

100V N-Channel Enhancement Mode MOSFET

Description

The STD15NF10 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.

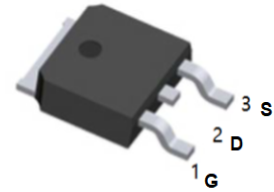
General Fea

$V_{DS} = 100V$ $I_D = 20A$

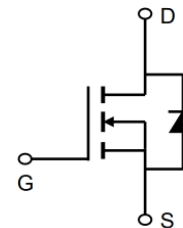
$R_{DS(ON)} < 75m\Omega$ @ $V_{GS}=10V$

Application

- Battery protection
- Load switch
- Uninterruptible power supply



TO-252(DPAK) top view



Absolute Maximum Ratings $T_c=25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_c=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	20	A
$I_D@T_c=100^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	10	A
$I_D@T_A=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	5	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, V_{GS} @ 10V ¹	3.4	A
I_{DM}	Pulsed Drain Current ²	30	A
EAS	Single Pulse Avalanche Energy ³	36.5	mJ
I_{AS}	Avalanche Current	15	A
$P_D@T_c=25^\circ C$	Total Power Dissipation ⁴	34.7	W
$P_D@T_A=25^\circ C$	Total Power Dissipation ⁴	2	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.4	$^\circ C/W$

100V N-Channel Enhancement Mode MOSFET

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C, $I_D=1mA$	---	0.098	---	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	---	65	75	mΩ
		$V_{GS}=4.5V, I_D=15A$	---	85	90	
$V_{GS(th)}$	Gate Threshold Voltage		1.0	---	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	$V_{GS}=V_{DS}, I_D=250\mu A$	---	-4.75	---	mV/°C
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25^\circ C$	---	---	10	uA
		$V_{DS}=80V, V_{GS}=0V, T_J=55^\circ C$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	±100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=20A$	---	28.7	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	1.6	3.2	Ω
Q_g	Total Gate Charge (10V)		---	26.2	---	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=80V, V_{GS}=10V, I_D=20A$	---	4.6	---	
Q_{gd}	Gate-Drain Charge		---	5.1	---	
$T_{d(on)}$	Turn-On Delay Time		---	4.2	---	ns
T_r	Rise Time	$V_{DD}=50V, V_{GS}=10V, R_G=3.3\Omega$	---	8.2	---	
$T_{d(off)}$	Turn-Off Delay Time	$I_D=20A$	---	35.6	---	
T_f	Fall Time		---	9.6	---	
C_{iss}	Input Capacitance		---	1535	---	pF
C_{oss}	Output Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	60	---	
C_{rss}	Reverse Transfer Capacitance		---	37	---	
I_S	Continuous Source Current ^{1,5}		---	---	22	A
I_{SM}	Pulsed Source Current ^{2,5}	$V_G=V_D=0V$, Force Current	---	---	45	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=20A, dI/dt=100A/\mu s, T_J=25^\circ C$	---	30	---	nS
Q_{rr}	Reverse Recovery Charge		---	37	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=27A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

100V N-Channel Enhancement Mode MOSFET

Typical Characteristics

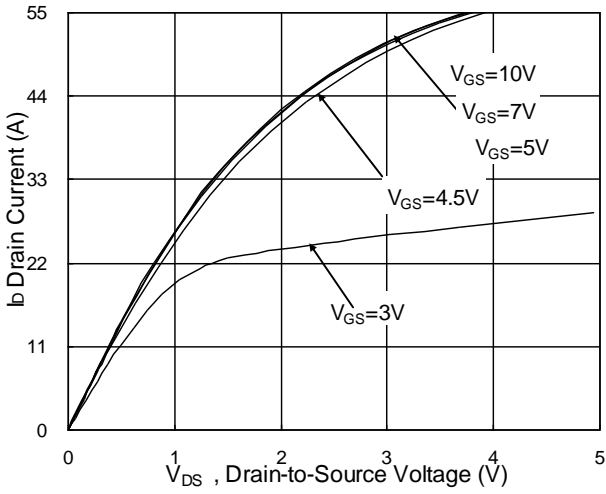


Fig.1 Typical Output Characteristics

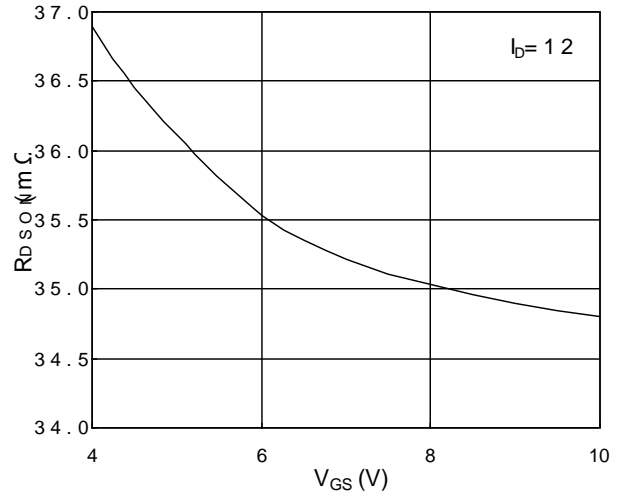


Fig.2 On-Resistance vs. Gate-Source

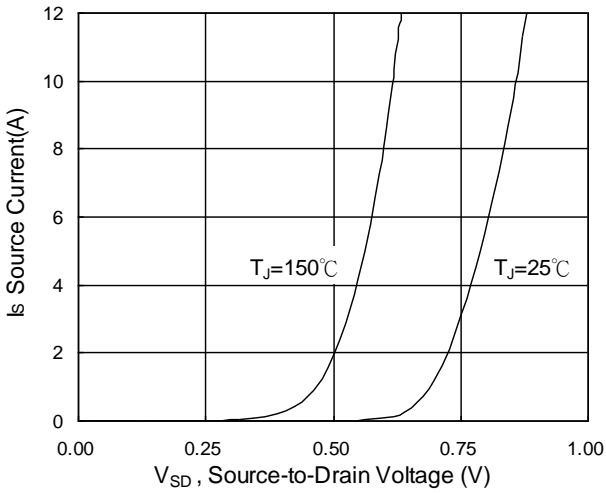


Fig.3 Forward Characteristics Of Reverse

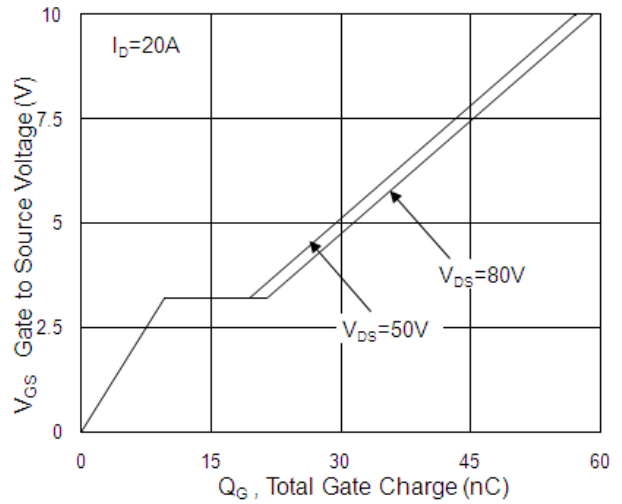


Fig.4 Gate-Charge Characteristics

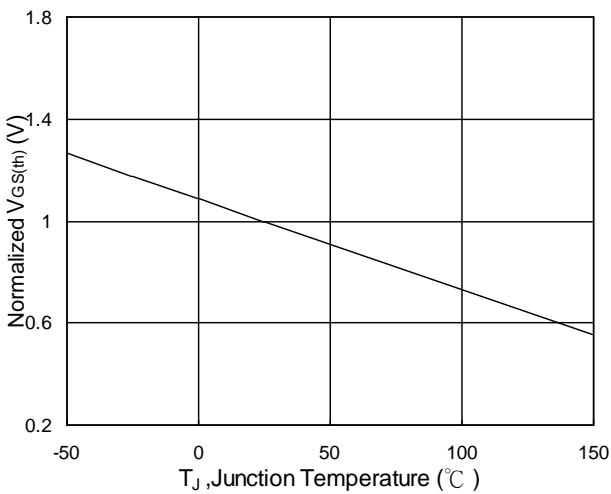


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

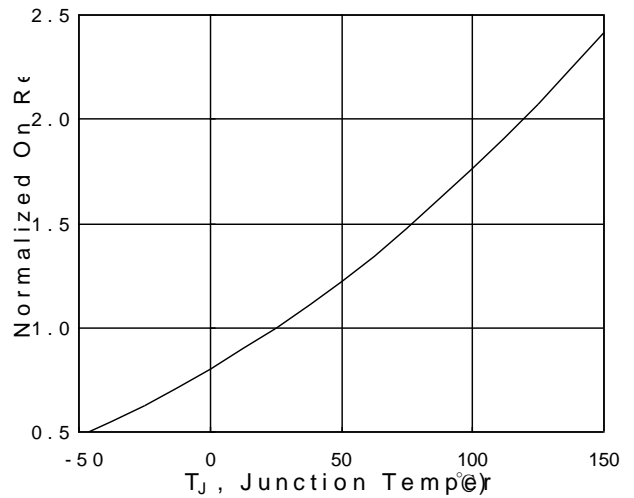


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

100V N-Channel Enhancement Mode MOSFET

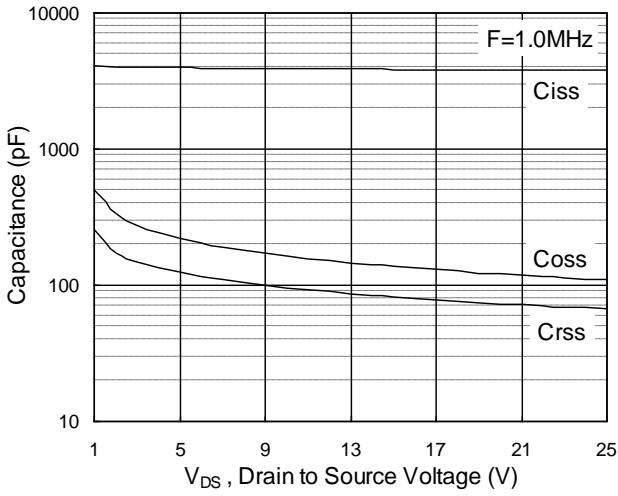


Fig.7 Capacitance

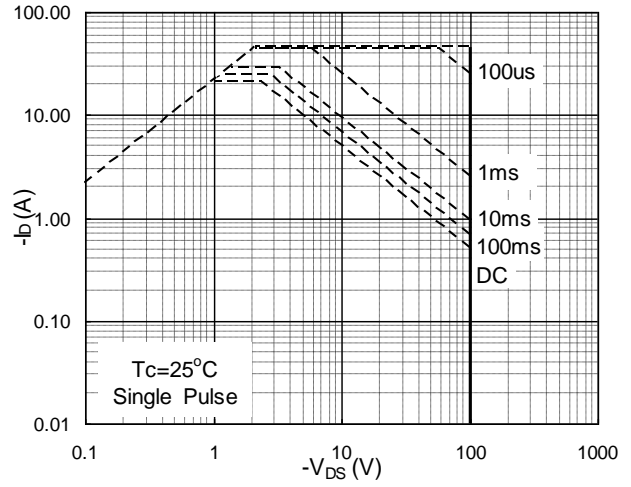


Fig.8 Safe Operating Area

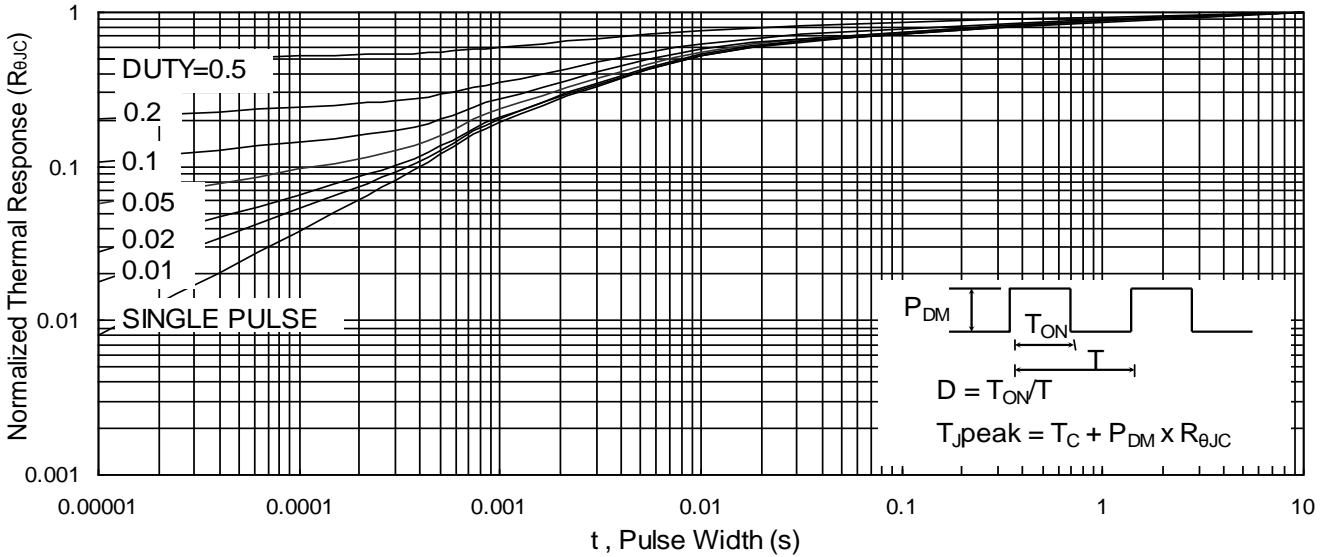


Fig.9 Normalized Maximum Transient Thermal Impedance

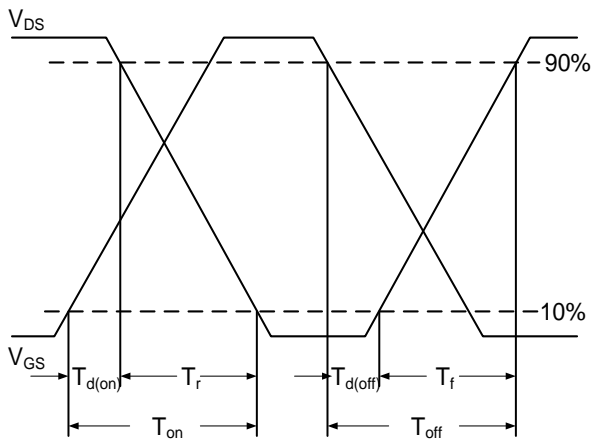


Fig.10 Switching Time Waveform

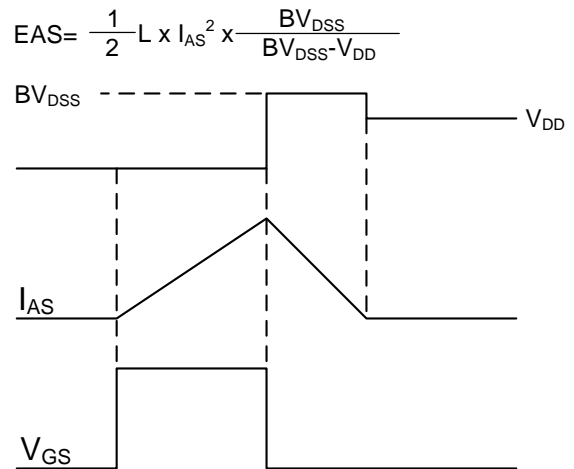
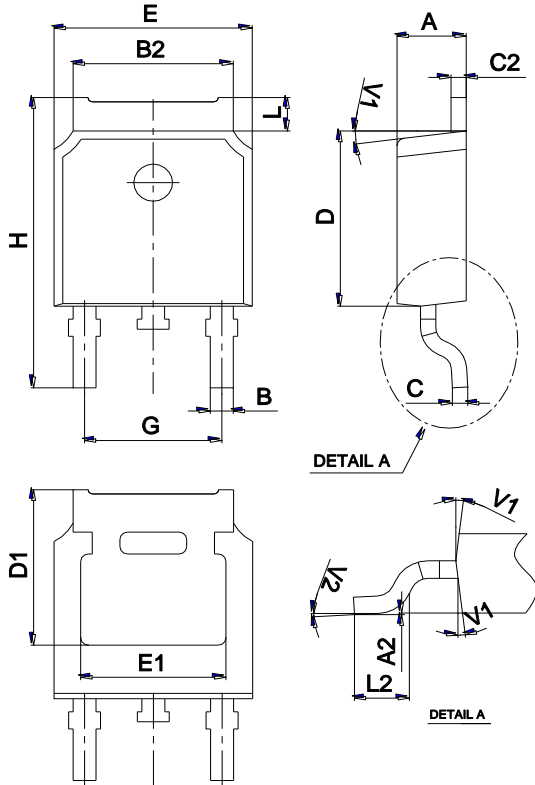


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Ordering information

Order code	Package	Baseqty	Delivery mode
STD15NF10L	TO-252	2500	Tape and reel