NTE2939
MOSFET
N−Ch, Enhancement Mode
High Speed Switch
TO−220 Full Pack Type Package
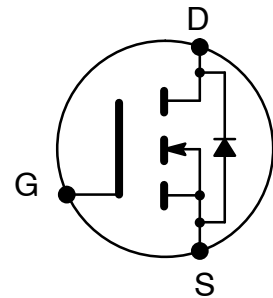
Features:

- Low Drain−Source ON Resistance: $R_{DS(ON)}$ = 0.33Ω Typ.
- High Forward Transfer Admittance: $|Y_{fs}|$ = 6.5 S Typ.
- Low Leakage Current: I_{DSS} = 10μA Max. (V_{DS} = 600V)
- Enhancement−Mode: V_{th} = 2.0V to 4.0V (V_{DS} = 10V, I_D = 1mA)

Absolute Maximum Ratings: (T_A = +25°C, Note 1 unless otherwise specified)

Drain−Source Voltage, V_{DSS} 600V

Gate−Source Voltage, V_{GSS} .... ±30

Drain Current (Note 2), I_D
  DC 13A
  Pulsed 52A

Drain Power Dissipation (T_C = +25°C), P_D 50W

Single Pulse Avalanche Energy (Note 3), E_{AS} 511mJ

Avalanche Current, I_{AR} 13A

Repetitive Avalanche Energy (Note 4), E_{AR} 5mJ

Channel Temperature, T_{ch} .... +150°C

Storage Temperature Range, T_{stg} .... −55° to +150°C

Thermal Resistance, Channel−to−Case, R_{thCH-C} .... 2.5°C/W

Thermal Resistance, Channel−to−Ambient, R_{thCH-A} .... 62.5°C/W

Note 1. Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc. may cause this device to decrease in reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the Absolute Maximum Ratings. This transistor is an electrostatic sensitive device. Please handle with caution.

Note 2. Make sure that the device channel temperature is below +150°C.

Note 3. V_{DD} = 90V, T_{ch} = +25°C (Initial), L = 5.3mH, R_G = 25Ω, I_{AR} = 13A

Note 4. Repetitive rating; pulse width limited by maximum channel temperature.

RoHS
2002/95/EC

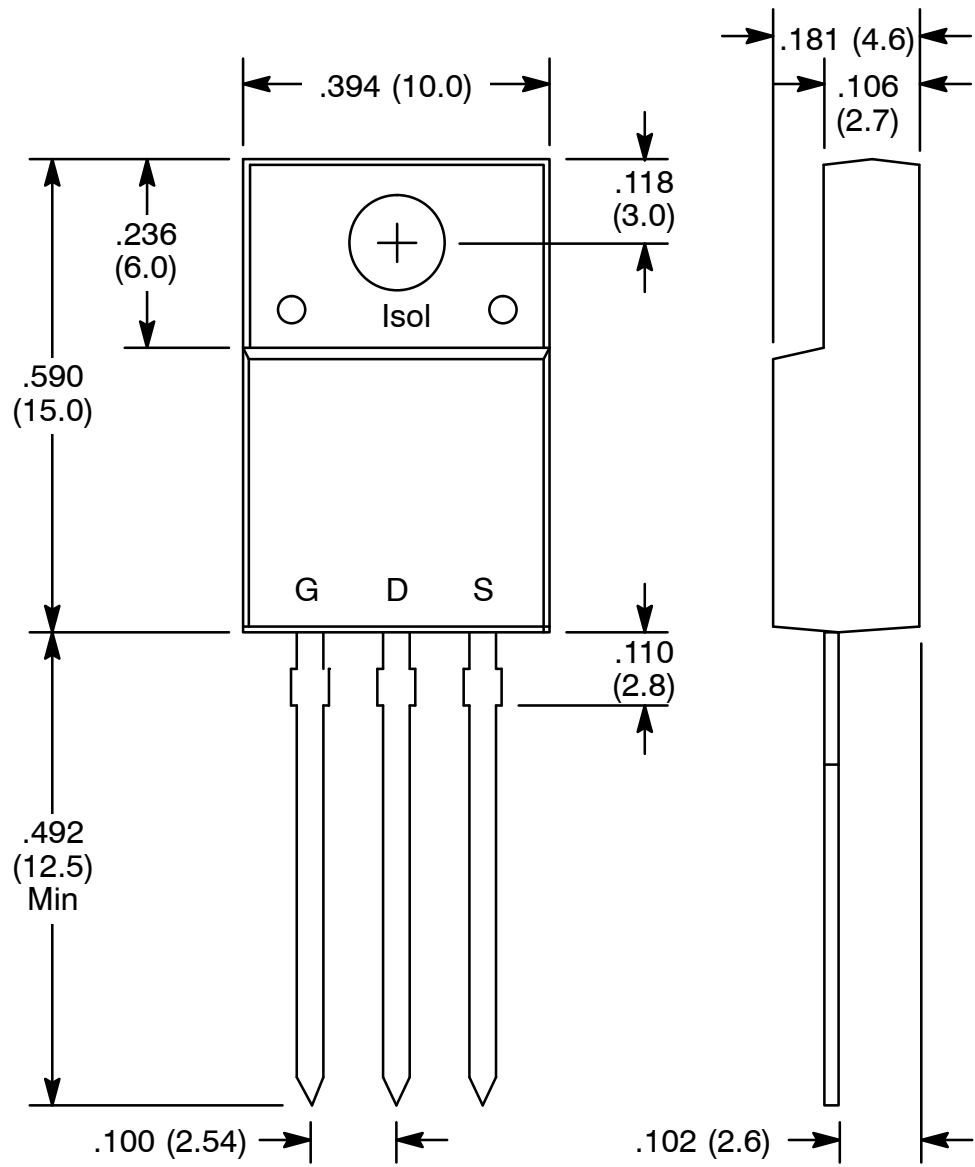## Electrical Characteristics: (T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Gate Leakage Current	I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V	–	–	±1	μA
Drain Cut–Off Current	I_{DSS}	V_{DS} = 600V, V_{GS} = 0V	–	–	10	μA
Drain–Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 10mA	600	–	–	V
Gate Threshold Voltage	V_{th}	V_{DS} = 10V, I_D = 1mA	2.0	–	4.0	V
Drain–Source On–Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 6.5A	–	0.33	0.43	Ω
Forward Transfer Admittance	$|Y_{fs}|$	V_{DS} = 10V, I_D = 6.5A	1.8	6.5	–	S
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz	–	2300	–	pF
Output Capacitance	C_{oss}		–	250	–	pF
Reverse Transfer Capacitance	C_{rss}		–	10	–	pF
Turn–On Delay Time	$t_{d(on)}$	V_{DD} = 200V, I_D = 6.5A, R_L = 30Ω, Note 5	–	100	–	ns
Rise Time	t_r		–	50	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	140	–	ns
Fall Time	t_f		–	25	–	ns
Total Gate Charge	Q_g	I_D = 13A, V_{DS} = 400V, V_{GS} = 10V	–	40	–	nC
Gate–to–Source Charge	Q_{gs}		–	25	–	nC
Gate–to–Drain ("Miller") Charge	Q_{gd}		–	15	–	nC

Note 5. Duty Cycle ≤ 1%, t_w = 10μs.

Source–Drain Ratings and Characteristics: (T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Drain Reverse Current	I_{DR}	Note 2	–	–	13	A
Pulsed Drain Reverse Current	I_{DRP}	Note 2	–	–	52	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 13A, V_{GS} = 0V	–	–	–1.7	V
Reverse Recovery Time	t_{rr}	I_{DR} = 13A, V_{GS} = 0V, di_{DR}/dt = 100A/μs	–	1600	–	ns
Reverse Recovery Charge	Q_{rr}		–	20	–	μC

Note 2. Make sure that the device channel temperature is below +150°C.

.394 (10.0)

.236
(6.0)

.590
(15.0)

.118
(3.0)

Isol

G   D   S

.110
(2.8)

.492
(12.5)
Min

.100 (2.54)

.181 (4.6)

.106
(2.7)

.102 (2.6)

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