



## Description

The HSTD20P3H6AG 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.

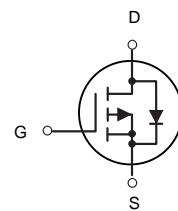


TO-252-2L

## General Features

$V_{DS} = -30V$   $I_D = -20A$

$R_{DS(ON)} < 42 m\Omega$  @  $V_{GS}=10V$



P-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HSTD20P3H6AG	TO-252-2L	HXY MOSFET	2500

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	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, $V_{GS} @ 10V^1$	-15	A
$Idm$	Pulsed Drain Current <sup>2</sup>	-50	A
$P_D @ T_c=25^\circ C$	Total Power Dissipation <sup>4</sup>	29	W
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	75	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	4.32	°C/W



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

Symbol	Parameter	Conditions	Min.	Tp	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$VGS=0\text{V}$ , $ID=-250\mu\text{A}$	-30	---	---	V
$\Delta BVDSS/\Delta TJ$	BVDSS Temperature Coefficient	Reference to $25^\circ\text{C}$ , $ID=-1\text{mA}$	---	22	---	$\text{V}/^\circ\text{C}$
RDS(ON)	Static Drain-Source On-Resistance2	$VGS=-10\text{V}$ , $ID=-15\text{A}$	32	38	42	$\text{m}\Omega$
VGS(th)	Gate Threshold Voltage	$VGS=-4.5\text{V}$ , $ID=-10\text{A}$	48	60	70	
		$VGS=VDS$ , $ID =-250\mu\text{A}$	-1.0	---	-2.5	V
$\Delta VGS(\text{th})$	VGS(th) Temperature Coefficient		---	4.6	---	$\text{mV}/^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$VDS=-24\text{V}$ , $VGS=0\text{V}$ , $TJ=25^\circ\text{C}$	---	---	-1	
		$VDS=-24\text{V}$ , $VGS=0\text{V}$ , $TJ=55^\circ\text{C}$	---	---	-5	$\mu\text{A}$
IGSS	Gate-Source Leakage Current	$VGS=\pm 25\text{V}$ , $VDS=0\text{V}$	---	---	$\pm 100$	nA
gfs	Forward Transconductance	$VDS=-5\text{V}$ , $ID=-15\text{A}$	---	19	---	S
Rg	Gate Resistance	$VDS=0\text{V}$ , $VGS=0\text{V}$ , $f=1\text{MHz}$	---	13	---	
Qg	Total Gate Charge (-4.5V)	$VDS=-15\text{V}$ , $VGS=-4.5\text{V}$ , $ID=-15\text{A}$	---	12.5	---	nC
Qgs	Gate-Source Charge		---	5.4	---	
Qgd	Gate-Drain Charge		---	5	---	
Td(on)	Turn-On Delay Time	$VDD=-15\text{V}$ , $VGS=-10\text{V}$ , $RG=3.3$ , $ID=-15\text{A}$	---	4.4	---	ns
Tr	Rise Time		---	11.2	---	
Td(off)	Turn-Off Delay Time		---	34	---	
Tf	Fall Time		---	18	---	
Ciss	Input Capacitance	$VDS=-15\text{V}$ , $VGS=0\text{V}$ , $f=1\text{MHz}$	---	1345	---	pF
Coss	Output Capacitance		---	194	---	
Crss	Reverse Transfer Capacitance		---	158	---	

**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  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



## Typical Electrical and Thermal Characteristics

Figure 5 Output Characteristics

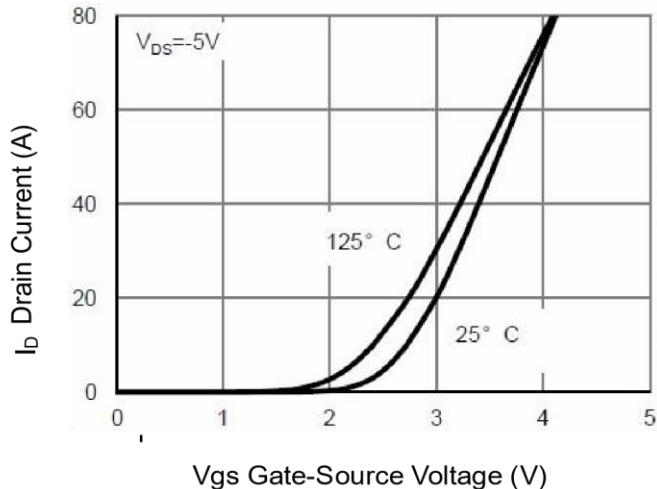


Figure 7 Transfer Characteristics

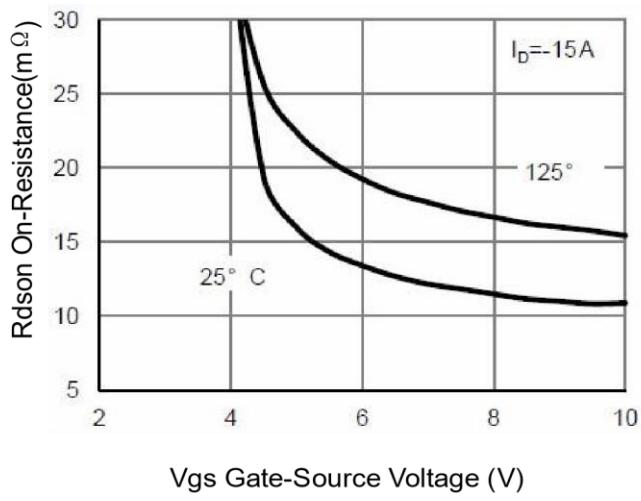


Figure 9  $R_{DSON}$  vs  $V_{GS}$

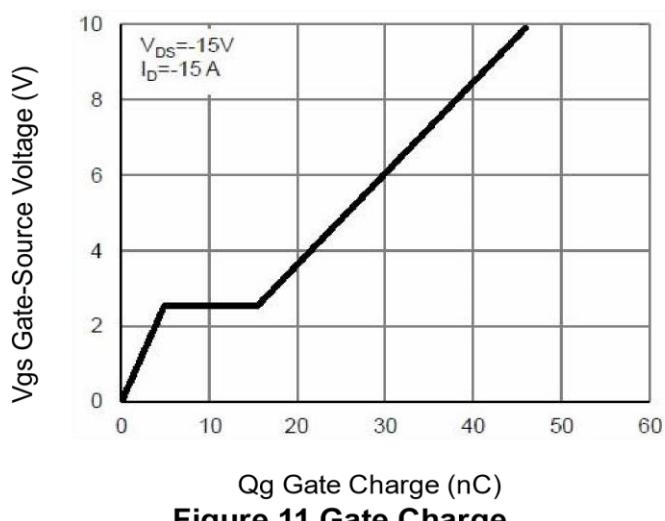


Figure 11 Gate Charge

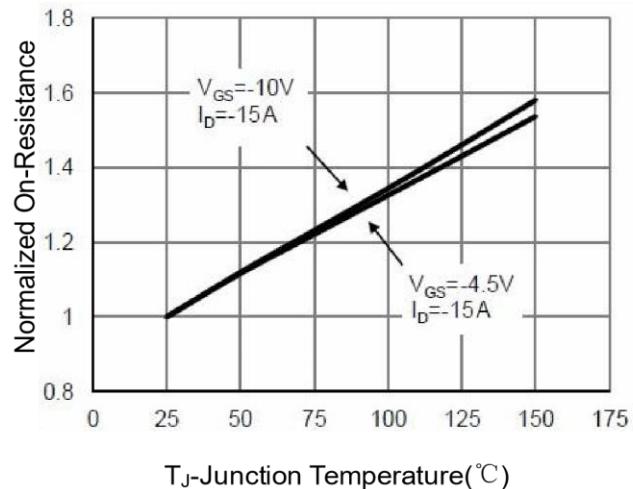


Figure 8 Drain-Source On-Resistance

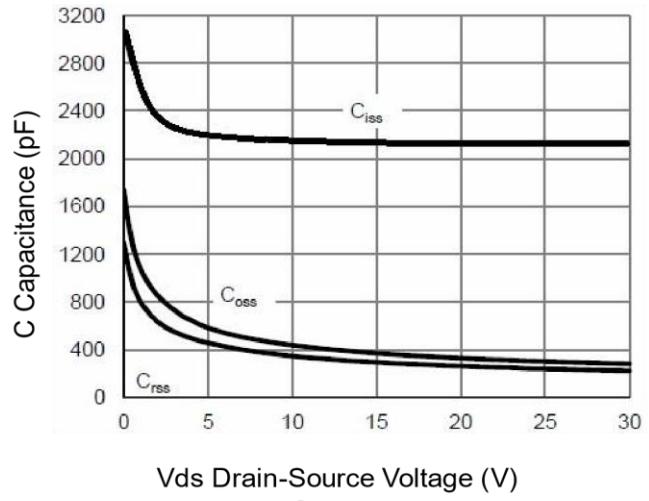


Figure 10 Capacitance vs  $V_{DS}$

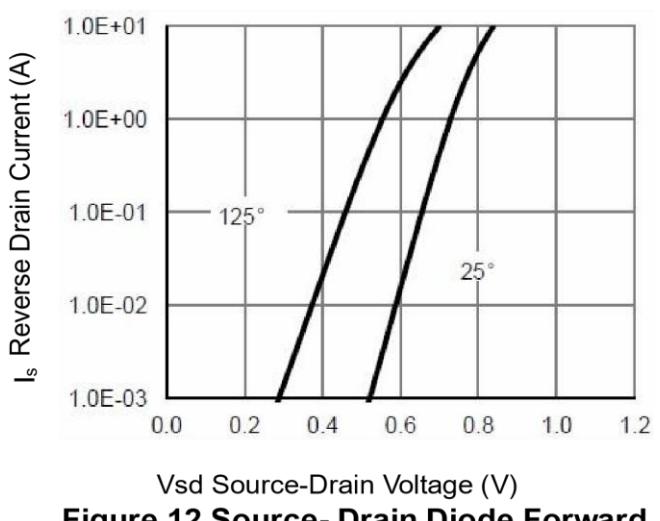
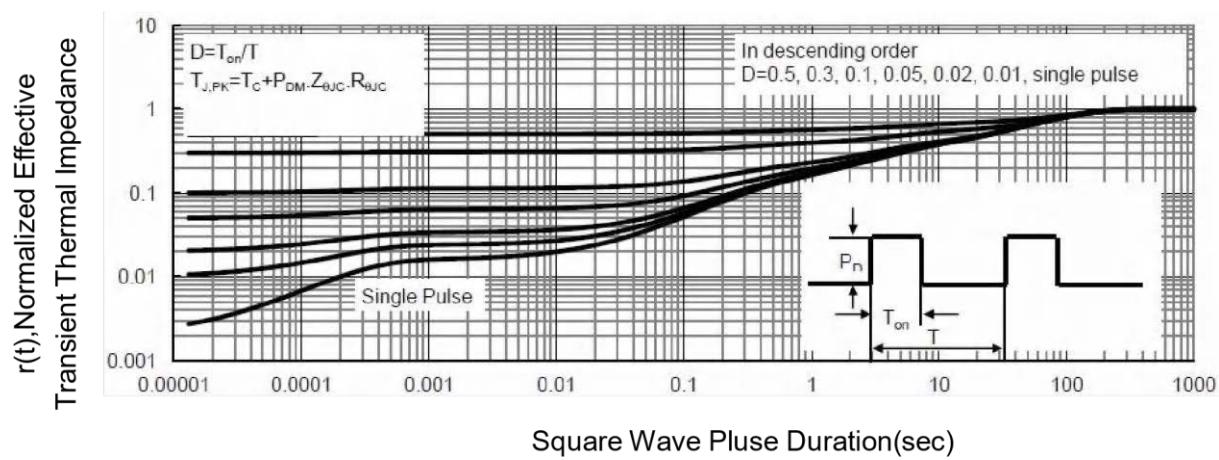
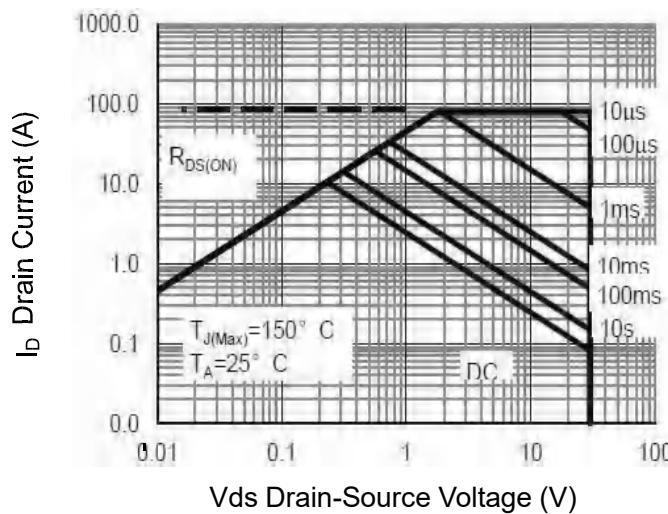
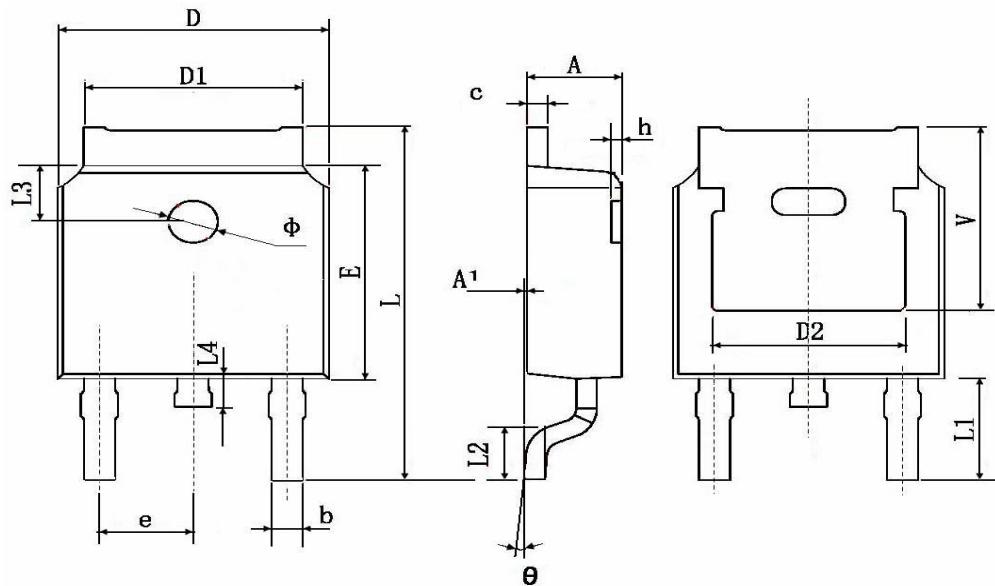


Figure 12 Source-Drain Diode Forward





## 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	4.830 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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