

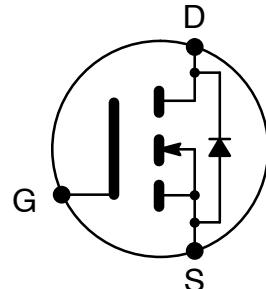


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NTE2946
MOSFET
N-Channel, Enhancement Mode
High Speed Switch
TO220 Full Pack Type Package

Features:

- Low Static Drain-Source ON Resistance
- Improved Inductive Ruggedness
- Fast Switching Times
- Low Input Capacitance
- Extended Safe Operating Area
- Improved High Temperature Reliability
- TO220 Type Isolated Package



Absolute Maximum Ratings:

Drain-Source Voltage (Note 1), V_{DSS}	500V
Drain-Gate Voltage ($R_{GS} = 1M\pm$, Note 1), V_{DGR}	500V
Gate-Source Voltage, V_{GS}	$\pm 20V$
Drain Current, I_D Continuous	
$T_C = +25^\circ C$	4.6A
$T_C = +100^\circ C$	3.2A
Pulsed (Note 2)	32A
Gate Current (Pulsed), I_{GM}	$\pm 1.5A$
Single Pulsed Avalanche Energy (Note 3), E_{AS}	161mJ
Avalanche Current, I_{AS}	4.6A
Total Power Dissipation ($T_C = +25^\circ C$), P_D	40W
Derate Above $25^\circ C$	$0.32W/^\circ C$
Operating Junction Temperature Range, T_J	-55° to +150°C
Storage Temperature Range, T_{stg}	-55° to +150°C
Maximum Lead Temperature (During Soldering, 1/8" from case, 5sec), T_L	+300°C
Thermal Resistance:	
Maximum Junction-to-Case, R_{thJC}	3.12K/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}	62.5K/W

Note 1. $T_J = +25^\circ$ to $+150^\circ C$.

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 3. $L = 14mH$, $V_{DD} = 50V$, $R_G = 25\pm$, Starting $T_J = +25^\circ C$.

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}	$V_{\text{GS}} = 0\text{V}, I_D = 250\text{mA}$	500	—	—	V
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250\text{mA}$	2.0	—	4.0	V
Gate-Source Leakage Forward	I_{GSS}	$V_{\text{GS}} = 20\text{V}$	—	—	100	nA
Gate-Source Leakage Reverse	I_{GSS}	$V_{\text{GS}} = -20\text{V}$	—	—	-100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = \text{Max. Rating}, V_{\text{GS}} = 0$	—	—	250	mA
		$V_{\text{DS}} = 0.8 \text{ Max. Rating}, T_C = +125^\circ\text{C}$	—	—	1000	mA
Static Drain-Source ON Resistance	$R_{\text{DS(on)}}$	$V_{\text{GS}} = 10\text{V}, I_D = 4\text{A}$, Note 4	—	—	0.85	\pm
Forward Transconductance	g_{fs}	$V_{\text{DS}} \geq 50\text{V}, I_D = 4\text{A}$, Note 4	4.0	6.5	—	mhos
Input Capacitance	C_{iss}	$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = 25\text{V}, f = 1\text{MHz}$	—	1510	—	pF
Output Capacitance	C_{oss}		—	154	—	pF
Reverse Transfer Capacitance	C_{rss}		—	66	—	pF
Turn-On Delay Time	$t_{\text{d(on)}}$	$V_{\text{DD}} = 0.5 \text{ BV}_{\text{DSS}}, I_D = 8\text{A}, Z_O = 9.1\pm$, (MOSFET switching times are essentially independent of operating temperature)	—	14	21	ns
Rise Time	t_r		—	23	35	ns
Turn-Off Delay Time	$t_{\text{d(off)}}$		—	49	74	ns
Fall Time	t_f		—	20	30	ns
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	$V_{\text{GS}} = 10\text{V}, I_D = 8\text{A}, V_{\text{DS}} = 0.8 \text{ Max. Rating}$, (Gate charge is essentially independent of operating temperature)	—	—	74	nC
Gate-Source Charge	Q_{gs}		—	9	—	nC
Gate-Drain ("Miller") Charge	Q_{gd}		—	27	—	nC
Source-Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode)	—	—	8	A
Pulse Source Current	I_{SM}	(Body Diode) Note 2	—	—	32	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 8\text{A}, V_{\text{GS}} = 0\text{V}$, Note 4	—	—	2	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 8\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	—	460	970	ns

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

