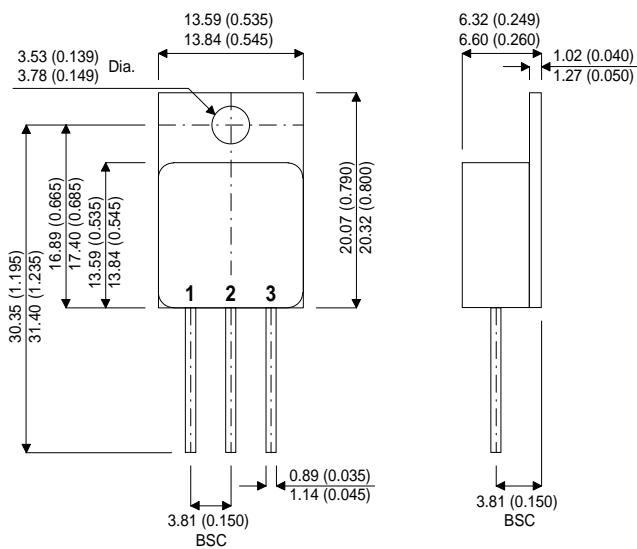


**MECHANICAL DATA**

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** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

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

**Notes**

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

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$  unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>STATIC ELECTRICAL RATINGS</b>					
$BV_{DSS}$	Drain – Source Breakdown Voltage	$V_{GS} = 0$ $I_D = 1\text{mA}$	500		V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Temperature Coefficient of Breakdown Voltage	Reference to $25^{\circ}\text{C}$ $I_D = 1\text{mA}$		0.68	$\text{V}/^{\circ}\text{C}$
$R_{DS(on)}$	Static Drain – Source On–State Resistance <sup>2</sup>	$V_{GS} = 10\text{V}$ $I_D = 8\text{A}$		0.415	$\Omega$
		$V_{GS} = 10\text{V}$ $I_D = 12\text{A}$		0.515	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\mu\text{A}$	2	4	V
$g_{fs}$	Forward Transconductance <sup>2</sup>	$V_{DS} \geq 15\text{V}$ $I_{DS} = 8\text{A}$	6.5		$\text{S}(\bar{\nu})$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0$ $V_{DS} = 0.8BV_{DSS}$ $T_J = 125^{\circ}\text{C}$		25	$\mu\text{A}$
				250	
$I_{GSS}$	Forward Gate – Source Leakage	$V_{GS} = 20\text{V}$		100	nA
$I_{GSS}$	Reverse Gate – Source Leakage	$V_{GS} = -20\text{V}$		-100	
<b>DYNAMIC CHARACTERISTICS</b>					
$C_{iss}$	Input Capacitance	$V_{GS} = 0$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$		2700	pF
$C_{oss}$	Output Capacitance			600	
$C_{rss}$	Reverse Transfer Capacitance			240	
$C_{DC}$	Drain – Case Capacitance			12	
$Q_g$	Total Gate Charge	$V_{GS} = 10\text{V}$	55	120	nC
$Q_{gs}$	Gate – Source Charge	$I_D = 12\text{A}$	5	19	
$Q_{gd}$	Gate – Drain (“Miller”) Charge	$V_{DS} = 0.5BV_{DSS}$	27	70	
$t_{d(on)}$	Turn– On Delay Time	$V_{DD} = 250\text{V}$ $I_D = 12\text{A}$ $R_G = 2.35\Omega$		35	ns
$t_r$	Rise Time			190	
$t_{d(off)}$	Turn–Off Delay Time			170	
$t_f$	Fall Time			130	
<b>SOURCE – DRAIN DIODE CHARACTERISTICS</b>					
$I_S$	Continuous Source Current			12	A
$I_{SM}$	Pulse Source Current <sup>1</sup>			48	
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$I_S = 12\text{A}$ $T_J = 25^{\circ}\text{C}$ $V_{GS} = 0$		1.7	V
$t_{rr}$	Reverse Recovery Time <sup>2</sup>	$I_F = 12\text{A}$ $T_J = 25^{\circ}\text{C}$		1600	ns
$Q_{rr}$	Reverse Recovery Charge <sup>2</sup>	$d_i / d_t \leq 100\text{A}/\mu\text{s}$ $V_{DD} \leq 50\text{V}$		14	$\mu\text{C}$
$t_{on}$	Forward Turn–On Time		Negligible		
<b>PACKAGE CHARACTERISTICS</b>					
$L_D$	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  $\leq 300\mu\text{s}$ ,  $\delta \leq 2\%$   
\*  $I_S$  Current limited by pin diameter.