

NTE2980 Logic Level MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Dynamic dv/dt Rating
- Logic Level Gate Drive
- $R_{DS(on)}$ Specified at $V_{GS} = 4V$ & $5V$
- Fast Switching

Absolute Maximum Ratings:

Drain Current, I_D

Continuous ($V_{GS} = 5V$)

$T_C = +25^\circ C$ 7.7A

$T_C = +100^\circ C$ 4.9A

Pulsed (Note 1) 31A

Total Power Dissipation ($T_C = +25^\circ C$), P_D 25W

Derate Above $25^\circ C$ 0.20W/ $^\circ C$

Total Power Dissipation (PC Board Mount, $T_C = +25^\circ C$, Note 2), P_D 2.5W

Derate Above $25^\circ C$ 0.02W/ $^\circ C$

Gate-Source Voltage, V_{GS} $\pm 10V$

Single Pulsed Avalanche Energy (Note 3), E_{AS} 47mJ

Peak Diode Recovery dv/dt (Note 4), dv/dt 4.5V/ns

Operating Junction Temperature Range, T_J -55° to $+150^\circ C$

Storage Temperature Range, T_{stg} -55° to $+150^\circ C$

Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L $+260^\circ C$

Maximum Thermal Resistance:

Junction-to-Case, R_{thJC} $5.0^\circ C/W$

Junction-to-Ambient (PCB Mount, Note 2), R_{thJA} $50^\circ C/W$

Junction-to-Ambient, R_{thJA} $110^\circ C/W$

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2. When mounted on a 1" square PCB (FR-4 or G-10 material).

Note 3. $L = 924\mu H$, $V_{DD} = 25V$, $R_G = 25\Omega$, Starting $T_J = +25^\circ C$, $I_{AS} = 7.7A$.

Note 4. $I_{SD} \leq 10A$, $di/dt \leq 90A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +150^\circ C$.

Electrical Characteristics: ($T_J = +25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	60	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	Reference to +25°C, $I_D = 1mA$	–	0.073	–	V/°C
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 5V, I_D = 4.6A$, Note 5	–	–	0.20	Ω
		$V_{GS} = 4V, I_D = 3.9A$, Note 4	–	–	0.28	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	–	2.0	V
Forward Transconductance	g_{fs}	$V_{DS} = 25V, I_D = 4.6A$, Note 5	3.4	–	–	mhos
Drain–to–Source Leakage Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0$	–	–	25	μA
		$V_{DS} = 48V, V_{GS} = 0V, T_C = +125^\circ C$	–	–	250	μA
Gate–Source Leakage Forward	I_{GSS}	$V_{GS} = 10V$	–	–	100	nA
Gate–Source Leakage Reverse	I_{GSS}	$V_{GS} = -10V$	–	–	–100	nA
Total Gate Charge	Q_g	$V_{GS} = 5V, I_D = 10A, V_{DS} = 48V$, Note 5	–	–	8.4	nC
Gate–Source Charge	Q_{gs}		–	–	3.5	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	–	6.0	nC
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 10A, R_G = 12\Omega, R_D = 2.8\Omega$, Note 5	–	9.3	–	ns
Rise Time	t_r		–	110	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	17	–	ns
Fall Time	t_f		–	26	–	ns
Internal Drain Inductance	L_D	Between lead, 6mm (0.25”) from package and center of die contact	–	4.5	–	nH
Internal Source Inductance	L_S		–	7.5	–	nH
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$	–	400	–	pF
Output Capacitance	C_{oss}		–	170	–	pF
Reverse Transfer Capacitance	C_{rss}		–	42	–	pF
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode)	–	–	7.7	A
Pulse Source Current	I_{SM}	(Body Diode) Note 1	–	–	31	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ C, I_S = 7.7A, V_{GS} = 0V$, Note 5	–	–	1.6	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ C, I_F = 10A, di/dt = 100A/\mu s$, Note 5	–	65	130	ns
Reverse Recovery Charge	Q_{rr}		–	0.33	0.65	μC
Forward Turn–On Time	t_{on}	Intrinsic turn–on time is negligible (turn–on is dominated by $L_S + L_D$)				

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 5. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

