



2N7012

T-39-05

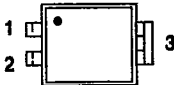
N-Channel Enhancement Mode Transistor

4-PIN DIP
(Similar to TO-250)

TOP VIEW

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)
60	0.35	1.2



1 GATE
2 SOURCE
3 DRAIN

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	$T_A = 25^\circ\text{C}$	I_D	1.2	A
	$T_A = 100^\circ\text{C}$		0.80	
Pulsed Drain Current ¹		I_{DM}	10	
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	1.0	W
	$T_A = 100^\circ\text{C}$		0.4	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^\circ\text{C}$
Lead Temperature ($1/16"$ from case for 10 sec.)		T_L	300	

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THERMAL RESISTANCE RATINGS

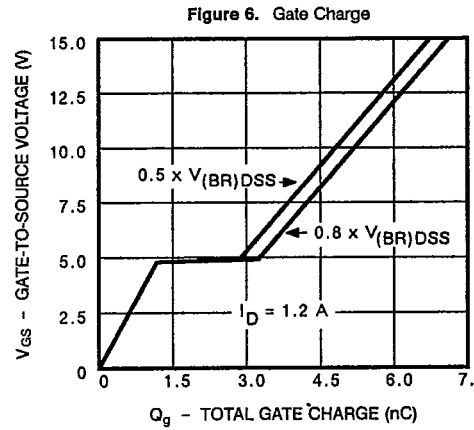
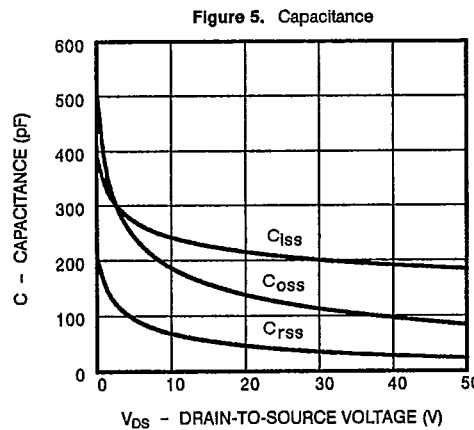
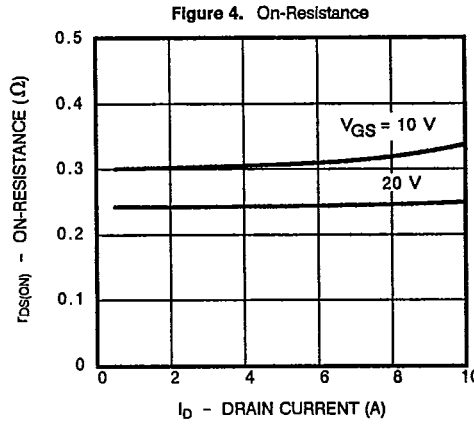
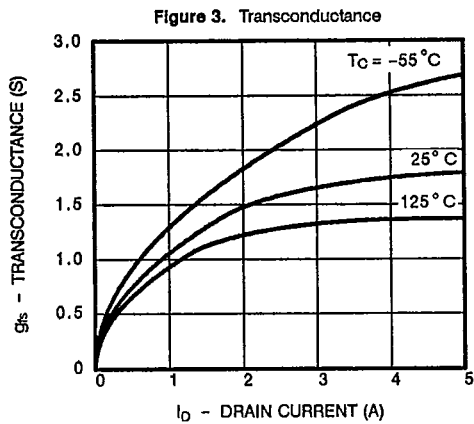
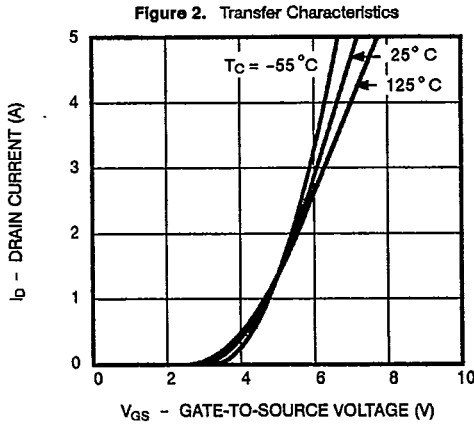
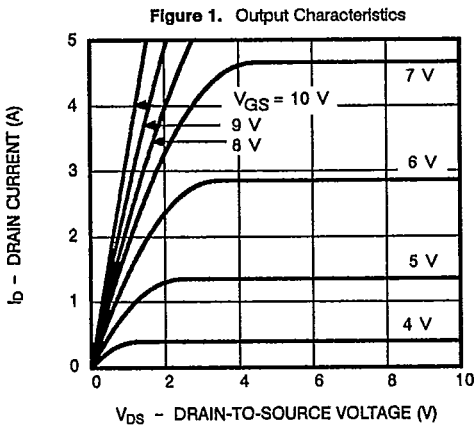
THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	R_{thJA}		120	K/W

¹Pulse width limited by maximum junction temperature.

2N7012**ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ Unless Otherwise Noted)****T-39-05**

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	LIMITS		UNIT
				MIN	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$		60		V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1000\text{ }\mu\text{A}$		2.0	4.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = V_{(BR)DSS}, V_{GS} = 0\text{ V}$			250	μA
		$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			1000	
On-State Drain Current ¹	$I_{D(ON)}$	$V_{DS} = 2\text{ V}, V_{GS} = 10\text{ V}$		1.2		A
Drain-Source On-State Resistance ¹	$r_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 1.0\text{ A}$	0.3		0.35	Ω
		$V_{GS} = 10\text{ V}, I_D = 1.0\text{ A}, T_J = 125^\circ\text{C}$	0.55		0.64	
Forward Transconductance ¹	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 1.0\text{ A}$	1.5	1.2		S
DYNAMIC						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	220		300	pF
Output Capacitance	C_{oss}		120		200	
Reverse Transfer Capacitance	C_{rss}		30		100	
Total Gate Charge ²	Q_g	$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 10\text{ V}, I_D = 15\text{ A}$	4.8		6.0	nC
Gate-Source Charge ²	Q_{gs}		1			
Gate-Drain Charge ²	Q_{gd}		2			
Turn-On Delay Time ²	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 25\text{ }\Omega$ $I_D \simeq 1.2\text{ A}, V_{GEN} = 10\text{ V}, R_G = 25\text{ }\Omega$	7		20	ns
Rise Time ²	t_r		13		30	
Turn-Off Delay Time ²	$t_{d(off)}$		18		30	
Fall Time ²	t_f		13		25	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_A = 25^\circ\text{C}$)						
Continuous Current	I_S				1.2	A
Pulsed Current ³	I_{SM}				10	
Forward Voltage ¹	V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$			1.6	V
Reverse Recovery Time	t_{rr}	$I_F = I_S, dI_F/dt = 100\text{ A}/\mu\text{s}$	45			ns
Reverse Recovery Charge	Q_{rr}		0.6			μC

¹Pulse test: Pulse Width $\leq 300\text{ }\mu\text{sec}$, Duty Cycle $\leq 2\%$.²Independent of operating temperature.³Pulse width limited by maximum junction temperature.



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TYPICAL CHARACTERISTICS (Cont'd)

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Figure 7. On-Resistance vs. Junction Temperature

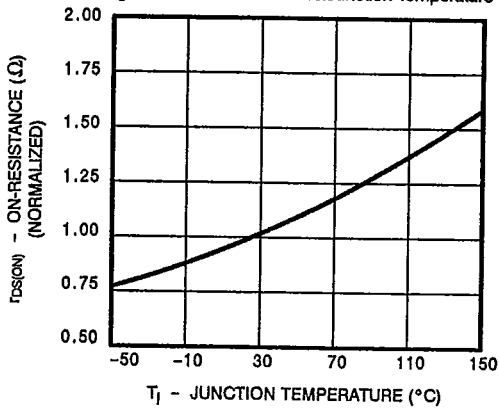
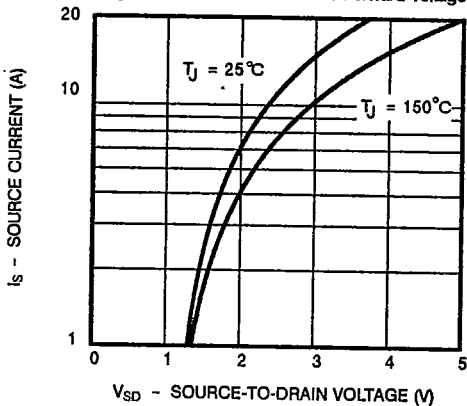


Figure 8. Source-Drain Diode Forward Voltage



THERMAL RATINGS

Figure 9. Maximum Drain Current vs. Case Temperature

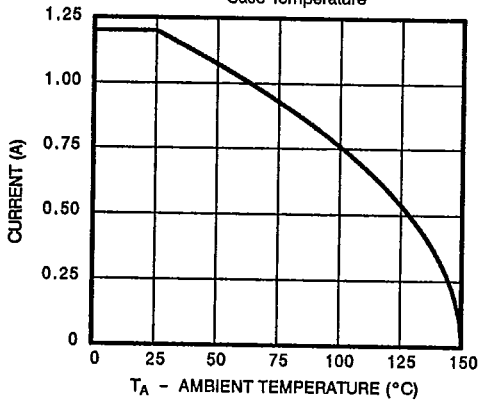


Figure 10. Safe Operating Area

