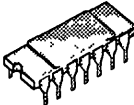
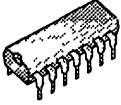

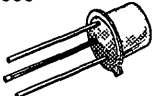
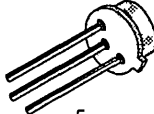


N-CHANNEL

PART #	$V_{(BR)DS}$ (V)	$r_{DS(ON)}$ (Ω)	$V_{GS(th)}$ (V)	t_{ON} (ns)	C_{iss} (pF)	I_D (mA)	PD
14-PIN CERAMIC (P) & PLASTIC (J)							
							
VQ1001J	30	1	2.5	30	38	0.85	2
VQ1001P	30	1	2.5	30	38	0.85	2
VQ1004P	60	3.5	2.5	10	35	0.46	2
VQ1004J	60	3.5	2.5	10	35	0.46	2
VQ1000J	60	5.5	2.5	10	16	0.23	2
VQ1000P	60	5.5	2.5	10	16	0.23	2
VQ1006P	90	4.5	2.5	10	35	0.40	2
VQ1006J	90	4.5	2.5	10	35	0.40	2
SOT-23							
							
VN0603T	60	4	3.0	15	16	0.22	0.36
VN0605T	60	5	3.0	20	16	0.18	0.36
2N7002	60	8	2.5	20	16	0.12	0.2
2N7001	240	45	2.5	30	15	0.05	0.2
VN45350T	450	350	4.5	25	5	0.02	0.35
VN50300T	500	300	4.5	20	5	0.02	0.35
TO-205AD (TO-39)							
							
VN0300B	30	1.2	2.5	30	38	1.51	5
2N6659	35	1.8	2.0	10	38	1.40	6.25
2N6660JANTX	60	3	2.0	10	30	0.99	6.25
2N6660	60	3	2.0	10	38	1.10	6.25
VN67AB	60	3.5	2.5	15	35	0.79	5
2N6661JANTX	90	4	2.0	10	30	0.86	6.25
2N6661	90	4	2.0	10	35	0.90	6.25
VN90AB	90	5	2.0	10	35	0.67	5
VN1206B	120	6	2.0	16	35	0.22	5
VN1706B	170	6	2.0	16	105	0.63	6.25
VN2406B	240	6	2.0	16	110	0.63	6.25
VN4012B	400	12	1.8	40	80	0.42	0.8
TO-206AC (TO-52)							
							
VN10LE	60	5	2.5	10	16	0.38	1.5
VN10KE	60	5	2.5	10	38	0.17	0.3

2N7002

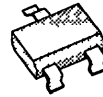


N-Channel Enhancement-Mode MOS Transistor

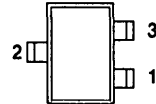
PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)	PACKAGE
60	7.5	0.115	SOT-23

SOT-23



TOP VIEW



1 GATE
2 DRAIN
3 SOURCE

Performance Curves VNDS06 (See Section 7)

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

PARAMETERS/TEST CONDITIONS	SYMBOL	2N7002	UNITS
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 40	
Continuous Drain Current	I_D	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
Pulsed Drain Current ¹	I_{DM}	0.8	
Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	mW
		$T_C = 100^\circ\text{C}$	
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to 150	
Lead Temperature (1/16" from case for 10 seconds)	T_L	300	

THERMAL RESISTANCE

THERMAL RESISTANCE	SYMBOL	2N7002	UNITS
Junction-to-Ambient	R_{thJA}	625	$^\circ\text{C}/\text{W}$

¹Pulse width limited by maximum junction temperature

ELECTRICAL CHARACTERISTICS ¹				LIMITS		
PARAMETER	SYMBOL	TEST CONDITIONS	TYP ²	2N7002		UNIT
				MIN	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 10\ \mu\text{A}$	70	60		V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 0.25\text{ mA}$	2.15	1	2.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$ $V_{GS} = \pm 20\text{ V}$ $T_C = 125^\circ\text{C}$	± 1 ± 5		± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$ $V_{DS} = 60\text{ V}$ $T_C = 125^\circ\text{C}$	0.02 1		1 500	μA
On-State Drain Current ³	$I_{D(ON)}$	$V_{DS} \geq 2 V_{DS(ON)}, V_{GS} = 10\text{ V}$	1000	500		mA
Drain-Source On-Resistance ³	$r_{DS(ON)}$	$V_{GS} = 5\text{ V}$ $I_D = 50\text{ mA}$ $T_C = 125^\circ\text{C}$	5 9		7.5 13.5	Ω
		$V_{GS} = 10\text{ V}$ $I_D = 0.5\text{ A}$ $T_C = 125^\circ\text{C}$	2.5 4.4		7.5 13.5	
		$V_{GS} = 5\text{ V}, I_D = 50\text{ mA}$	0.25		0.375	
Drain-Source On-Voltage ³	$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$ $I_D = 0.5\text{ A}$ ${}^4T_C = 125^\circ\text{C}$	1.25 2.2		3.75 6.75	V
		$V_{GS} = 5\text{ V}, I_D = 50\text{ mA}$	0.25		0.375	
		$V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$	1.25		3.75	
Forward Transconductance ³	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 0.2\text{ A}$ $f = 1\text{ kHz}$	170	80		mS
Common Source Output Conductance ^{3,4}	g_{OS}	$V_{DS} = 5\text{ V}, I_D = 50\text{ mA}$	500			μS
DYNAMIC						
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}$ $V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	16		50	pF
Output Capacitance	C_{oss}		11		25	
Reverse Transfer Capacitance	C_{rss}		2		5	
SWITCHING						
Turn-On Time	t_{ON}	$V_{DD} = 30\text{ V}, R_L = 150\ \Omega$ $I_D = 0.2\text{ A}, V_{GEN} = 10\text{ V}$ $R_G = 25\ \Omega$ (Switching time is essentially independent of operating temperature)	7		20	ns
Turn-Off Time	t_{OFF}		7		20	

- NOTES
- $T_C = 25^\circ\text{C}$ unless otherwise noted
 - For design aid only, not subject to production testing
 - Pulse test, $PW = 80\ \mu\text{s}$, duty cycle $\leq 1\%$
 - This parameter not registered with JEDEC

N-Channel Enhancement-Mode MOSFET

DESIGNED FOR:

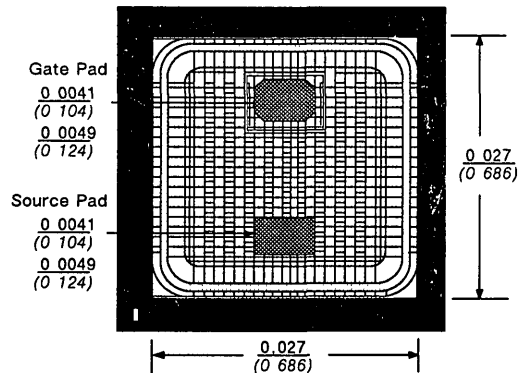
Switching
Amplification

FEATURES

- Low $r_{DS(on)} < 10 \Omega$
- Low Cost
- Surface Mount Package SOT-23

TYPE	PACKAGE	DEVICE
Single	TO-206AC	• VN10LE
	TO-92	• 2N7000, 2N7008 VN0603L, VN0610LL VN2222LL
	TO-237	• VN2222LM
	SOT-23	• VN0603T, VN0605T 2N7002
Quad	14-Pin Plastic	• VQ1000J
	14-Pin Dual-In-Line	• VQ1000P
	Chip	• Available as above specifications

GEOMETRY DIAGRAM



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