r	Rise Time		11			
t _{d(off)}	Turn-Off Delay Time		12			
t _f	Fall Time		3.3			
C _{iss}	Input Capacitance		1150		pF	V _{GS} = 0V V _{DS} = 15V f = 1.0MHz
C _{oss}	Output Capacitance		260			
C _{rss}	Reverse Transfer Capacitance		120			

Avalanche Characteristics

	Parameter	Max.	Units
E _{AS}	Single Pulse Avalanche Energy ②	42	mJ
I _{AR}	Avalanche Current ①	12	A
E _{AR}	Repetitive Avalanche Energy ①	5.0	mJ

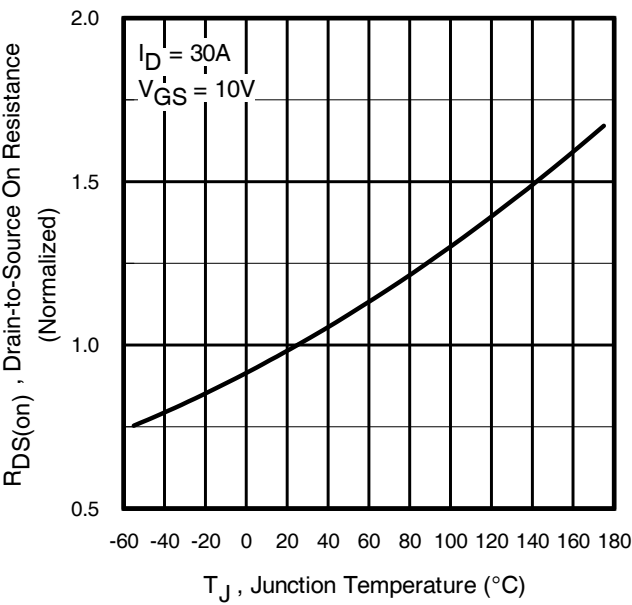
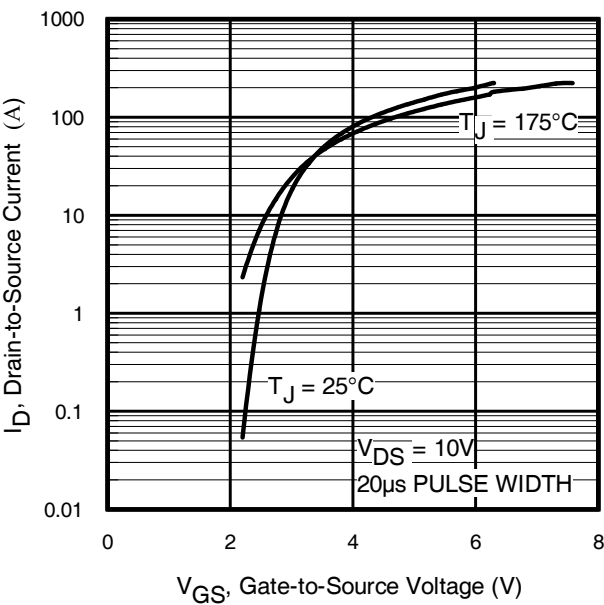
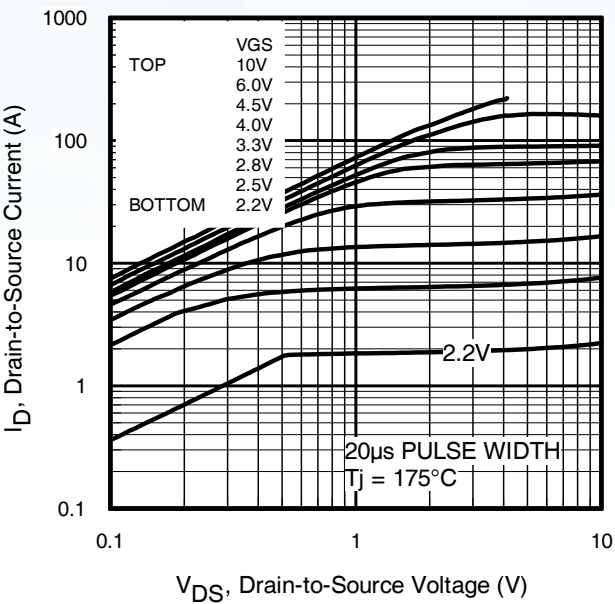
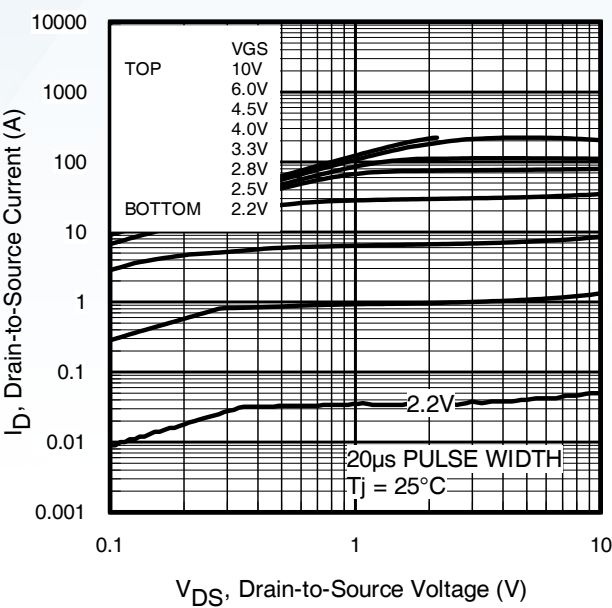
Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)			56④	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①			220		
V _{SD}	Diode Forward Voltage			1.0	V	T _J = 25°C, I _S = 12A, V _{GS} = 0V③
t _{rr}	Reverse Recovery Time		25	38	ns	T _J = 25°C ,I _F = 12A, V _{DS} = 15V di/dt = 100A/μs ③
Q _{rr}	Reverse Recovery Charge		17	26	nC	
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _S +L _D)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature
 ② starting T_J = 25°C, L = 0.58mH, R_G = 25Ω, I_{AS} = 12A.
 ③ Pulse width ≤ 400μs; duty cycle ≤ 2%.
 ④ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 30A.

30V N -Channel MOSFET



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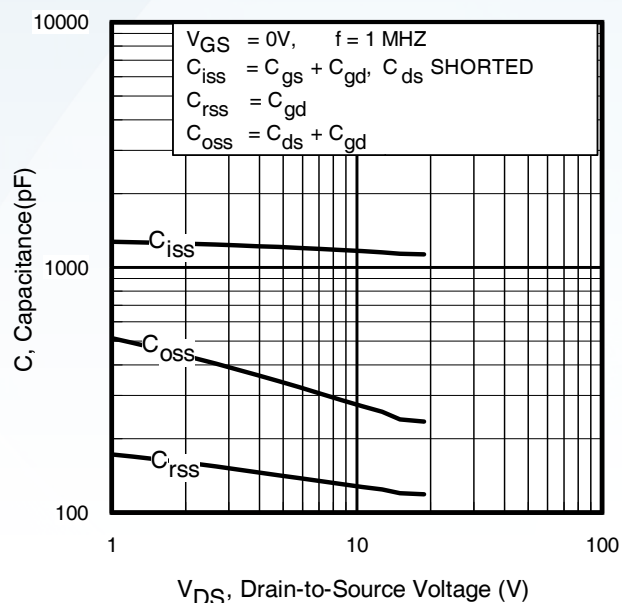


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

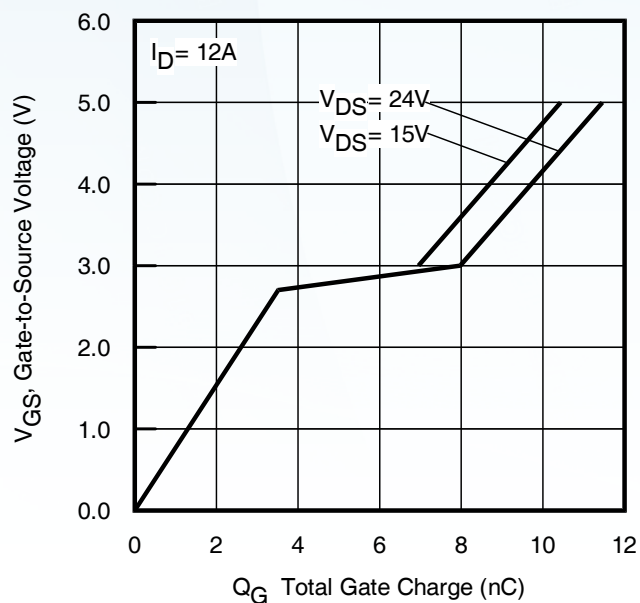


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

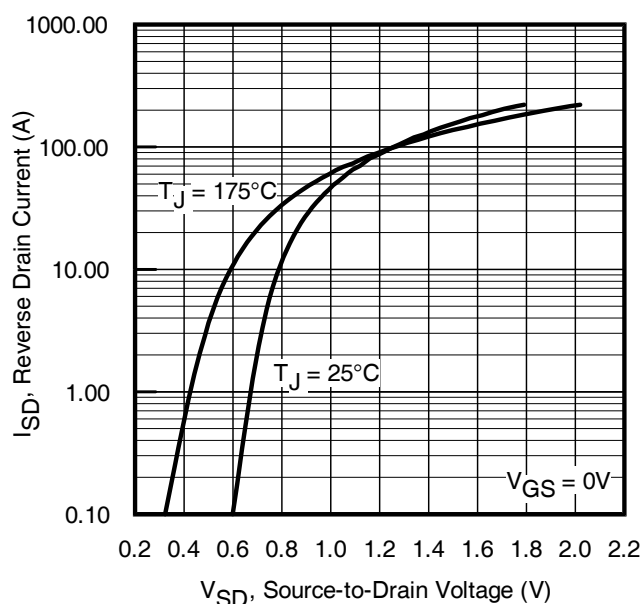


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

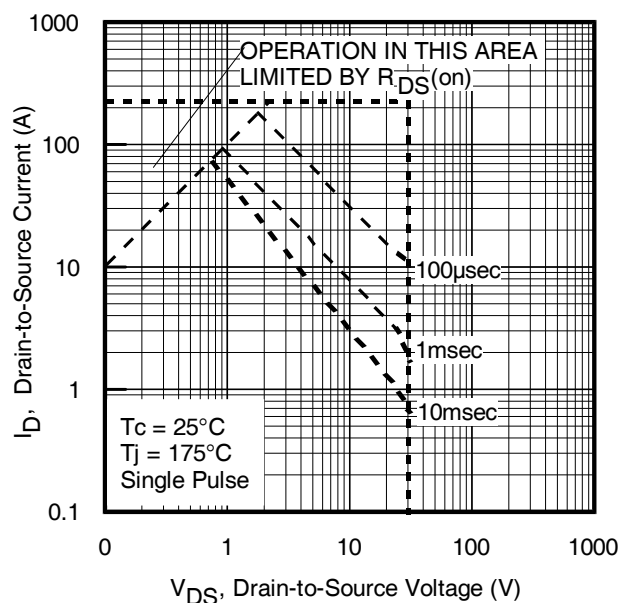


Fig 8. Maximum Safe Operating Area

30V N -Channel MOSFET

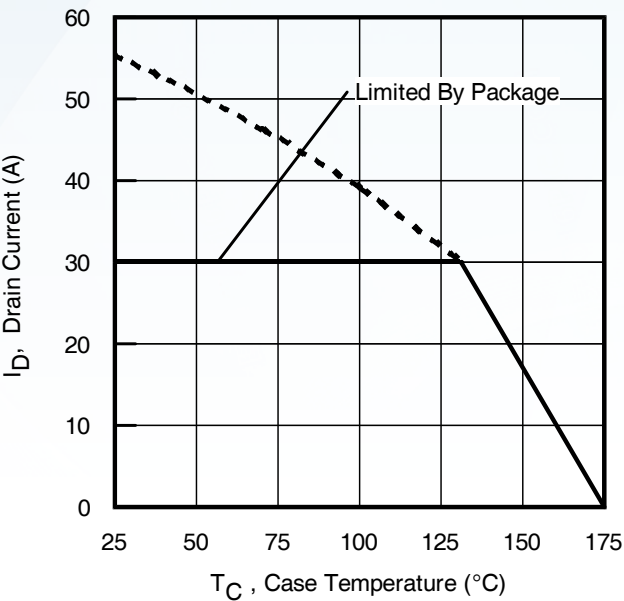


Fig 9. Maximum Drain Current vs. Case Temperature

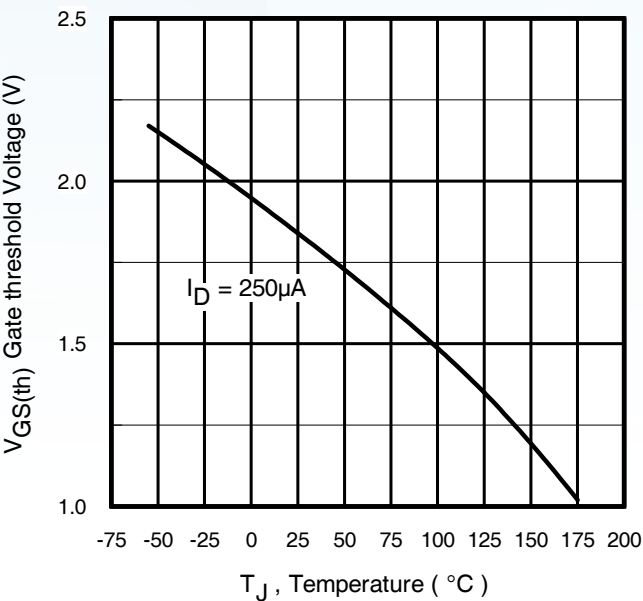


Fig 10. Threshold Voltage vs. Temperature

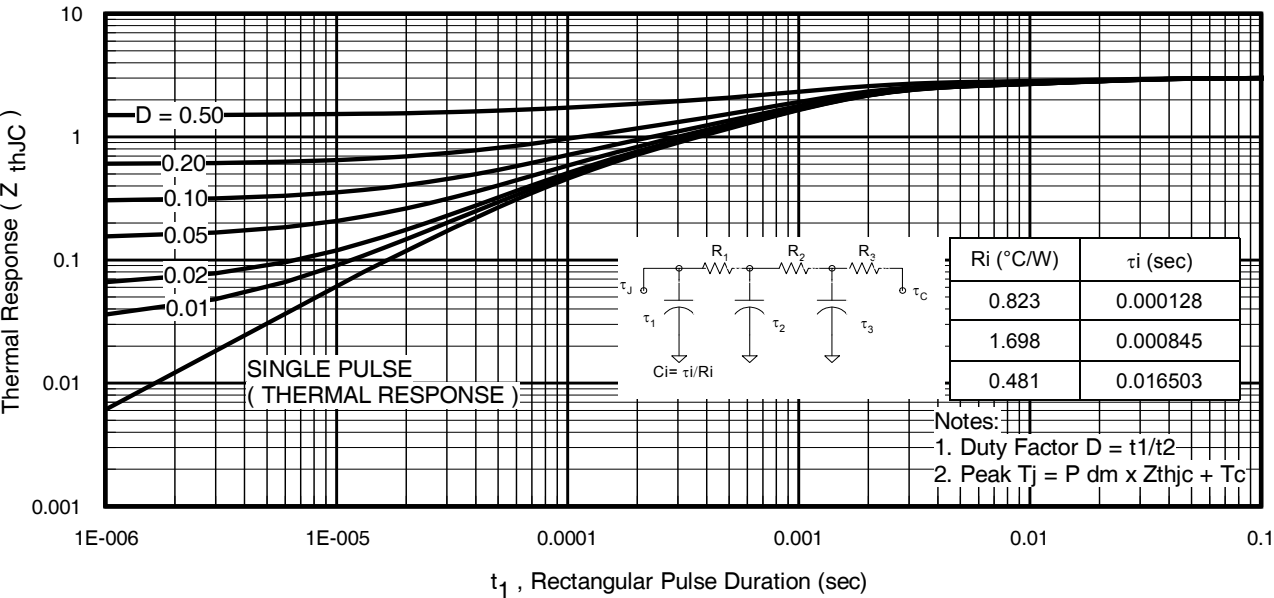


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

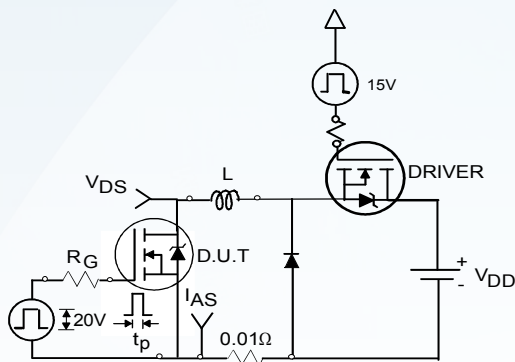


Fig 12a. Unclamped Inductive Test Circuit

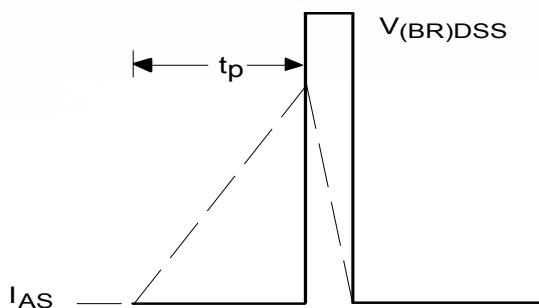


Fig 12b. Unclamped Inductive Waveforms

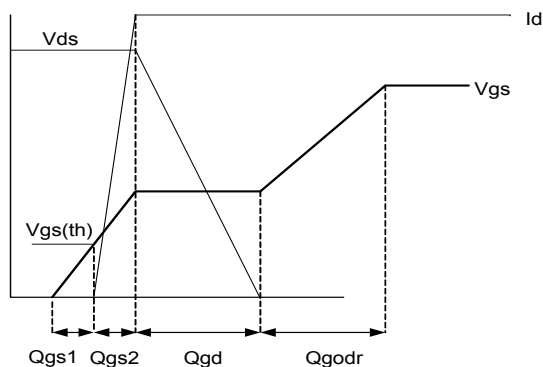


Fig 13a. Gate Charge Waveform

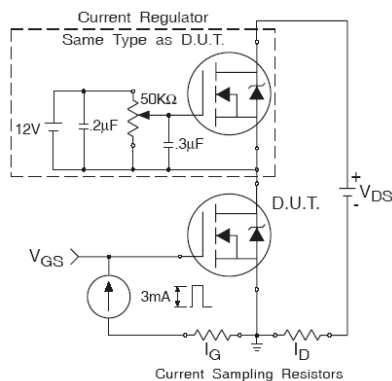


Fig 13b. Gate Charge Test Circuit

30V N -Channel MOSFET

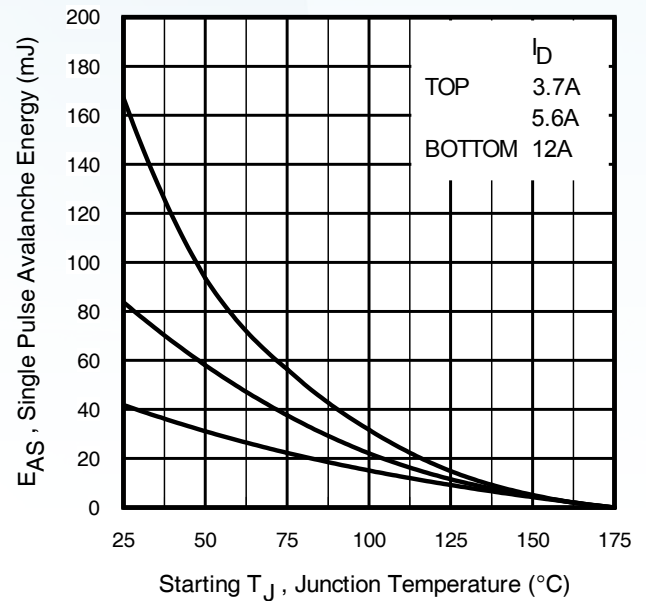


Fig 12c. Maximum Avalanche Energy vs. Drain Current

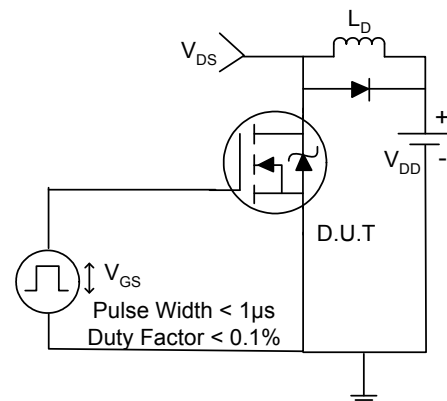


Fig 14a. Switching Time Test Circuit

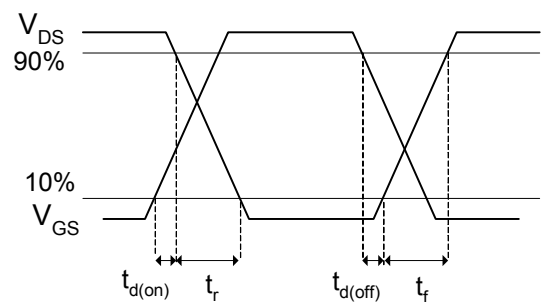
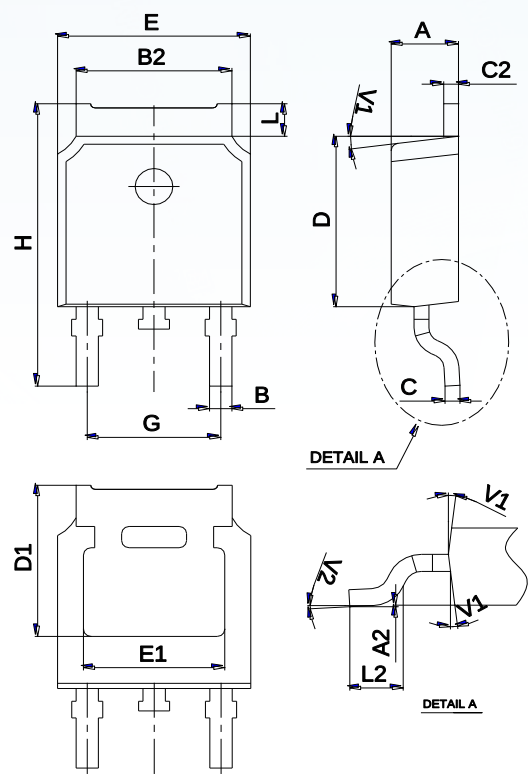


Fig 14b. Switching Time Waveforms

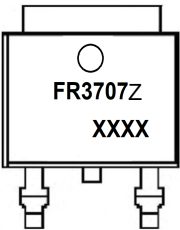
30V N -Channel MOSFET

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
IRFR3707Z	TO-252	2500	Tape and reel

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