

NTE2981 Logic Level MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

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

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 42W

Derate Above $25^\circ C$ 0.33W/ $^\circ C$

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} 210mJ

Avalanche Current (Note 1), I_{AR} 7.7A

Repetitive Avalanche Energy (Note 1), E_{AR} 4.2mJ

Peak Diode Recovery dv/dt (Note 4), dv/dt 5.5V/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} $3.0^\circ C/W$

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. $L = 5.3mH$, $V_{DD} = 25V$, $R_G = 25\Omega$, Starting $T_J = +25^\circ C$, $I_{AS} = 7.7A$.

Note 4. $I_{SD} \leq 9.2A$, $di/dt \leq 110A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +150^\circ C$.

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 = 250μA	100	–	–	V
Breakdown Voltage Temperature Coefficient	ΔV _{(BR)DSS} /ΔT _J	Reference to +25°C, I _D = 1mA	–	0.13	–	V/°C
Static Drain–Source ON Resistance	R _{DS(on)}	V _{GS} = 5V, I _D = 4.6A, Note 5	–	–	0.27	Ω
		V _{GS} = 4V, I _D = 3.9A, Note 4	–	–	0.38	Ω
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	–	2.0	V
Forward Transconductance	g _{fs}	V _{DS} = 50V, I _D = 4.6A, Note 5	4.4	–	–	mhos
Drain–to–Source Leakage Current	I _{DSS}	V _{DS} = 100V, V _{GS} = 0	–	–	25	μA
		V _{DS} = 80V, V _{GS} = 0V, T _C = +125°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 = 9.2A, V _{DS} = 80V, Note 5	–	–	12	nC
Gate–Source Charge	Q _{gs}		–	–	3.0	nC
Gate–Drain (“Miller”) Charge	Q _{gd}		–	–	7.1	nC
Turn–On Delay Time	t _{d(on)}	V _{DD} = 50V, I _D = 9.2A, R _G = 9.0Ω, R _D = 5.2Ω, Note 5	–	9.8	–	ns
Rise Time	t _r		–	64	–	ns
Turn–Off Delay Time	t _{d(off)}		–	21	–	ns
Fall Time	t _f		–	27	–	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	–	490	–	pF
Output Capacitance	C _{oss}		–	150	–	pF
Reverse Transfer Capacitance	C _{rss}		–	30	–	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°C, I _S = 7.7A, V _{GS} = 0V, Note 5	–	–	2.5	V
Reverse Recovery Time	t _{rr}	T _J = +25°C, I _F = 9.2A, di/dt = 100A/μs, Note 5	–	110	140	ns
Reverse Recovery Charge	Q _{rr}		–	0.8	1.0	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 $\leq 2\%$.

