

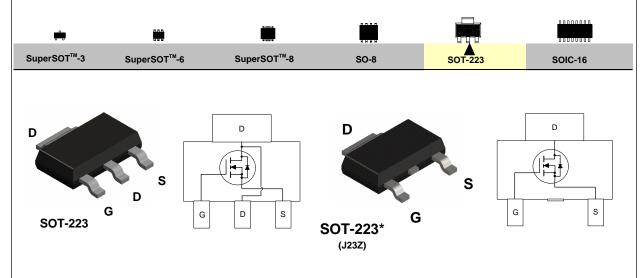
# NDT3055 N-Channel Enhancement Mode Field Effect Transistor

## **General Description**

These N-Channel enhancement mode power field effect transistors are produced using Fairchild's proprietary, high cell density, DMOS technology. This very high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These devices are particularly suited for low voltage applications such as DC motor control and DC/DC conversion where fast switching, low in-line power loss, and resistance to transients are needed.

## Features

- 4 A, 60 V.  $R_{DS(ON)} = 0.100 \Omega @ V_{GS} = 10 V.$
- High density cell design for extremely low R<sub>DS(ON)</sub>.
- High power and current handling capability in a widely used surface mount package.



# **Absolute Maximum Ratings** $T_A = 25^{\circ}C$ unless otherwise noted

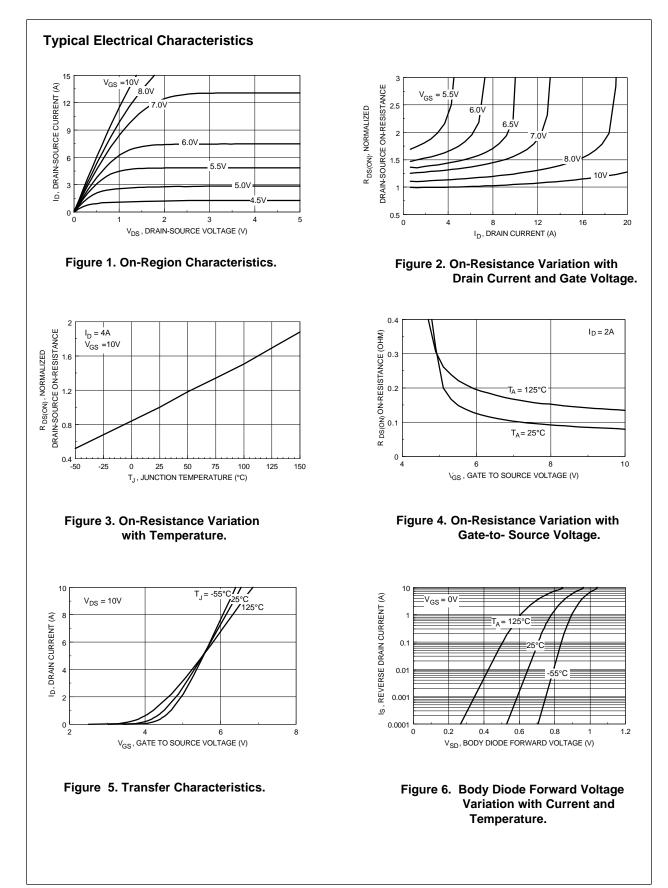
Symbol	Parameter		NDT3055	Units
V <sub>DSS</sub>	Drain-Source Voltage		60	V
V <sub>GSS</sub>	Gate-Source Voltage - Continuous		<u>+2</u> 0	V
I <sub>D</sub>	Maximum Drain Current - Continuou	S (Note 1a)	4	А
- Pulsed			25	
P <sub>D</sub>	Maximum Power Dissipation	(Note 1a)	3	W
		(Note 1b)	1.3	
		(Note 1c)	1.1	
T_,,T <sub>stg</sub>	Operating and Storage Temperature	Range	-65 to 150	C°
THERMA	L CHARACTERISTICS			
R <sub>eja</sub>	Thermal Resistance, Junction-to-Am	bient (Note 1a)	42	°C/W
R <sub>evc</sub>	Thermal Resistance, Junction-to-Cas	SE (Note 1)	12	°C/W

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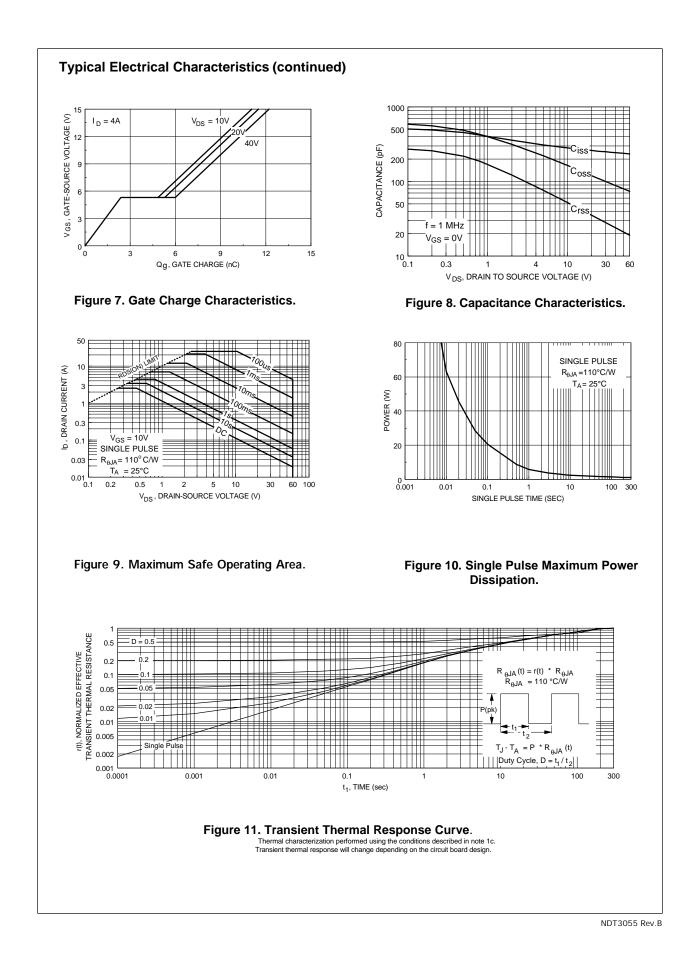
May 1998

ERISTICS ain-Source Breakdown Voltage eakdown Voltage Temp. Coefficient ro Gate Voltage Drain Current ate - Body Leakage, Forward ate - Body Leakage, Reverse RISTICS (Note 2) ate Threshold Voltage atic Drain-Source On-Resistance h-State Drain Current rward Transconductance EACTERISTICS but Capacitance atput Capacitance exerse Transfer Capacitance ARACTERISTICS (Note 2)	$V_{GS} = 0 V, I_{D} = 250 \mu A$ $I_{D} = 250 \mu A, Referenced$ $V_{DS} = 48 V, V_{GS} = 0 V$ $V_{GS} = 20 V, V_{DS} = 0 V$ $V_{GS} = -20 V, V_{DS} = 0 V$ $V_{DS} = V_{GS}, I_{D} = 250 \mu A$ $V_{GS} = 10 V, I_{D} = 4 A$ $V_{GS} = 10 V, V_{DS} = 10 V$ $V_{DS} = 15 V, I_{D} = 4 A$ $V_{DS} = 30 V, V_{GS} = 0 V,$	to 25 °C T <sub>J</sub> =125 °C T <sub>J</sub> =125 °C T <sub>J</sub> =125 °C	60 2 1.5 15	63 63 2.4 0.084 0.14	10 100 -100 -100 4 3 0.1 0.18	V mV/°C μA μA nA nA V V
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rward Transconductance CACTERISTICS Dut Capacitance Utput Capacitance Everse Transfer Capacitance	$V_{DS} = 15 \text{ V}, I_{D} = 4 \text{ A}$		15			
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out Capacitance Itput Capacitance everse Transfer Capacitance	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1.0 MHz			6		3
utput Capacitance everse Transfer Capacitance	f = 1.0  MHz			250		pF
verse Transfer Capacitance				100		pF
•				30		pF
ARACIERISTICS (Note 2)				50		р
rn - On Delay Time	$V_{DD} = 25 \text{ V}, \text{ I}_{D} = 1.2 \text{ A},$			10	25	ns
rn - On Rise Time	$V_{DD} = 25 \text{ V}, \text{ I}_{D} = 1.2 \text{ A},$ $V_{GS} = 10 \text{ V}, \text{ R}_{GEN} = 50 \text{ G}$	2		18	23 50	ns
rn - Off Delay Time	V <sub>GS</sub> = 10 V, V <sub>GEN</sub> = 00 L			37	65	
rn - Off Fall Time				30	60	ns
	V - 40 V I - 4 A			9	15	ns nC
tal Gate Charge	$V_{\rm DS} = 40 \text{ V}, \ I_{\rm D} = 4 \text{ A}, \\ V_{\rm GS} = 10 \text{ V}$			-	15	nC
				-		
-				2.0		nC
					25	А
	1			0.95		V X
; junction-to-case and case-to-ambient thermal resistance ) while $R_{\rm gcA}$ is determined by the user's board design.	where the case thermal reference is defined		unting surfa			bins. R <sub>euc</sub> is
a. 42°C/W when mounted on a 1 in <sup>2</sup> pad of 2oz Cu.	b. 95°CW when mount pad of 2oz Cu.	ed on a 0.066 in <sup>2</sup>				d on a 0.001:
size paper th ≤ 300μs, Duty Cycle ≤ 2.0%						
	aximum Continuous Drain-Source Diode F ain-Source Diode Forward Voltage a junction-to-case and case-to-ambient thermal resistance while R <sub>eck</sub> is determined by the user's board design. a board layouts shown below on FR-4 PCB in a still air env a. 42°C/W when mounted on a 1 in <sup>2</sup> pad of 2oz Cu.	inte-Source Criarge       inte-Drain Charge         DIODE CHARACTERISTICS AND MAXIMUM RATINGS         aximum Continuous Drain-Source Diode Forward Current         ain-Source Diode Forward Voltage $V_{GS} = 0 \text{ V}, I_S = 2.5 \text{ A}$ (No         ain-Source Diode Forward Voltage $V_{GS} = 0 \text{ V}, I_S = 2.5 \text{ A}$ (No         a junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined by the user's board design.         a board layouts shown below on FR-4 PCB in a still air environment:         a. 42°C/W when mounted on a 1 in² pad of 20z Cu.         size paper	ite-Source Criarge       ite-Drain Charge <b>DODE CHARACTERISTICS AND MAXIMUM RATINGS</b> aximum Continuous Drain-Source Diode Forward Current         ain-Source Diode Forward Voltage $V_{GS} = 0 \text{ V}, \text{ I}_S = 2.5 \text{ A} \text{ (Note 2)}$ a junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder monor while $R_{ecA}$ is determined by the user's board design.         a board layouts shown below on FR-4 PCB in a still air environment:         a. 42°C/W when mounted on a 1 in² pad of 20z Cu.         b. 95°C/W when mounted on a 0.066 in²         pad of 20z Cu.         size paper	inte-Source Charge       inte-Drain Charge         DIODE CHARACTERISTICS AND MAXIMUM RATINGS         aximum Continuous Drain-Source Diode Forward Current         ain-Source Diode Forward Voltage $V_{GS} = 0 V$ , $I_S = 2.5 A$ (Note 2)         a junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface while $R_{ecA}$ is determined by the user's board design.         a board layouts shown below on FR-4 PCB in a still air environment:         a. 42°C/W when mounted on a 1 in <sup>2</sup> pad of 2oz Cu.         a. 42°C/W when mounted on a 1 in <sup>2</sup> pad of 2oz Cu.         as a tag apper	ate-Source Charge       2.3         tte-Drain Charge       2.6         DIODE CHARACTERISTICS AND MAXIMUM RATINGS         aximum Continuous Drain-Source Diode Forward Current       0         ain-Source Diode Forward Voltage $V_{GS} = 0 V$ , $I_S = 2.5 A$ (Note 2)       0.85         a junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of a while $R_{ecA}$ is determined by the user's board design.       0.85         a a. 42°C/W when mounted on a 1 in <sup>2</sup> pad of $2oz Cu$ .       0.95°C/W when mounted on a 0.066 in <sup>2</sup> $4$ c. 110°C/W w in <sup>2</sup> pad of 2oz Cu.         size paper       size paper $42^{\circ}CW$ when mounted on a 1 in <sup>2</sup> pad of 2oz $42^{\circ}CW$ $42^{\circ}CW$ $42^{\circ}CW$	ate-Source Criarge       2.3         te-Drain Charge       2.6         DODE CHARACTERISTICS AND MAXIMUM RATINGS         aximum Continuous Drain-Source Diode Forward Current       2.5         ain-Source Diode Forward Voltage $V_{GS} = 0 V$ , $I_S = 2.5 A$ (Note 2)       0.85       1.2         ain-Source Diode Forward Voltage $V_{GS} = 0 V$ , $I_S = 2.5 A$ (Note 2)       0.85       1.2         a junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of while $R_{ecA}$ is determined by the user's board design.       the drain for while $R_{ecA}$ is determined by the user's board design.         a board layouts shown below on FR-4 PCB in a still air environment:       b. 95°C/W when mounted on a 0.066 in <sup>2</sup> $\stackrel{f}{=}$ c. 110°C/W when mounted in <sup>2</sup> pad of 2oz Cu.         a. 42°C/W when mounted on a 1 in <sup>2</sup> pad of 2oz Cu. $\stackrel{f}{=}$ do f 2oz Cu. $\stackrel{f}{=}$ do f 2oz Cu.         size paper       size paper

NDT3055 Rev.B



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