

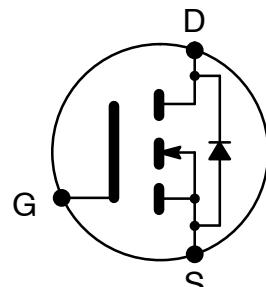


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NTE2986
Logic Level MOSFET
N-Channel, Enhancement Mode
High Speed Switch
TO220 Type Package

Features:

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



Absolute Maximum Ratings:

Drain Current, I_D	
Continuous ($V_{GS} = 5V$)	
$T_C = +25^{\circ}\text{C}$	..... 50A
$T_C = +100^{\circ}\text{C}$	..... 36A
Pulsed (Note 1)	..... 200A
Total Power Dissipation ($T_C = +25^{\circ}\text{C}$), P_D	..... 150W
Derate Above 25°C}$	..... 1.0\text{W}/^{\circ}\text{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 $+175^{\circ}\text{C}$
Storage Temperature Range, T_{stg}	..... -55° to $+175^{\circ}\text{C}$
Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L$	..... +300^{\circ}\text{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. $L = 179 \leq H$, $V_{DD} = 25V$, $R_G = 25\Omega$, $I_{AS} = 51A$, Starting $T_J = +175^{\circ}\text{C}$.

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

Rev. 10-13

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}	$V_{\text{GS}} = 0\text{V}$, $I_D = 250\text{mA}$	60	—	—	V
Breakdown Voltage Temperature Coefficient	$\pm V_{(\text{BR})\text{DSS}}/\pm T_J$	Reference to $+25^\circ\text{C}$, $I_D = 1\text{mA}$	—	0.07	—	$\text{V}/^\circ\text{C}$
Static Drain–Source ON Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 5\text{V}$, $I_D = 31\text{A}$, Note 4	—	—	0.028	\geq
		$V_{\text{GS}} = 4\text{V}$, $I_D = 25\text{A}$, Note 4	—	—	0.039	\geq
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}$, $I_D = 250\text{nA}$	1.0	—	2.0	V
Forward Transconductance	g_{fs}	$V_{\text{DS}} \geq 25\text{V}$, $I_D = 31\text{A}$, Note 4	23	—	—	mhos
Drain-to-Source Leakage Current	I_{DSS}	$V_{\text{DS}} = 60\text{V}$, $V_{\text{GS}} = 0$	—	—	25	$\leq\text{A}$
		$V_{\text{DS}} = 48\text{V}$, $V_{\text{GS}} = 0\text{V}$, $T_C = +150^\circ\text{C}$	—	—	250	$\leq\text{A}$
Gate–Source Leakage Forward	I_{GSS}	$V_{\text{GS}} = 10\text{V}$	—	—	100	nA
Gate–Source Leakage Reverse	I_{GSS}	$V_{\text{GS}} = -10\text{V}$	—	—	-100	nA
Total Gate Charge	Q_g	$V_{\text{GS}} = 5\text{V}$, $I_D = 51\text{A}$, $V_{\text{DS}} = 48\text{V}$	—	—	66	nC
Gate–Source Charge	Q_{gs}		—	—	12	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		—	—	43	nC
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = 30\text{V}$, $I_D = 51\text{A}$, $R_G = 4.6\text{M}\Omega$, $R_D = 0.56\text{M}\Omega$	—	17	—	ns
Rise Time	t_r		—	230	—	ns
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		—	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}	$V_{\text{GS}} = 0\text{V}$, $V_{\text{DS}} = 25\text{V}$, $f = 1\text{MHz}$	—	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}	$T_J = +25^\circ\text{C}$, $I_S = 51\text{A}$, $V_{\text{GS}} = 0\text{V}$, Note 4	—	—	2.5	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}$, $I_F = 51\text{A}$, $dI/dt = 100\text{A}/\mu\text{s}$, 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 $\leq 2\%$.

