

## NTE2376 MOSFET N-Ch, Enhancement Mode High Speed Switch

### **Features:**

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

### **Absolute Maximum Ratings:**

Continuous Drain Current ( $V_{GS} = 10V$ ), $I_D$	
$T_C = +25^\circ C$ .....	30A
$T_C = +100^\circ C$ .....	19A
Pulsed Drain Current (Note 1), $I_{DM}$ .....	120A
Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	190W
Derate Linearly Above $25^\circ C$ .....	1.5W/ $^\circ C$
Gate-to-Source Voltage, $V_{GS}$ .....	$\pm 20V$
Single Pulse Avalanche Energy (Note 2), $E_{AS}$ .....	410mJ
Avalanche Current (Note 1), $I_{AR}$ .....	30A
Repetitive Avalanche Energy (Note 1), $E_{AR}$ .....	19mJ
Peak Diode Recovery dv/dt (Note 3), dv/dt .....	5V/ns
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ C$
Lead Temperature (During Soldering, 1.6mm from case for 10sec), $T_L$ .....	$+300^\circ C$
Mounting Torque (6-32 or M3 Screw) .....	10 lbf•in (1.1N•m)
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	0.65 $^\circ C/W$
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	40 $^\circ C/W$
Typical Thermal Resistance, Case-to-Sink (Flat, Greased Surface), $R_{thCS}$ .....	0.24 $^\circ C/W$

Note 1. Repetitive rating; pulse width limited by maximum junction temperature.

Note 2.  $V_{DD} = 50V$ , starting  $T_J = +25^\circ C$ ,  $L = 683\mu H$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 30A$

Note 3.  $I_{SD} \leq 30A$ ,  $di/dt \leq 190A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq +150^\circ C$

**Electrical Characteristics:** ( $T_J = +25^{\circ}\text{C}$  unless otherwise specified)

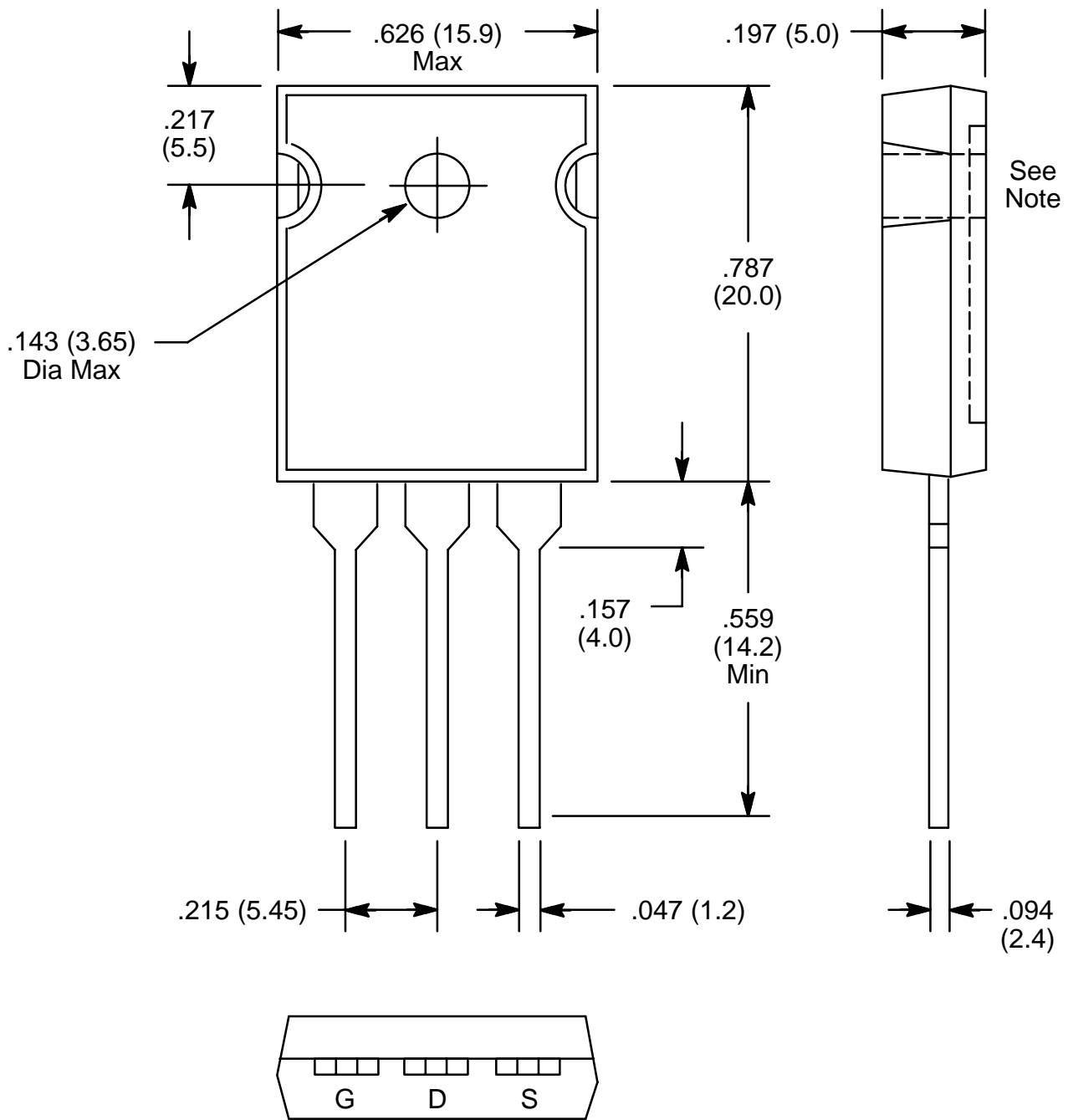
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}$ , $I_D = 250\mu\text{A}$	200	—	—	V
Breakdown Voltage Temp. Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to $+25^{\circ}\text{C}$ , $I_D = 1\text{mA}$	—	0.27	—	V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$ , $I_D = 18\text{A}$ , Note 4	—	—	0.085	$\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$	2.0	—	4.0	V
Forward Transconductance	$g_{fs}$	$V_{DS} = 50\text{V}$ , $I_D = 18\text{A}$ , Note 4	12	—	—	mhos
Drain-to-Source Leakage Current	$I_{DSS}$	$V_{DS} = 200\text{V}$ , $V_{GS} = 0\text{V}$	—	—	25	$\mu\text{A}$
		$V_{DS} = 160\text{V}$ , $V_{GS} = 0\text{V}$ , $T_J = +125^{\circ}\text{C}$	—	—	250	$\mu\text{A}$
Gate-to-Source Forward Leakage	$I_{GSS}$	$V_{GS} = 20\text{V}$	—	—	100	nA
Gate-to-Source Reverse Leakage	$I_{GSS}$	$V_{GS} = -20\text{V}$	—	—	-100	nA
Total Gate Charge	$Q_g$	$I_D = 30\text{A}$ , $V_{DS} = 160\text{V}$ , $V_{GS} = 10\text{V}$ , Note 4	—	—	140	nC
Gate-to-Source Charge	$Q_{gs}$		—	—	28	nC
Gate-to-Drain ("Miller") Charge	$Q_{gd}$		—	—	74	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 100\text{V}$ , $I_D = 30\text{A}$ , $R_G = 6.2\Omega$ , $R_D = 3.2\Omega$ , Note 4	—	16	—	ns
Rise Time	$t_r$		—	86	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	70	—	ns
Fall Time	$t_f$		—	62	—	ns
Internal Drain Inductance	$L_D$	Between lead, .250in. (6.0) mm from package and center of die contact	—	5.0	—	nH
Internal Source Inductance	$L_S$		—	13.0	—	nH
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$	—	2800	—	pF
Output Capacitance	$C_{oss}$		—	780	—	pF
Reverse Transfer Capacitance	$C_{rss}$		—	250	—	pF

**Source-Drain Ratings and Characteristics:**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	$I_S$		—	—	30	A
Pulsed Source Current (Body Diode)	$I_{SM}$	Note 1	—	—	120	A
Diode Forward Voltage	$V_{SD}$	$T_J = +25^{\circ}\text{C}$ , $I_S = 30\text{A}$ , $V_{GS} = 0\text{V}$ , Note 4	—	—	2.0	V
Reverse Recovery Time	$t_{rr}$	$T_J = +25^{\circ}\text{C}$ , $I_F = 30\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$ , Note 4	—	360	540	ns
Reverse Recovery Charge	$Q_{rr}$		—	4.6	6.9	$\mu\text{C}$
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 width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .



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**Note:** Drain connected to metal part of mounting surface.