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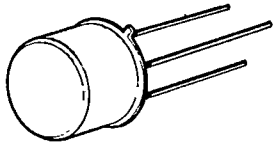
T-39-09

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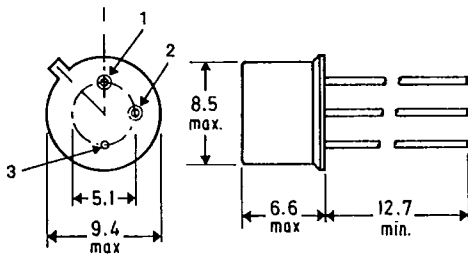
**2N 6789**

**2N 6790**

**MECHANICAL DATA**

Dimensions in mm

**MOS POWER  
N-Channel Enhancement Mode**



**APPLICATIONS**

- FAST SWITCHING
- MOTOR CONTROLS
- POWER SUPPLIES

PIN 1—Source PIN 2—Gate PIN 3 Drain and Case  
T039

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

Parameter	2N 6789	2N 6790	
$V_{DS}$	Drain source voltage	150V	200V
$V_{DGR}$	Drain gate voltage ( $R_{GS} = 1M\Omega$ )	150V	200V
$I_D @ T_c = 25^{\circ}C$	Continuous drain current	±3.5A	
$I_D @ T_c = 100^{\circ}C$	Continuous drain current	±2.25A	
$I_{DM}$	Pulsed drain current (I)	±7.5A	
$V_{GS}$	Gate-source voltage	±40V	
$P_D @ T_c = 25^{\circ}C$	Maximum power dissipation	20W	
$P_D @ T_c = 100^{\circ}C$	Maximum power dissipation	8W	
Junction to case	Linear derating factor	0.16 W/°C	
Junction to ambient	Linear derating factor	0.005 W/°C	
$T_J$	Operating and	-55 to 150°C	
$T_{stg}$	storage temperature range	-55 to 150°C	
Lead temperature	(1/16" from case for 10 secs.)	300°C	

(i) Pulse test: Pulse width  $\leq 300\mu\text{sec}$ , duty cycle  $\leq 2\%$

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2N 6789 2N 6790

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ELECTRICAL CHARACTERISTICS (T<sub>CASE</sub> = 25°C unless otherwise specified)

## STATIC

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV <sub>DSS</sub> Drain-Source Breakdown Voltage	2N6789	150*			V	V <sub>GS</sub> = 0 I <sub>D</sub> = 1.0 mA
	2N6790	200*			V	
V <sub>GS(th)</sub> Gate-Threshold Voltage	All	2.0*		4.0*	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1.0 mA
I <sub>GSSF</sub> Gate-Body Leakage Forward	All			100*	nA	V <sub>GS</sub> = 20V
I <sub>GSSR</sub> Gate-Body Leakage Reverse	All			-100*	nA	V <sub>GS</sub> = -20V
I <sub>DSS</sub> Zero Gate Voltage Drain Current	All			1.0*	mA	V <sub>DS</sub> = Max. Rating, V <sub>GS</sub> = 0 T <sub>C</sub> = 125°C
	All			4.0*	mA	
I <sub>D(on)</sub> On-State Drain Current <sup>1</sup>	2N6789	3.5			A	V <sub>DS</sub> = 2V <sub>DS(ON)</sub> , V <sub>GS</sub> = 10V
	2N6790	3.5			A	
V <sub>DS(on)</sub> Static Drain-Source On-State Voltage <sup>1</sup>	2N6789			2.8*	V	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.5A
	2N6790			2.8*	V	
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>	2N6789			0.8*	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.25A
	2N6790			0.8*	Ω	
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance <sup>1</sup>	2N6789			1.5*	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.25A, T <sub>C</sub> = -125°C
	2N6790			1.5*	Ω	


## DYNAMIC

g <sub>fs</sub> Forward Transconductance <sup>1</sup>	All	1.5*		4.5*	S (fs)	V <sub>DS</sub> = 2V <sub>DS(ON)</sub> , I <sub>D</sub> = 2.25A
C <sub>iss</sub> Input Capacitance	All	200*		600*	pF	V <sub>GS</sub> = 0, V <sub>DS</sub> = 25V f = 1 MHz
C <sub>oss</sub> Output Capacitance	All	60*		300*	pF	
C <sub>rss</sub> Reverse Transfer Capacitance	All	15*		80*	pF	
t <sub>d(on)</sub> Turn-On Delay Time	All			40*	ns	V <sub>DD</sub> = 74V, I <sub>D</sub> = 2.25A R <sub>g</sub> = 25Ω, R <sub>L</sub> = 32Ω (MOS FET switching times are essentially independent of operating temperature)
t <sub>r</sub> Rise Time	All			50*	ns	
t <sub>d(off)</sub> Turn-Off Delay Time	All			50*	ns	
t <sub>f</sub> Fall Time	All			50*	ns	

## THERMAL RESISTANCE

R <sub>thJC</sub> Junction-to-Case	All			6.25*	°C/W	
R <sub>thJA</sub> Junction-to-Ambient	All			170	°C/W	Free Air Operation

## BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I <sub>S</sub> Continuous Source Current (Body Diode)	2N6789			-3.5*	A	Modified MOS POWER symbol showing the intergal P-N junction rectifier. 
	2N6790			-3.5*	A	
I <sub>SM</sub> Source Current <sup>1</sup> (Body Diode)	2N6789			-7.50	A	
	2N6790			-7.50	A	
V <sub>SD</sub> Diode Forward Voltage <sup>1</sup>	2N6789	-0.7		-1.5*	V	T <sub>C</sub> = 25°C, I <sub>S</sub> = -3.5, V <sub>GS</sub> = 0 T <sub>C</sub> = 25°C, I <sub>S</sub> = -3.5, V <sub>GS</sub> = 0
	2N6790	-0.7		-1.5*	V	
t <sub>rr</sub> Reverse Recovery Time	All		450		ns	T <sub>J</sub> = 150°C, I <sub>F</sub> = I <sub>S</sub> , dI <sub>F</sub> /dI <sub>S</sub> = 100 A/μs

<sup>1</sup> Pulse Test: Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%

\* JEDEC Registered Values

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