



ELECTRONICS, INC.
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NTE2933 MOSFET N-Channel, Enhancement Mode High Speed Switch

Features:

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower $R_{DS(on)}$: 0.437 Ω Typ
- Lower Leakage Current: 10 μ A (Max) @ $V_{DS} = 400V$

Absolute Maximum Ratings:

Drain-to-Source Voltage, V_{DSS}	400V
Drain Current, I_D	
Continuous	
$T_C = +25^\circ C$	8A
$T_C = +100^\circ C$	5.1A
Pulsed (Note 1)	44A
Total Power Dissipation ($T_C = +25^\circ C$), P_D	85W
Derate Above $25^\circ C$	0.68W/ $^\circ C$
Gate-Source Voltage, V_{GS}	$\pm 30V$
Single Pulsed Avalanche Energy (Note 2), E_{AS}	549mJ
Avalanche Current (Note 1), I_{AR}	8A
Repetitive Avalanche Energy (Note 1), E_{AR}	8.5mJ
Peak Diode Recovery dv/dt (Note 3), dv/dt	4.0V/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, 1/8" from case, 5sec), T_L	$+300^\circ C$
Thermal Resistance, Junction-to-Case, R_{thJC}	1.46 $^\circ C/W$
Thermal Resistance, Junction-to-Ambient, R_{thJA}	40 $^\circ C/W$

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

Note 2. $L = 15mH$, $I_{AS} = 8A$, $V_{DD} = 50V$, $R_G = 27\Omega$, Starting $T_J = +25^\circ C$.

Note 3. $I_{SD} \leq 10A$, $di/dt \leq 170A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, 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}	$V_{GS} = 0V, I_D = 250\mu A$	400	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	$I_D = 250\mu A$	–	0.50	–	V/°C
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 5V, I_D = 250\mu A$	2.0	–	4.0	V
Gate–Source Leakage Forward	I_{GSS}	$V_{GS} = 30V$	–	–	100	nA
Gate–Source Leakage Reverse	I_{GSS}	$V_{GS} = -30V$	–	–	-100	nA
Drain–to–Source Leakage Current	I_{DSS}	$V_{DS} = 400V$	–	–	10	μA
		$V_{DS} = 320V, T_C = +150^\circ\text{C}$	–	–	100	μA
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4A, \text{Note 4}$	–	–	0.55	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 50V, I_D = 4A, \text{Note 4}$	–	7.05	–	mhos
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$	–	1180	1530	pF
Output Capacitance	C_{oss}		–	175	205	pF
Reverse Transfer Capacitance	C_{rss}		–	80	95	pF
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 200V, I_D = 10A, R_G = 9.1\Omega, \text{Note 4, Note 5}$	–	18	50	ns
Rise Time	t_r		–	21	55	ns
Turn–Off Delay Time	$t_{d(off)}$		–	78	170	ns
Fall Time	t_f		–	28	65	ns
Total Gate Charge	Q_g	$V_{GS} = 10V, I_D = 10A, V_{DS} = 320V, \text{Note 4, Note 5}$	–	58	75	nC
Gate–Source Charge	Q_{gs}		–	8.1	–	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	31.3	–	nC
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode)	–	–	8	A
Pulse Source Current	I_{SM}	(Body Diode) Note 1	–	–	44	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 8A, V_{GS} = 0V, \text{Note 4}$	–	–	1.5	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 10A, di_F/dt = 100A/\mu s, \text{Note 4}$	–	315	–	ns
Reverse Recovery Charge	Q_{rr}		–	2.84	–	μC

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

Note 4. Pulse Test: Pulse Width = 250 μs , Duty Cycle $\leq 2\%$.

Note 5. Essentially independent of operating temperature.

