



## Description

The STD40NF10 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



## General Features

$V_{DS} = 100V$   $I_D = 30A$

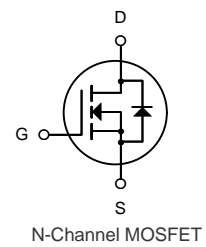
$R_{DS(ON)} < 30 m\Omega @ V_{GS} = 10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
STD40NF10	TO-252-2L	HXY MOSFET	2500

## Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous (Tc=25°C)	30	A
	Drain Current – Continuous (Tc=100°C)	20	A
$I_{DM}$	Drain Current – Pulsed	120	A
EAS	Single Pulse Avalanche Energy	56	mJ
IAS	Single Pulse Avalanche Current	42	A
$P_D$	Power Dissipation (Tc=25°C)	88	W
	Power Dissipation – Derate above 25°C	0.43	W/°C
$T_{STG}$	Storage Temperature Range	-55 to 175	°C
$T_J$	Operating Junction Temperature Range	-55 to 175	°C
$R_{\theta JA}$	Thermal Resistance Junction to ambient	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	1.7	°C/W



**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>BV<sub>DSS</sub></b>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	---	---	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>GS</sub> =0V, V <sub>DS</sub> =100V	---	---	1	μA
<b>I<sub>GSS</sub></b>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0A	---	---	±100	nA
<b>V<sub>GS(th)</sub></b>	GATE-Source Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1	1.5	2.5	V
<b>R<sub>DS(ON)</sub></b>	Drain-Source On Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	24	30	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	---	26	34	mΩ
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	2857	---	pF
<b>C<sub>oss</sub></b>	Output Capacitance		---	126	--	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		---	99	---	
<b>t<sub>d(on)</sub></b>	Turn-On Delay Time	V <sub>DS</sub> =30V, I <sub>D</sub> =15A, R <sub>ENG</sub> =1.8Ω, V <sub>GS</sub> =10V	---	10	---	ns
<b>t<sub>r</sub></b>	Rise Time		---	44	---	ns
<b>t<sub>d(off)</sub></b>	Turn-Off Delay Time		---	66	---	ns
<b>t<sub>f</sub></b>	Fall Time		---	47	---	ns
<b>Q<sub>gs</sub></b>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =15A	---	65	---	nc
<b>Q<sub>gd</sub></b>	Gate-Source Charge		---	9	---	nc
<b>Q<sub>g</sub></b>	Gate-Drain "Miller" Charge		---	13	---	nc
<b>V<sub>SD</sub></b>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>SD</sub> =30A	---	---	1.2	V
<b>I<sub>s</sub></b>	Continuous Drain Current	V <sub>D</sub> =V <sub>G</sub> =0V	---	---	30	A
<b>I<sub>SM</sub></b>	Pulsed Drain Current		---	---	120	A
<b>T<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =30A, T <sub>J</sub> =25°C	---	28	---	ns
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	di/dt=100A/us	---	40	---	nc

**Notes:**

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω, I<sub>AS</sub>=15A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



### Typical Characteristics

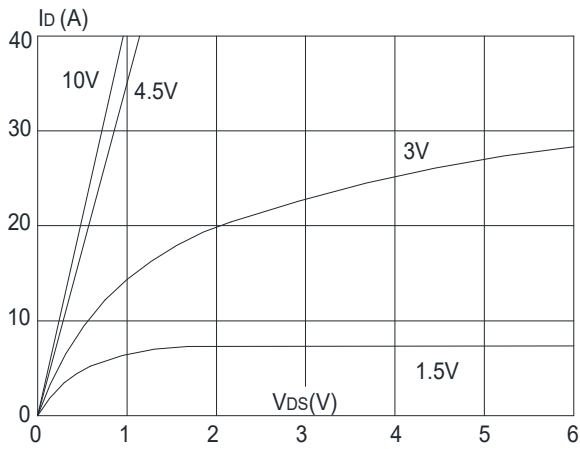


Figure1: Output Characteristics

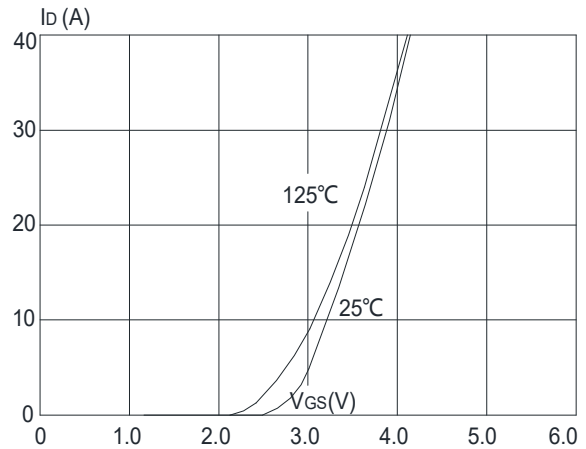


Figure 2: Typical Transfer Characteristics

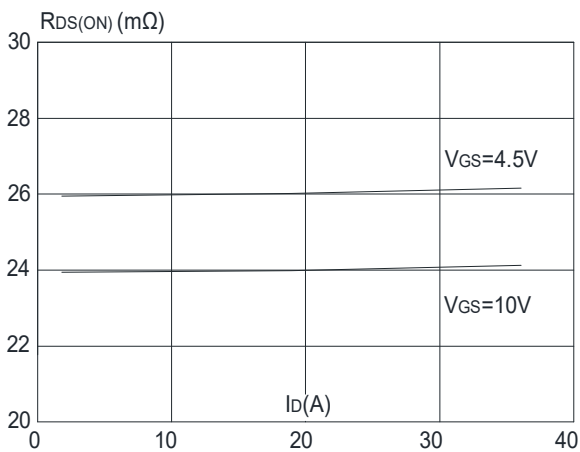


Figure 3: On-resistance vs. Drain Current

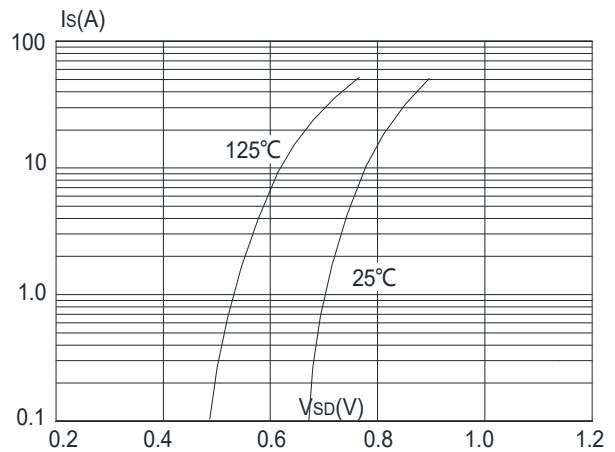


Figure 4: Body Diode Characteristics

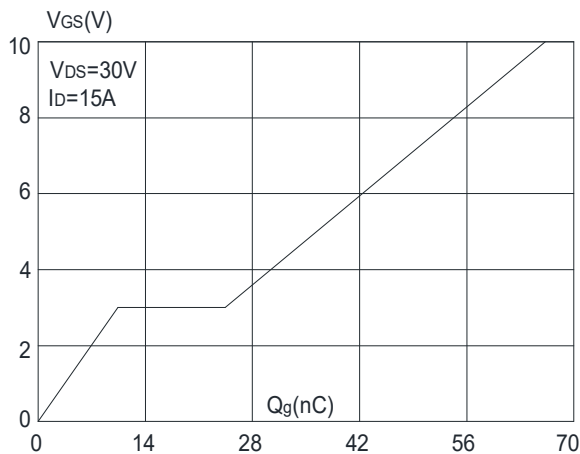


Figure 5: Gate Charge Characteristics

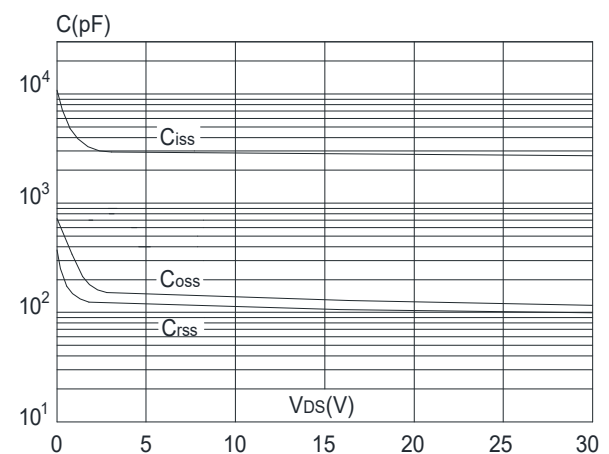
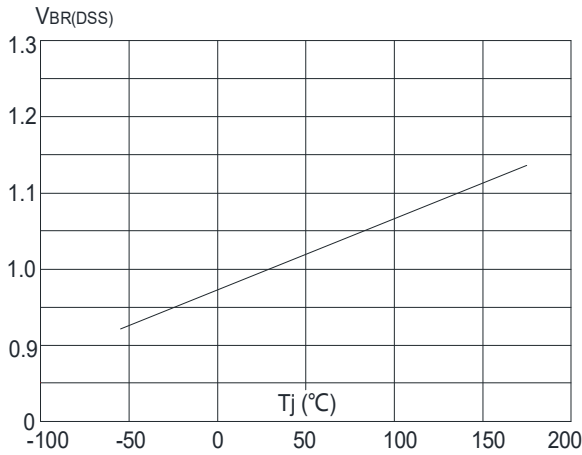
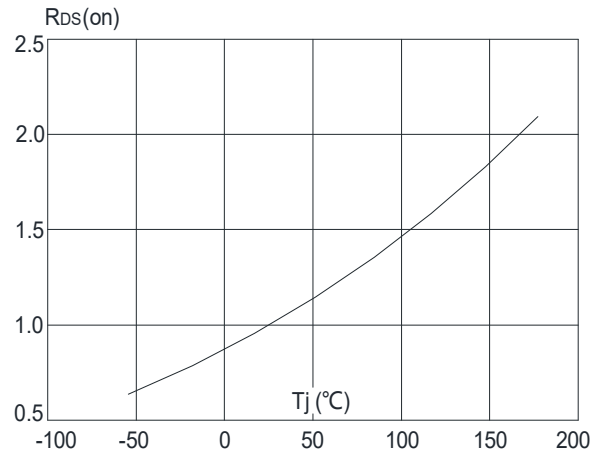


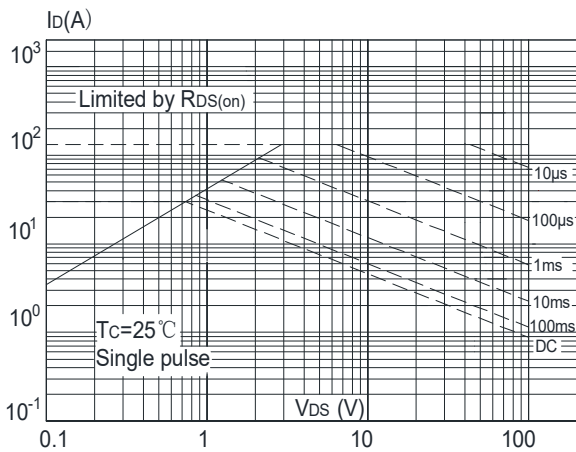
Figure 6: Capacitance Characteristics



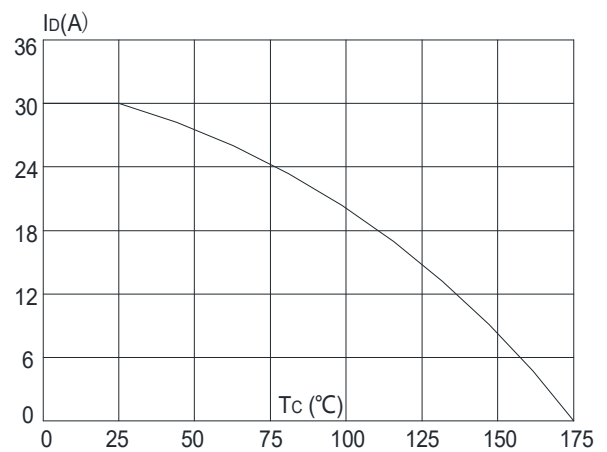
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



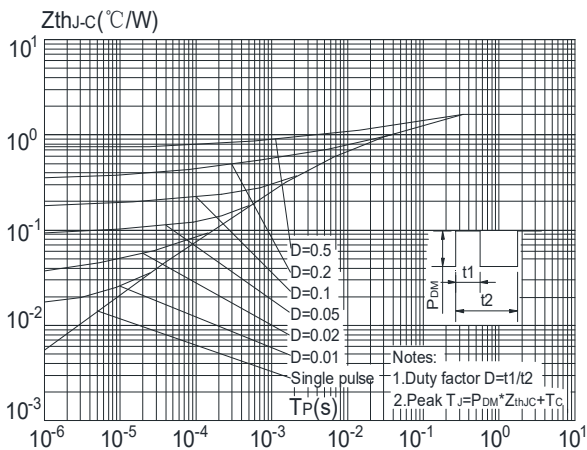
**Figure 8:** Normalized on Resistance vs. Junction Temperature



**Figure 9:** Maximum Safe Operating Area



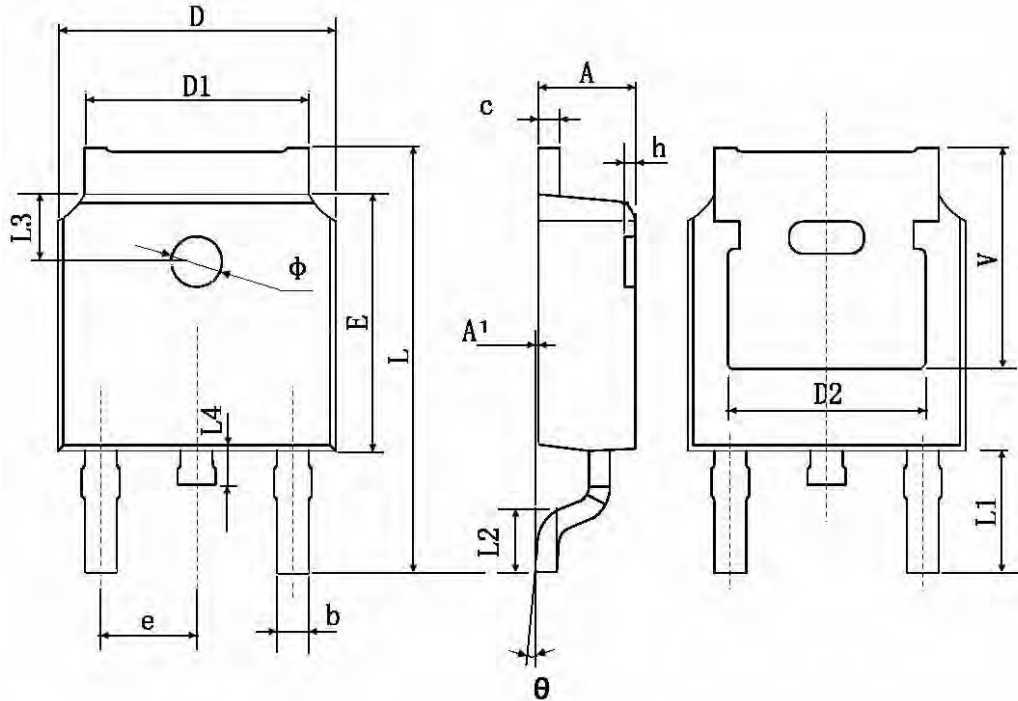
**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



### TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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