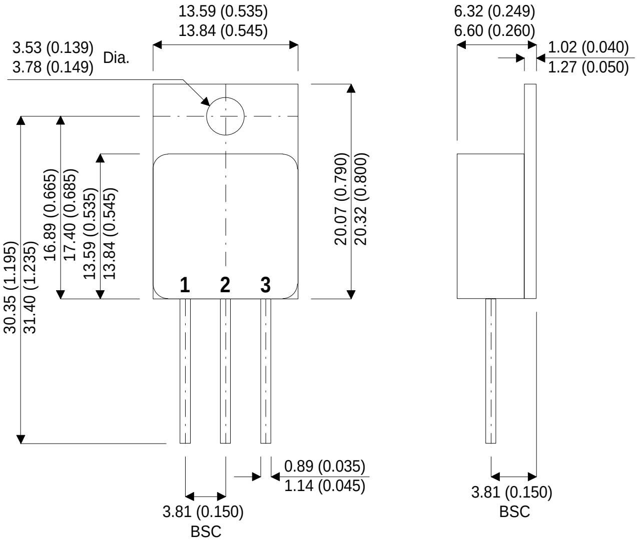
IRFM450

MECHANICAL DATA

Dimensions in mm (inches)



TO–254AA – Metal Package

Pin 1 – Drain Pin 2 – Source Pin 3 – Gate

N–CHANNEL POWER MOSFET

V_{DSS}	500V
$I_{D(cont)}$	12A
$R_{DS(on)}$	0.415Ω

FEATURES

- HERMETICALLY SEALED ISOLATED PACKAGE
- AVALANCHE ENERGY RATING
- SIMPLE DRIVE REQUIREMENTS
- ALSO AVAILABLE IN TO–220 METAL AND SURFACE MOUNT PACKAGES
- EASE OF PARALLELING

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C unless otherwise stated)

V_{GS}	Gate – Source Voltage		±20V
I_D	Continuous Drain Current	(V_{GS} = 10V , T_{case} = 25°C)	12A
I_D	Continuous Drain Current	(V_{GS} = 10V , T_{case} = 100°C)	8A
I_{DM}	Pulsed Drain Current [1]		48A
P_D	Power Dissipation @ T_{case} = 25°C		150W
	Linear Derating Factor		1.2W/°C
E_{AS}	Single Pulse Avalanche Energy [2]		750mJ
I_{AR}	Avalanche Current [1]		12A
E_{AR}	Repetitive Avalanche Energy [1]		15mJ
dv/dt	Peak Diode Recovery [3]		3.5V/ns
T_J , T_{stg}	Operating and Storage Temperature Range		–55 to 150°C
T_L	Lead Temperature measured $^1/_{16}$” (1.6mm) from case for 10 sec.		300°C
$R_{\theta JC}$	Thermal Resistance Junction to Case		0.83°C/W
$R_{\theta CS}$	Thermal Resistance Case to Sink (Typical)		0.21°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient		48°C/W

Notes

1) Repetitive Rating – Pulse width limited by Maximum Junction Temperature
2) @ V_{DD} = 50V , L ≥ 9.4mH , R_G = 25Ω , Peak I_L = 12A , Starting T_J = 25°C
3) @ $I_{SD} \leq$ 12A , di/dt ≤ 130A/µs , $V_{DD} \leq BV_{DSS}$, $T_J \leq$ 150°C , Suggested R_G = 2.35Ω

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise stated)

	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
	STATIC ELECTRICAL RATINGS						
BV_{DSS}	Drain – Source Breakdown Voltage	$V_{GS} = 0$	I_D = 1mA	500			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Temperature Coefficient of Breakdown Voltage	Reference to 25°C I_D = 1mA			0.68		V/°C
$R_{DS(on)}$	Static Drain – Source On–State Resistance [2]	V_{GS} = 10V	I_D = 8A			0.415	Ω
		V_{GS} = 10V	I_D = 12A			0.515	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$	I_D = 250μA	2		4	V
g_{fs}	Forward Transconductance [2]	$V_{DS} \geq$ 15V	I_{DS} = 8A	6.5			S(℧)
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0$	$V_{DS} = 0.8BV_{DSS}$			25	μA
			T_J = 125°C			250	
I_{GSS}	Forward Gate – Source Leakage	V_{GS} = 20V				100	nA
I_{GSS}	Reverse Gate – Source Leakage	V_{GS} = –20V				–100	
	DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	$V_{GS} = 0$ V_{DS} = 25V f = 1MHz			2700		pF
C_{oss}	Output Capacitance				600		
C_{rss}	Reverse Transfer Capacitance				240		
C_{DC}	Drain – Case Capacitance				12		
Q_g	Total Gate Charge	V_{GS} = 10V I_D = 12A $V_{DS} = 0.5BV_{DSS}$		55		120	nC
Q_{gs}	Gate – Source Charge			5		19	
Q_{gd}	Gate – Drain (“Miller”) Charge			27		70	
$t_{d(on)}$	Turn– On Delay Time	V_{DD} = 250V I_D = 12A R_G = 2.35Ω				35	ns
t_r	Rise Time					190	
$t_{d(off)}$	Turn–Off Delay Time					170	
t_f	Fall Time					130	
	SOURCE – DRAIN DIODE CHARACTERISTICS						
I_S	Continuous Source Current					12	A
I_{SM}	Pulse Source Current [1]					48	
V_{SD}	Diode Forward Voltage [2]	I_S = 12A $V_{GS} = 0$	T_J = 25°C			1.7	V
t_{rr}	Reverse Recovery Time [2]	I_F = 12A	T_J = 25°C			1600	ns
Q_{rr}	Reverse Recovery Charge [2]	$d_i / d_t \leq$ 100A/μs	$V_{DD} \leq$ 50V			14	μC
t_{on}	Forward Turn–On Time			Negligible			
	PACKAGE CHARACTERISTICS						
L_D	Internal Drain Inductance	Measured from 6mm down drain lead to centre of die			8.7		nH
L_S	Internal Source Inductance	Measured from 6mm down source lead to source bond pad			8.7		

Notes

1) Repetitive Rating – Pulse width limited by Maximum Junction Temperature
2) Pulse Test: Pulse Width ≤ 300μs, δ ≤ 2%

* I_S Current limited by pin diameter.