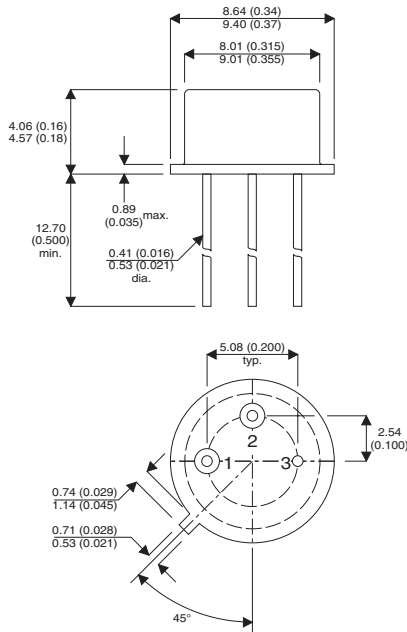


**MECHANICAL DATA**

Dimensions in mm (inches)



**TO39 – Package (TO-205AF)**

Underside View

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

**N-CHANNEL ENHANCEMENT MODE POWER MOSFET**

**$BV_{DSS}$     500V**  
 **$I_{D(cont)}$     1.5**  
 **$R_{DS(on)}$     3.0Ω**

**FEATURES**

- AVALANCHE ENERGY RATED
- HERMETICALLY SEALED
- DYNAMIC dv/dt RATING
- SIMPLE DRIVE REQUIREMENTS

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

$V_{GS}$	Gate – Source Voltage	±20V
$I_D$	Continuous Drain Current ( $V_{GS} = 10V, T_{case} = 25^{\circ}C$ )	1.5A
$I_D$	Continuous Drain Current ( $V_{GS} = 10V, T_{case} = 100^{\circ}C$ )	1A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	6.5A
$P_D$	Power Dissipation @ $T_{case} = 25^{\circ}C$	20W
	Linear Derating Factor	0.16W/°C
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	0.11mJ
dv/dt	Peak Diode Recovery <sup>3</sup>	3.5V/ns
$T_J, T_{stg}$	Operating and Storage Temperature Range	-55 to 150°C
$R_{\theta JC}$	Thermal Resistance Junction to Case	6.25°C/W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient	175°C/W

**Notes**

- 1) Pulse Test: Pulse Width ≤ 300µs, δ ≤ 2%
- 2) @  $V_{DD} = 50V, L \geq 0.100mH, R_G = 25\Omega, Peak I_L = 1.5A, Starting T_J = 25^{\circ}C$
- 3) @  $I_{SD} \leq 1.5A, di/dt \leq 50A/\mu s, V_{DD} \leq BV_{DSS}, T_J \leq 150^{\circ}C, SUGGESTED R_G = 7.5\Omega$

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

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**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 $25^{\circ}\text{C}$ $I_D = 1\text{mA}$		0.43	$\text{V}/^{\circ}\text{C}$
$R_{DS(on)}$	Static Drain – Source On-State Resistance	$V_{GS} = 10\text{V}$ $I_D = 1\text{A}$		3	$\Omega$
		$V_{GS} = 10\text{V}$ $I_D = 1.5\text{A}$		3.45	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\mu\text{A}$	2	4	V
$g_{fs}$	Forward Transconductance	$V_{DS} = 5\text{V}$ $I_{DS} = 1\text{A}$	1	3	$\text{S}(\bar{v})$
$I_{DSS}$	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	$V_{GS} = 0$		350	pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25\text{V}$		80	
$C_{rss}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		35	
$Q_g$	Total Gate Charge	$V_{GS} = 10\text{V}$ $I_D = 1.5\text{A}$ $V_{DS} = 0.5BV_{DS}$	7.3	16.7	nC
$Q_{gs}$	Gate – Source Charge	$I_D = 1.5\text{A}$	0.1	3	nC
$Q_{gd}$	Gate – Drain (“Miller”) Charge	$V_{DS} = 0.5BV_{DS}$	3.7	8.7	
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 250\text{V}$ $I_D = 1.5\text{A}$ $R_G = 7.5\Omega$		40	ns
$t_r$	Rise Time			30	
$t_{d(off)}$	Turn-Off Delay Time			60	
$t_f$	Fall Time			30	
<b>SOURCE – DRAIN DIODE CHARACTERISTICS</b>					
$I_S$	Continuous Source Current			1.5	A
$I_{SM}$	Pulse Source Current <sup>2</sup>			6.5	
$V_{SD}$	Diode Forward Voltage	$I_S = 1.5\text{A}$ $T_J = 25^{\circ}\text{C}$ $V_{GS} = 0$		1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F = 1.5\text{A}$ $T_J = 25^{\circ}\text{C}$		900	ns
$Q_{rr}$	Reverse Recovery Charge	$d_i / d_t \leq 100\text{A}/\mu\text{s}$ $V_{DD} \leq 50\text{V}$		5.9	$\mu\text{C}$
$t_{on}$	Forward Turn-On Time		Negligible		
<b>PACKAGE CHARACTERISTICS</b>					
$L_D$	Internal Drain Inductance (from centre of drain pad to die)		5.0		nH
$L_S$	Internal Source Inductance (from centre of source pad to end of source bond wire)		15.0		

- Notes**
- 1) Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ ,  $\delta \leq 2\%$
  - 2) Repetitive Rating – Pulse width limited by maximum junction temperature.

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