



Description

The HSTD20NF10T4 uses advanced trench technology to provide excellent $R_{DS(ON)}$, 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

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

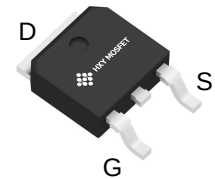
$R_{DS(ON)} < 43m\Omega$ @ $V_{GS}=10V$

Application

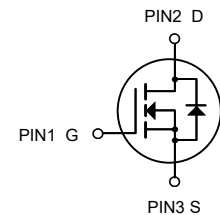
Battery protection

Load switch

Uninterruptible power supply



TO-252-2L
(DPAK)



N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HSTD20NF10T4	TO-252-2L(DPAK)	HXY MOSFET	2500

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	30	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	13.5	A
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	4.2	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	3.4	A
I_{DM}	Pulsed Drain Current ²	45	A
EAS	Single Pulse Avalanche Energy ³	36.5	mJ
I_{AS}	Avalanche Current	27	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	52.1	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	$^{\circ}C/W$



Electrical Characteristics (T_c=25°C unless otherwise noted)

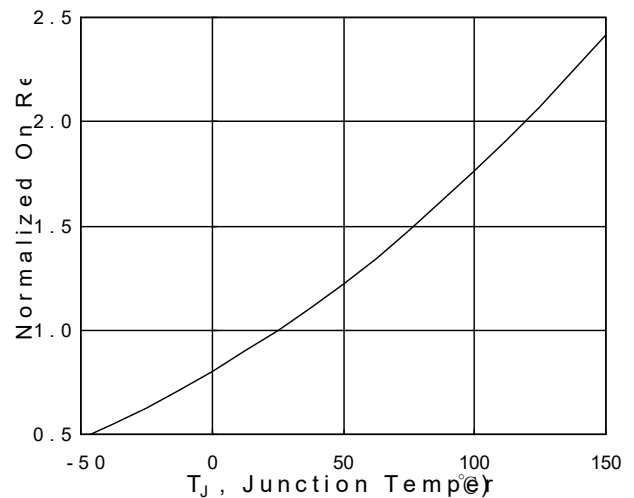
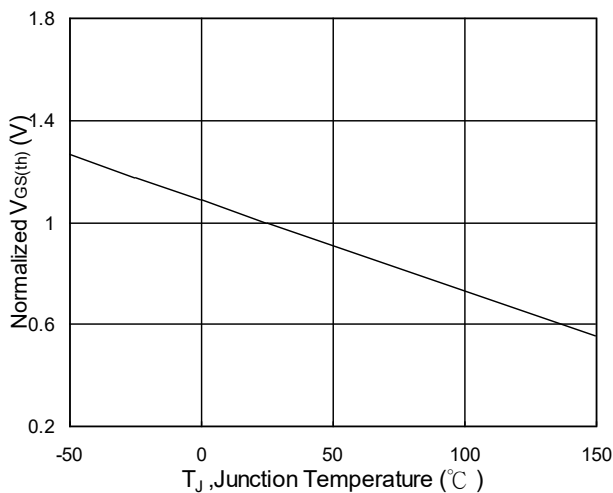
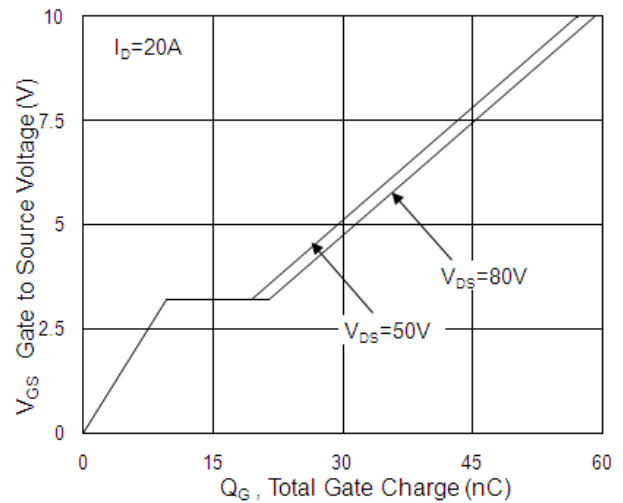
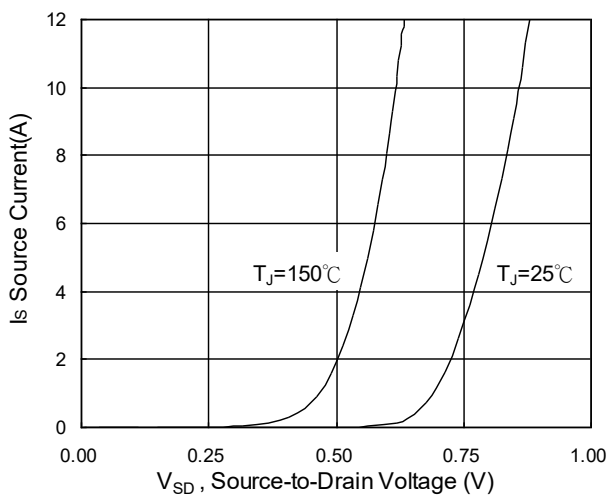
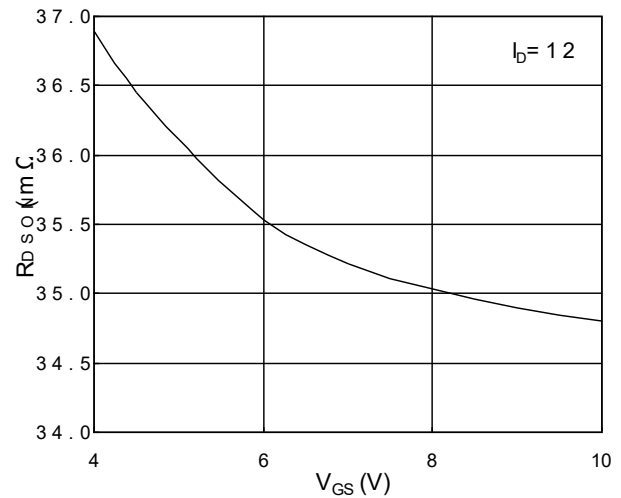
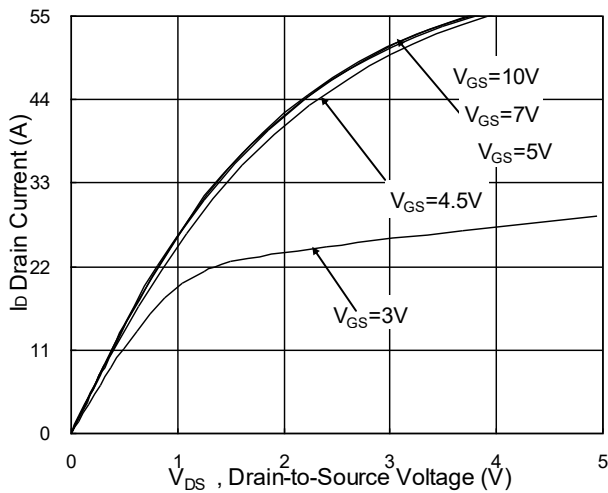
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.098	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =20A	---	35	43	mΩ
		V _{GS} =4.5V, I _D =15A	---	40	50	
V _{GS(th)}	Gate Threshold Voltage		1.3	---	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =250uA	---	-5.52	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	10	uA
		V _{DS} =80V, V _{GS} =0V, T _J =55°C	---	---	100	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±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)	V _{DS} =80V, V _{GS} =10V, I _D =20A	---	60	84	nC
Q _{gs}	Gate-Source Charge		---	9.7	14	
Q _{gd}	Gate-Drain Charge		---	11.8	16.5	
T _{d(on)}	Turn-On Delay Time	V _{DD} =50V, V _{GS} =10V, R _G =3.3Ω I _D =20A	---	10.4	21	ns
T _r	Rise Time		---	46	83	
T _{d(off)}	Turn-Off Delay Time		---	54	108	
T _f	Fall Time		---	10	20	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	3848	5387	pF
C _{oss}	Output Capacitance		---	137	192	
C _{rss}	Reverse Transfer Capacitance		---	82	115	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	22	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	45	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =20A, dI/dt=100A/μs, T _J =25°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 20Z copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 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.



Typical Characteristics



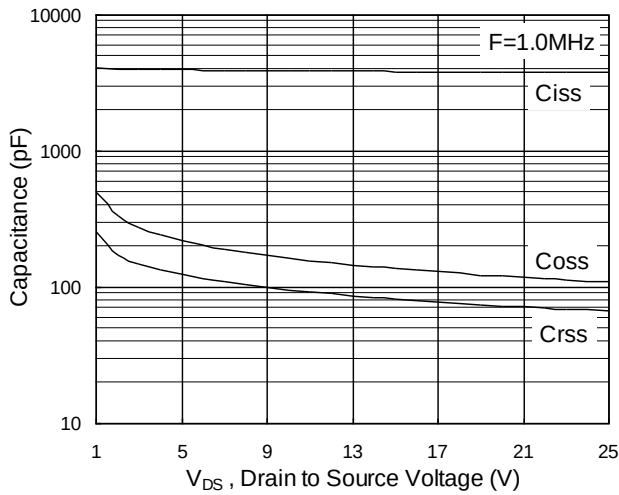


Fig.7 Capacitance

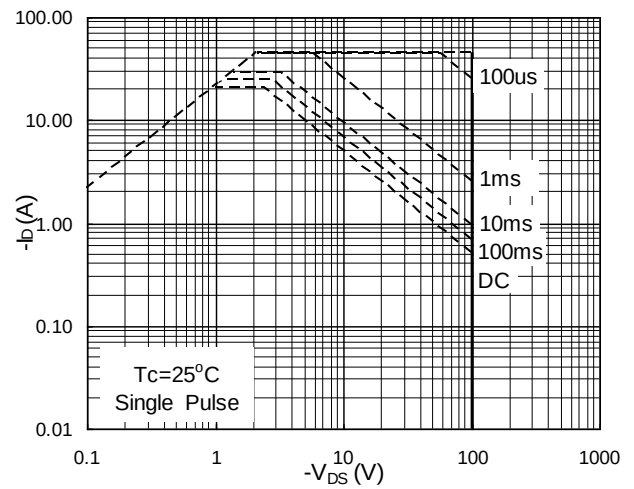


Fig.8 Safe Operating Area

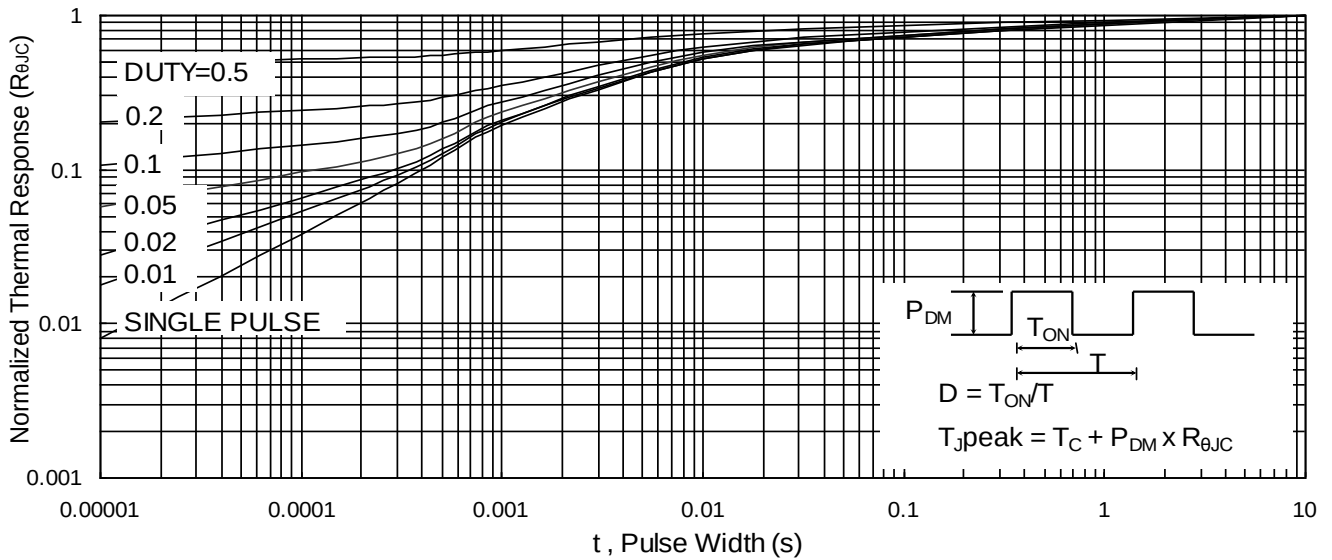


Fig.9 Normalized Maximum Transient Thermal Impedance

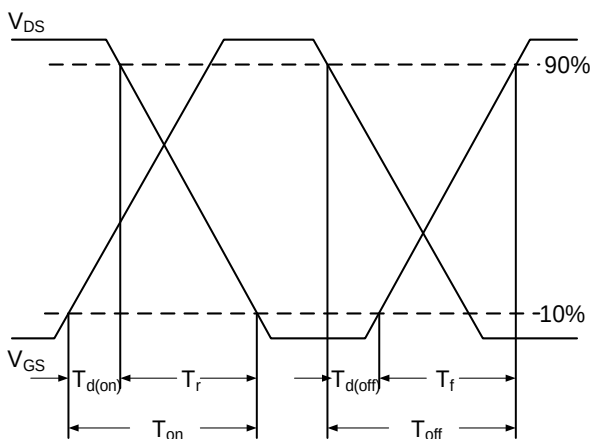


Fig.10 Switching Time Waveform

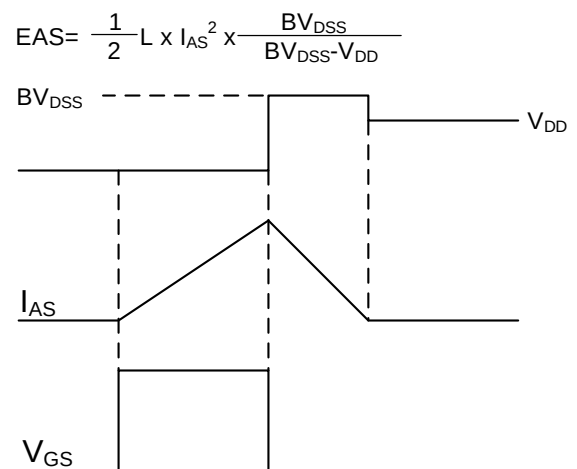


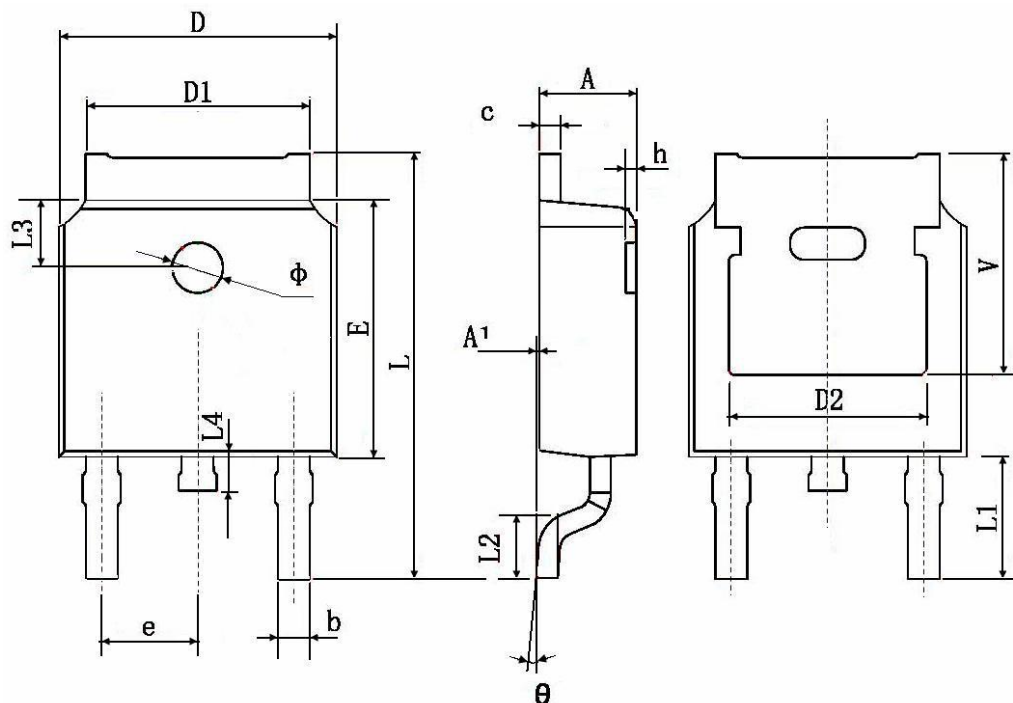
Fig.11 Unclamped Inductive Switching Waveform



HSTD20NF10T4

N-Channel Enhancement Mode MOSFET

TO-252-2L(DPAK) 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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