



## Description

The STD10NF10T4 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

## General Features

$V_{DS} = 100V, I_D = 10A$

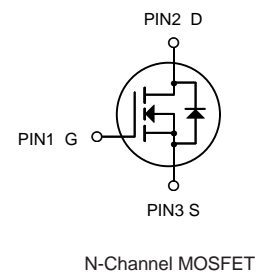
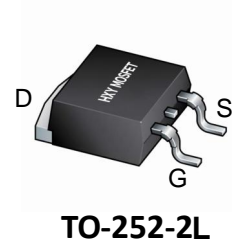
$R_{DS(ON)} < 160m\Omega @ V_{GS}=10V$

$R_{DS(ON)} < 170m\Omega @ V_{GS}=4.5V$

High density cell design for ultra low  $R_{dson}$

Fully characterized avalanche voltage and current

Excellent package for good heat dissipation



## Application

Power switching application

Hard switched and high frequency circuits

Uninterruptible power supply

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
STD10NF10T4	TO-252-2L	HXY MOSFET	2500

## Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	10	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	20	A
Maximum Power Dissipation	$P_D$	40	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 175	$^\circ C$
Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	3.75	$^\circ C/W$



**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=3A$	-	140	160	m $\Omega$
		$V_{GS}=4.5V, I_D=3A$	-	160	170	
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=3A$	-	5	-	S
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	650	-	PF
Output Capacitance	$C_{oss}$		-	25	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	20	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=50V, R_L=19\Omega$ $V_{GS}=10V, R_G=3\Omega$	-	6	-	nS
Turn-on Rise Time	$t_r$		-	4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	20	-	nS
Turn-Off Fall Time	$t_f$		-	4	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=50V, I_D=3A,$ $V_{GS}=10V$	-	20.6		nC
Gate-Source Charge	$Q_{gs}$		-	2.1	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3.3	-	nC
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=3A$	-	-	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$		-	-	7	A

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



### Typical Electrical and Thermal Characteristics (Curves)

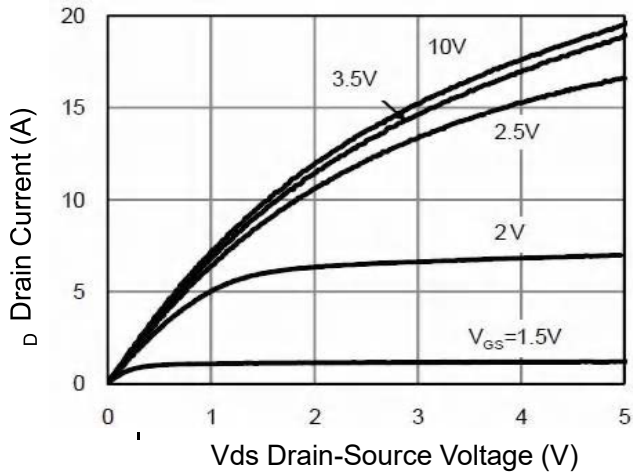


Figure 1 Output Characteristics

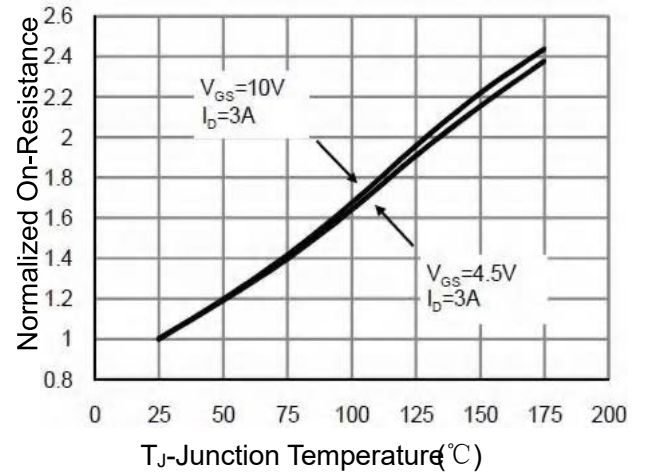


Figure 4 Rdson-Junction Temperature

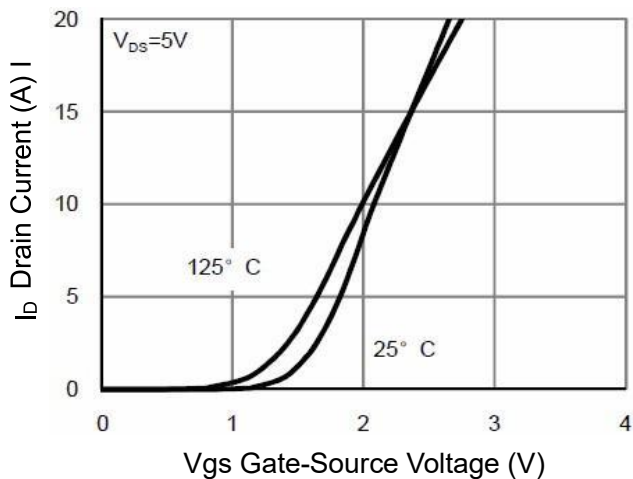


Figure 2 Transfer Characteristics

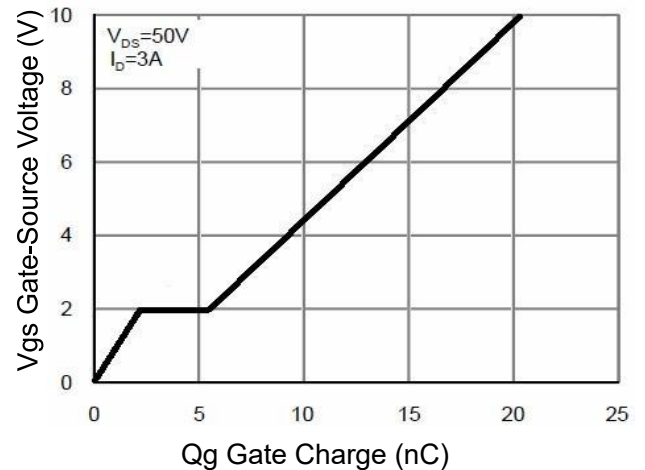


Figure 5 Gate Charge

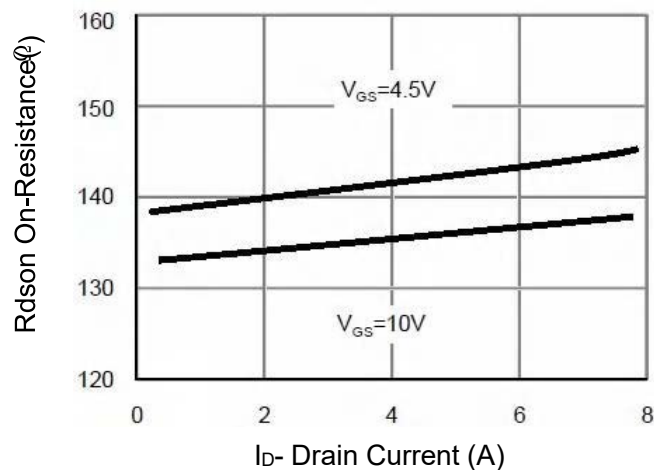


Figure 3 Rdson-Drain Current

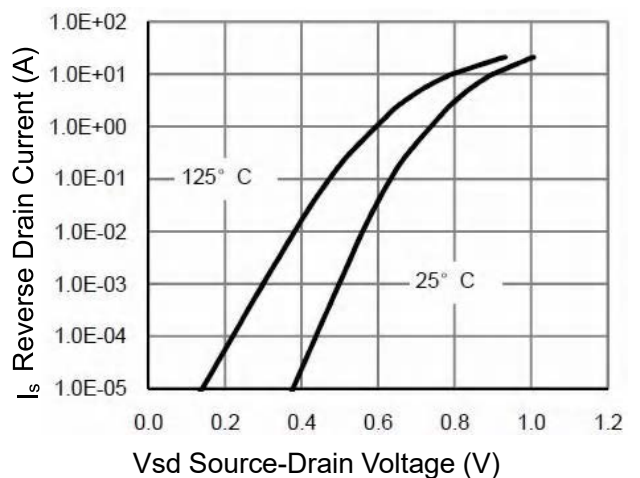


Figure 6 Source- Drain Diode Forward

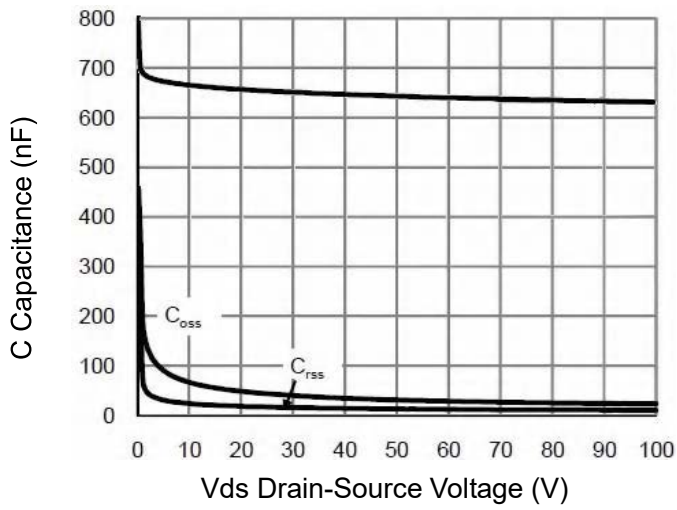


Figure 7 Capacitance vs Vds

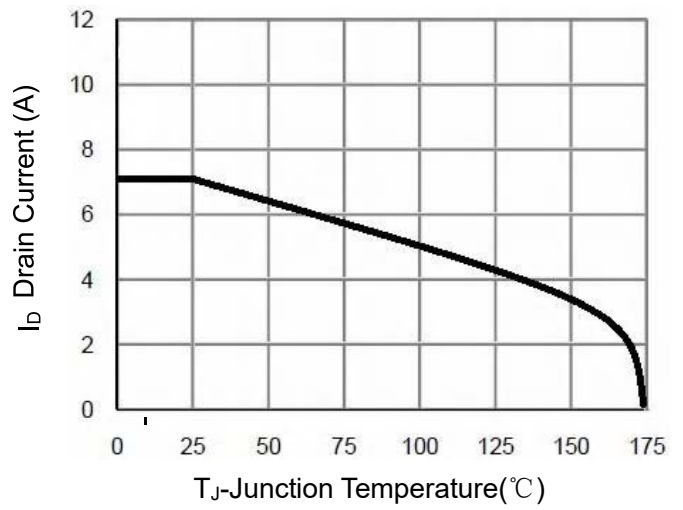


Figure 9  $BV_{DSS}$  vs Junction Temperature

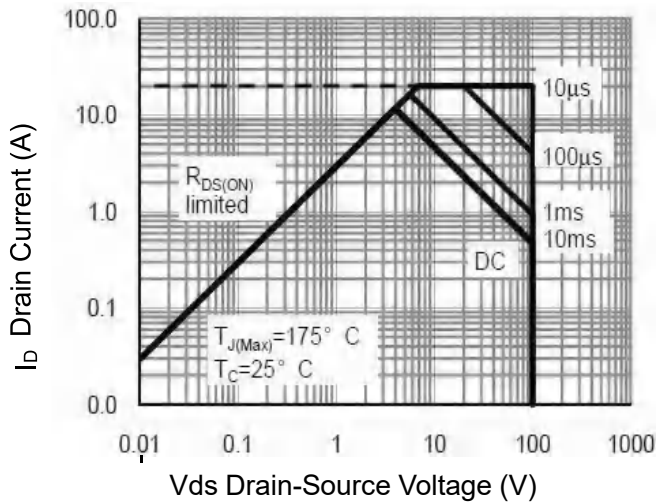


Figure 8 Safe Operation Area

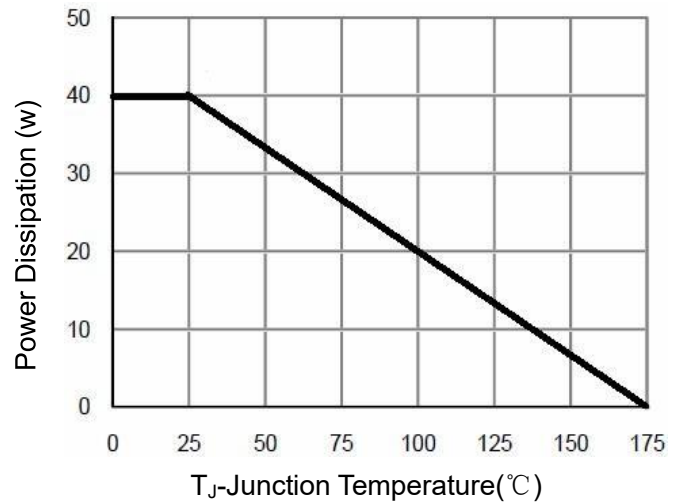


Figure 10 Power De-rating

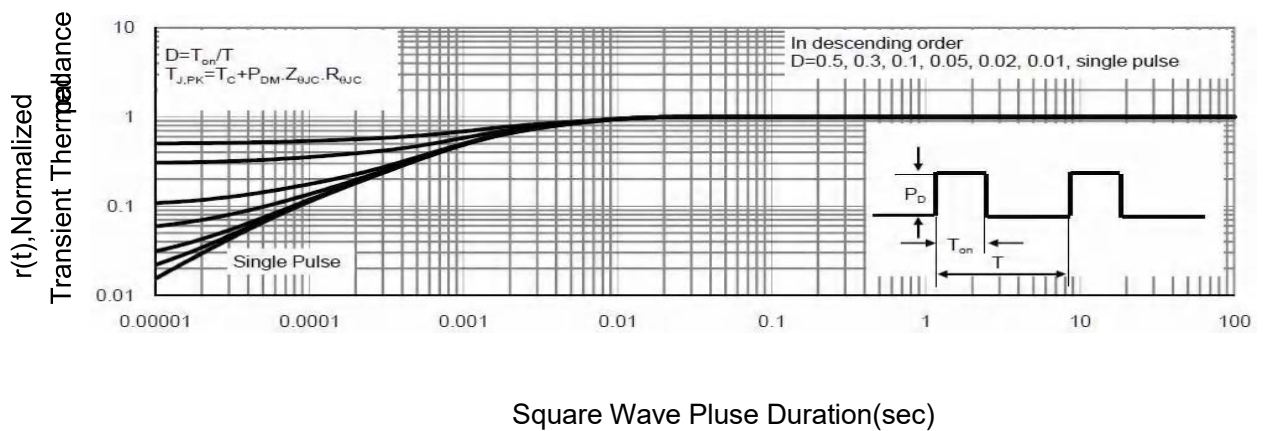


Figure 11 Normalized Maximum Transient Thermal Impedance





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