

NTE2986 Logic Level MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Dynamic dv/dt Rating
- Logic Level Gate Drive
- $R_{DS(on)}$ Specified at $V_{GS} = 4V$ & $5V$
- $+175^{\circ}C$ Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

Absolute Maximum Ratings:

Drain Current, I_D

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

$T_C = +25^{\circ}C$ 50A

$T_C = +100^{\circ}C$ 36A

Pulsed (Note 1) 200A

Total Power Dissipation ($T_C = +25^{\circ}C$), P_D 150W

Derate Above $25^{\circ}C$ 1.0W/ $^{\circ}C$

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

Single Pulsed Avalanche Energy (Note 2), E_{AS} 110mJ

Peak Diode Recovery dv/dt (Note 3), dv/dt 4.5V/ns

Operating Junction Temperature Range, T_J -55° to $+175^{\circ}C$

Storage Temperature Range, T_{stg} -55° to $+175^{\circ}C$

Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L $+300^{\circ}C$

Mounting Torque, 6-32 or M3 Screw 10 lbf•in (1.1 N•m)

Thermal Resistance:

Maximum Junction-to-Case, R_{thJC} 1.0K/W

Typical Case-to-Sink (Mounting surface flat, smooth, and greased), R_{thCS} 0.5K/W

Maximum Junction-to-Ambient (Free Air Operation), R_{thJA} 62K/W

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

Note 2. $L = 179\mu H$, $V_{DD} = 25V$, $R_G = 25\Omega$, $I_{AS} = 51A$, Starting $T_J = +175^{\circ}C$.

Note 3. $I_{SD} \leq 51A$, $di/dt \leq 250A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +175^{\circ}C$.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250μA	60	–	–	V
Breakdown Voltage Temperature Coefficient	ΔV _{(BR)DSS} /ΔT _J	Reference to +25°C, I _D = 1mA	–	0.07	–	V/°C
Static Drain–Source ON Resistance	R _{DS(on)}	V _{GS} = 5V, I _D = 31A, Note 4	–	–	0.028	Ω
		V _{GS} = 4V, I _D = 25A, Note 4	–	–	0.039	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} ≥ 25V, I _D = 31A, Note 4	23	–	–	mhos
Drain–to–Source Leakage Current	I _{DSS}	V _{DS} = 60V, V _{GS} = 0	–	–	25	μA
		V _{DS} = 48V, V _{GS} = 0V, , T _C = +150°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 = 51A, V _{DS} = 48V	–	–	66	nC
Gate–Source Charge	Q _{gs}		–	–	12	nC
Gate–Drain (“Miller”) Charge	Q _{gd}		–	–	43	nC
Turn–On Delay Time	t _{d(on)}	V _{DD} = 30V, I _D = 51A, R _G = 4.6Ω, R _D = 0.56Ω	–	17	–	ns
Rise Time	t _r		–	230	–	ns
Turn–Off Delay Time	t _{d(off)}		–	42	–	ns
Fall Time	t _f		–	110	–	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	–	3300	–	pF
Output Capacitance	C _{oss}		–	1200	–	pF
Reverse Transfer Capacitance	C _{rss}		–	200	–	pF
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I _S	(Body Diode)	–	–	50	A
Pulse Source Current	I _{SM}	(Body Diode) Note 1	–	–	200	A
Diode Forward Voltage	V _{SD}	T _J = +25°C, I _S = 51A, V _{GS} = 0V, Note 4	–	–	2.5	V
Reverse Recovery Time	t _{rr}	T _J = +25°C, I _F = 51A, di/dt = 100A/μs, Note 4	–	130	180	ns
Reverse Recovery Charge	Q _{rr}		–	0.84	1.3	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 4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

