



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.

General Features

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

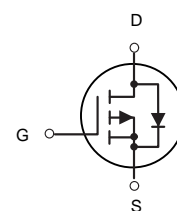
$R_{DS(ON)} < 42\text{ m}\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

Package Marking and Ordering Information

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

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	-20	A
$I_D @ T_C=100^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	-15	A
IDM	Pulsed Drain Current ²	-50	A
$P_D @ T_C=25^{\circ}\text{C}$	Total Power Dissipation ⁴	29	W
TSTG	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	75	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4.32	$^{\circ}\text{C/W}$



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

Symbol	Parameter	Conditions	Min.	Tp	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	VGS=0V , ID=-250uA	-30		---	V
$\Delta\text{BVDSS}/\Delta\text{TJ}$	BVDSS Temperature Coefficient	Reference to 25°C , ID=-1mA	---	22	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	VGS=-10V , ID=-15A	32	38	42	mΩ
VGS(th)	Gate Threshold Voltage	VGS=-4.5V , ID=-10A	48	60	70	
		VGS=VDS , ID =-250uA	-1.0	---	-2.5	V
$\Delta\text{VGS(th)}$	VGS(th) Temperature Coefficient		---	4.6	---	mV/°C
IDSS	Drain-Source Leakage Current	VDS=-24V , VGS=0V , TJ=25°C	---	---	-1	uA
		VDS=-24V , VGS=0V , TJ=55°C	---	---	-5	
IGSS	Gate-Source Leakage Current	VGS=±25V , VDS=0V	---	---	±100	nA
gfs	Forward Transconductance	VDS=-5V , ID=-15A	---	19	---	S
Rg	Gate Resistance	VDS=0V , VGS=0V , f=1MHz	---	13	---	
Qg	Total Gate Charge (-4.5V)	VDS=-15V , VGS=-4.5V , ID=-15A	---	12.5	---	nC
Qgs	Gate-Source Charge		---	5.4	---	
Qgd	Gate-Drain Charge		---	5	---	
Td(on)	Turn-On Delay Time	VDD=-15V , VGS=-10V , RG=3.3 , ID=-15A	---	4.4	---	ns
Tr	Rise Time		---	11.2	---	
Td(off)	Turn-Off Delay Time		---	34	---	
Tf	Fall Time		---	18	---	
Ciss	Input Capacitance	VDS=-15V , VGS=0V , f=1MHz	---	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 ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

Figure 5 Output Characteristics

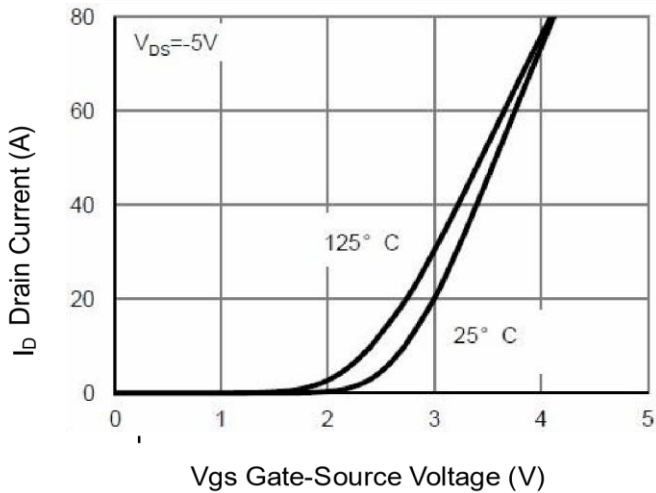


Figure 7 Transfer Characteristics

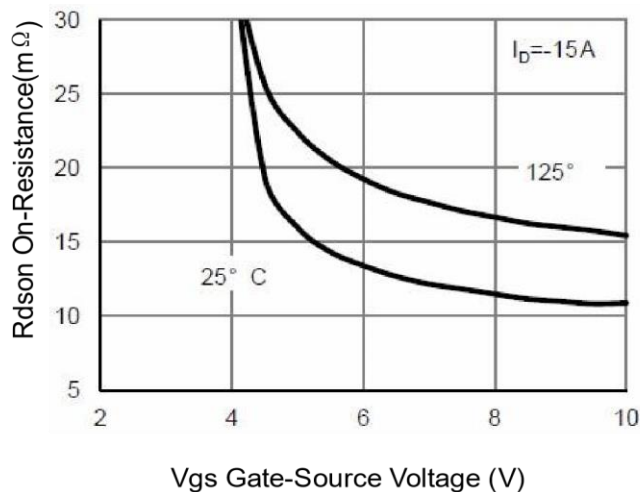


Figure 9 Rdson vs Vgs

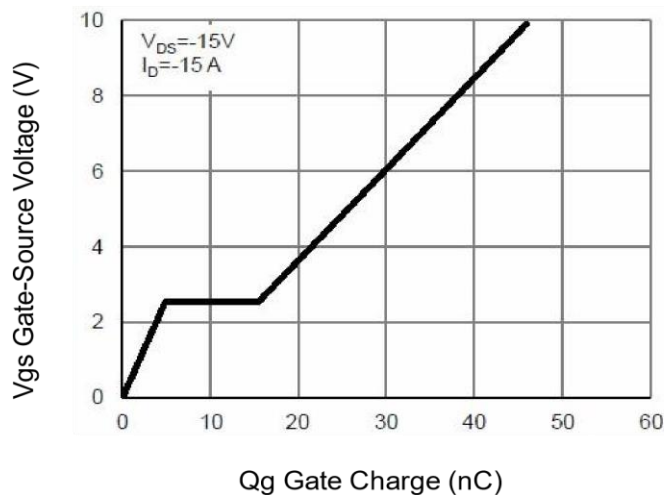


Figure 11 Gate Charge

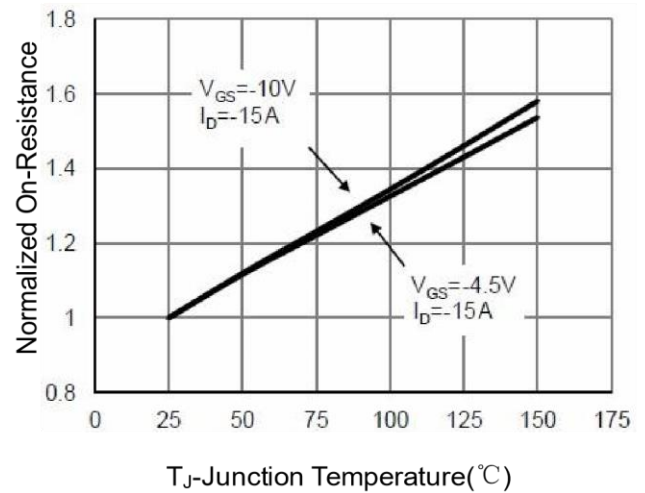


Figure 8 Drain-Source On-Resistance

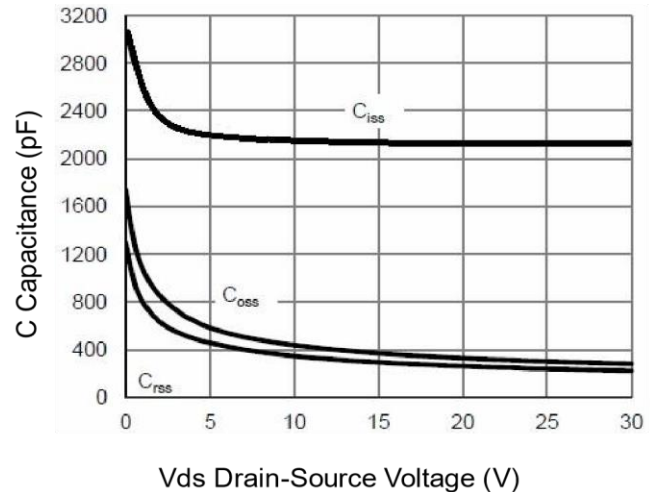


Figure 10 Capacitance vs Vds

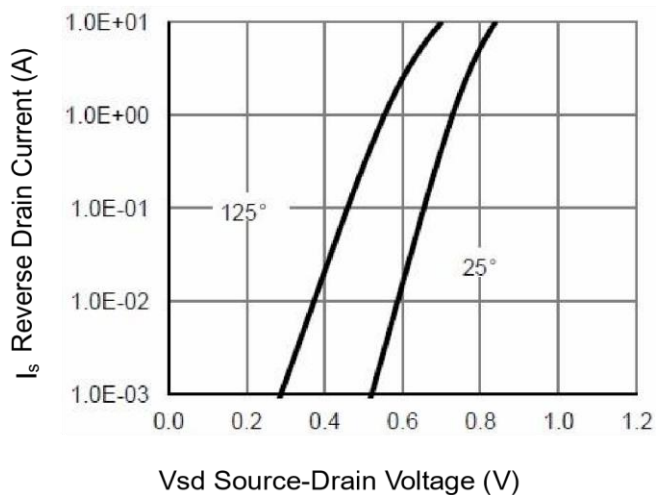


Figure 12 Source- Drain Diode Forward

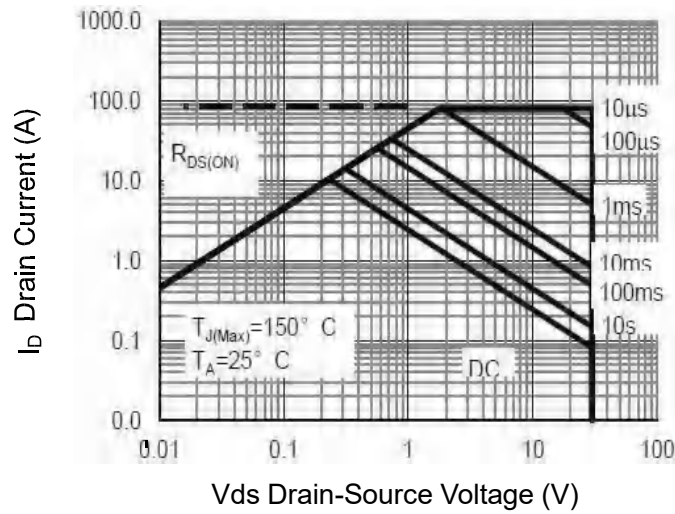


Figure 13 Safe Operation Area

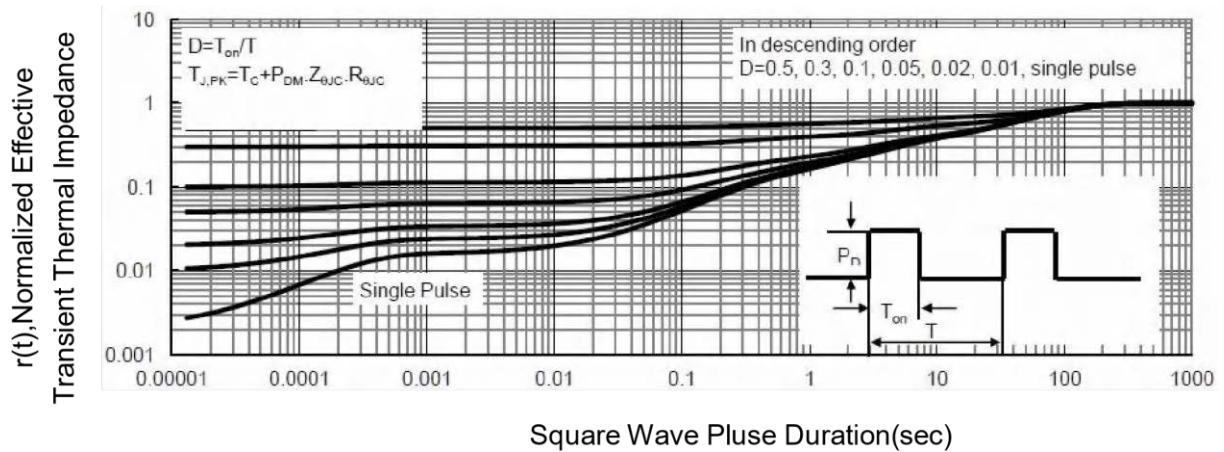
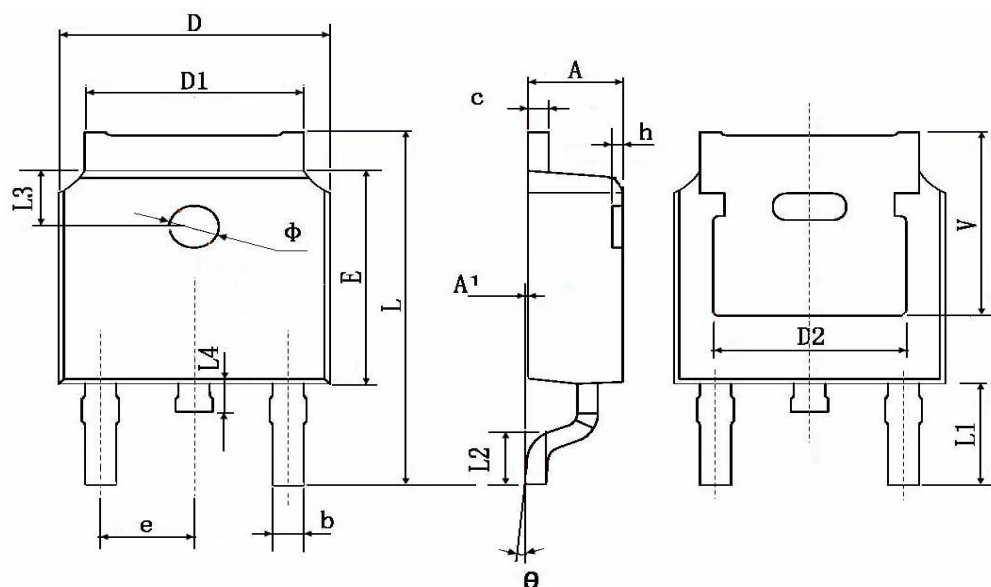


Figure 14 Normalized Maximum Transient Thermal Impedance



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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