

**NTE2945
 MOSFET
 N-Channel, Enhancement Mode
 High Speed Switch**

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}	400V
Drain-Gate Voltage ($R_{GS} = 1M\Omega$, Note 1), V_{DGR}	400V
Gate-Source Voltage, V_{GS}	$\pm 20V$
Drain Current, I_D	
Continuous	
$T_C = +25^\circ C$	5.5A
$T_C = +100^\circ C$	3.9A
Pulsed (Note 2)	40A
Gate Current (Pulsed), I_{GM}	$\pm 1.5A$
Single Pulsed Avalanche Energy (Note 3), E_{AS}	157mJ
Avalanche Current, I_{AS}	5.5A
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 $+150^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ C$
Maximum Lead Temperature (During Soldering, 1/8" from case, 5sec), T_L	$+300^\circ C$
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. $L = 9.1mH$, $V_{DD} = 50V$, $R_G = 25\Omega$, 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}	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	450	–	–	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.0	–	4.0	V
Gate–Source Leakage Forward	I_{GSS}	$V_{GS} = 20\text{V}$	–	–	100	nA
Gate–Source Leakage Reverse	I_{GSS}	$V_{GS} = -20\text{V}$	–	–	-100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = \text{Max. Rating}, V_{GS} = 0$	–	–	250	μA
		$V_{DS} = 0.8 \text{ Max. Rating}, T_C = +125^\circ\text{C}$	–	–	1000	μA
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 5\text{A}, \text{Note 4}$	–	–	0.55	Ω
Forward Transconductance	g_{fs}	$V_{DS} \geq 50\text{V}, I_D = 5\text{A}, \text{Note 4}$	5.8	8.7	–	mhos
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$	–	1500	–	pF
Output Capacitance	C_{oss}		–	170	–	pF
Reverse Transfer Capacitance	C_{rss}		–	75	–	pF
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 0.5 BV_{DSS}, I_D = 10\text{A}, Z_O = 9.1\Omega,$ (MOSFET switching times are essentially independent of operating temperature)	–	14	21	ns
Rise Time	t_r		–	27	41	ns
Turn–Off Delay Time	$t_{d(off)}$		–	50	75	ns
Fall Time	t_f		–	24	36	ns
Total Gate Charge (Gate–Source Plus Gate–Drain)	Q_g	$V_{GS} = 10\text{V}, I_D = 10\text{A}, V_{DS} = 0.8 \text{ Max. Rating},$ (Gate charge is essentially independent of operating temperature)	–	–	79	nC
Gate–Source Charge	Q_{gs}		–	1013	–	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	32.3	–	nC
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode)	–	–	10	A
Pulse Source Current	I_{SM}	(Body Diode) Note 2	–	–	40	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 10\text{A}, V_{GS} = 0\text{V}, \text{Note 4}$	–	–	2	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 10\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	–	370	–	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 $\leq 2\%$.

