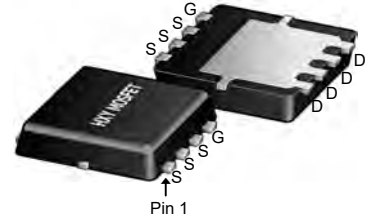




## Description

The CSD17581Q5A 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.



DFN5X6-8L

## General Features

$V_{DS} = 30\text{ V}$   $I_D = 120\text{ A}$

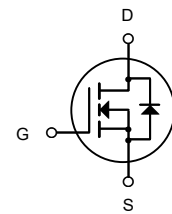
$R_{DS(ON)} < 4.4\text{ m}\Omega$   $V_{GS} = 10\text{ V}$

## Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
CSD17581Q5A	DFN5X6-8L	HXY MOSFET	5000

## 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	$\pm 20$	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}^{1,6}$	120	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}^{1,6}$	66	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	320	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	180	mJ
$I_{AS}$	Avalanche Current	60	A
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	187	W
$T_{STG}$	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 <sup>1</sup>	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	1.1	$^\circ\text{C/W}$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	30	---	---	V
∂BV <sub>DSS</sub> /∂T <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =1mA	---	0.014	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =30A	---	3.5	4.4	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =15A	---	4.6	5.8	
V <sub>GS(th)</sub>	Gate Threshold Voltage		1.2	---	2.5	V
∂V <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	---	-4	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V , I <sub>D</sub> =30A	---	50	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz	---	1.7	---	Ω
Q <sub>g</sub>	Total Gate Charge (4.5V)	V <sub>DS</sub> =15V , V <sub>GS</sub> =10V , I <sub>D</sub> =15A	---	56.9	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	13.8	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	23.5	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3 Ω , I <sub>D</sub> =1A	---	20.1	---	ns
T <sub>r</sub>	Rise Time		---	6.3	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	124.6	---	
T <sub>f</sub>	Fall Time		---	15.8	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz	---	4345	---	pF
C <sub>oss</sub>	Output Capacitance		---	340	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	225	---	
I <sub>s</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	85	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V , I <sub>s</sub> =1A , T <sub>J</sub> =25°C	---	---	1.2	V



### Typical Characteristics

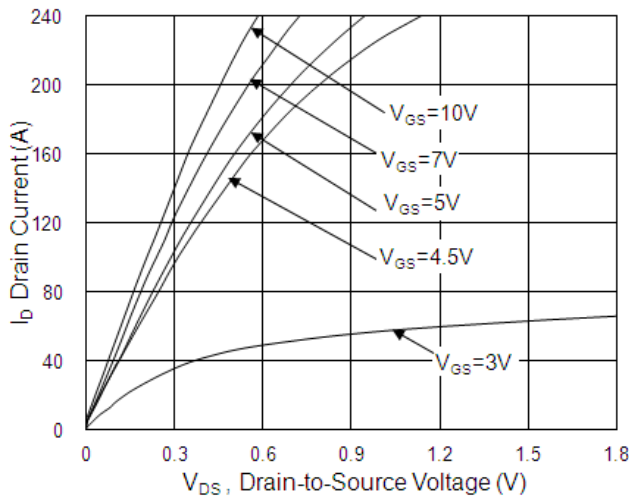


Fig.1 Typical Output Characteristics

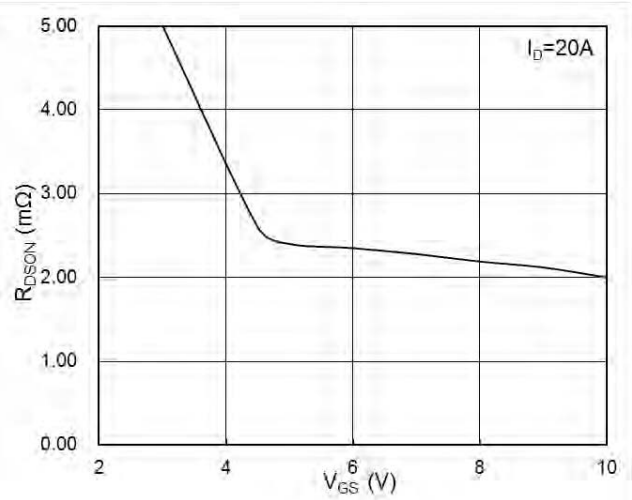


Fig.2 On-Resistance v.s Gate-Source

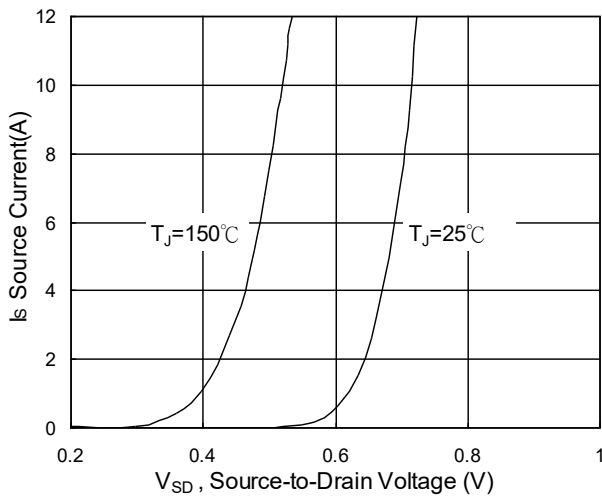


Fig.3 Forward Characteristics of Reverse

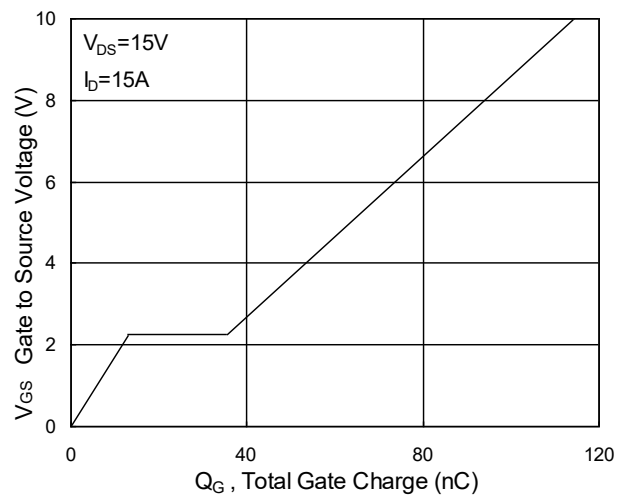


Fig.4 Gate-Charge Characteristics

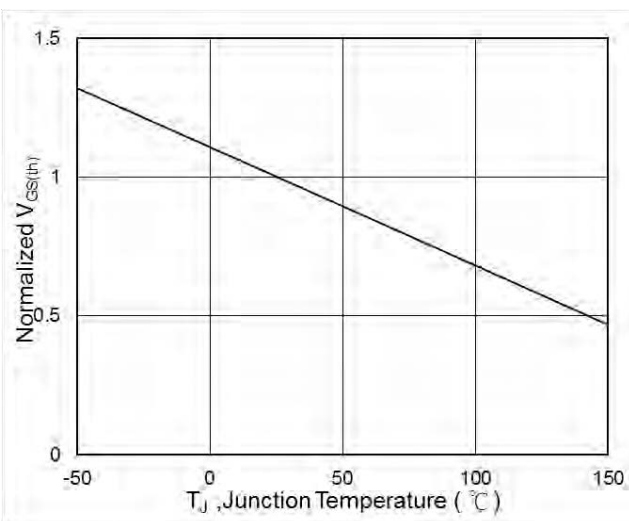


Fig.5 Normalized V<sub>GS(th)</sub> v.s T<sub>J</sub>

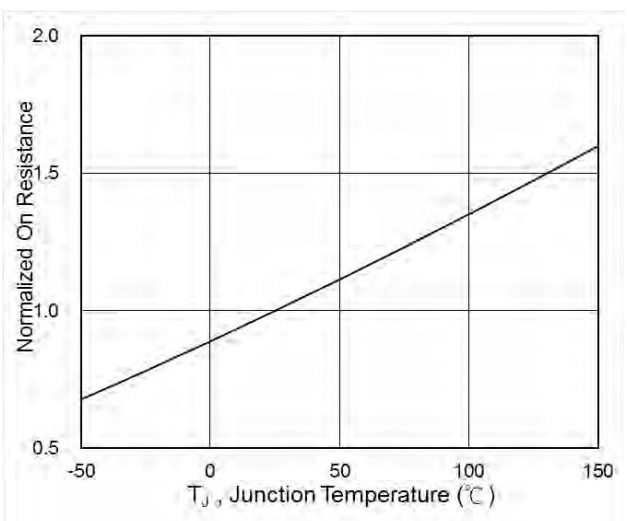


Fig.6 Normalized R<sub>DS(ON)</sub> v.s T<sub>J</sub>

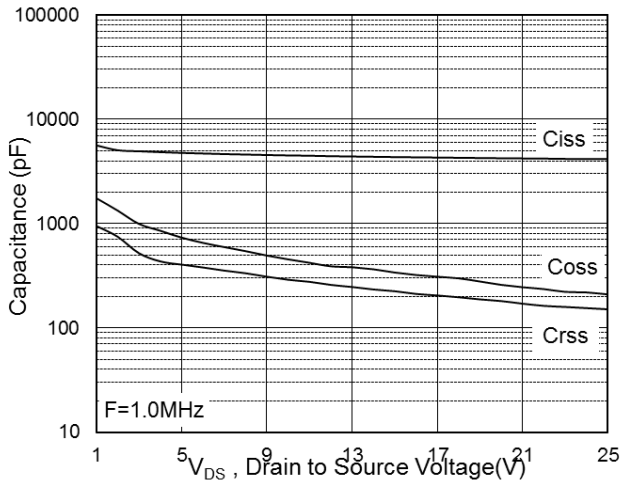


Fig.7 Capacitance

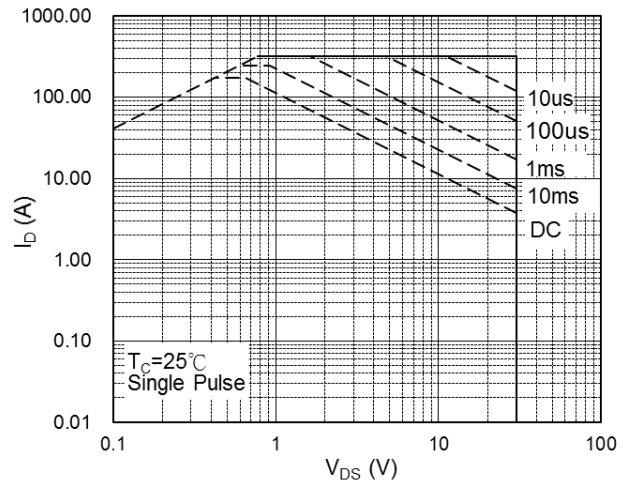


Fig.8 Safe Operating Area

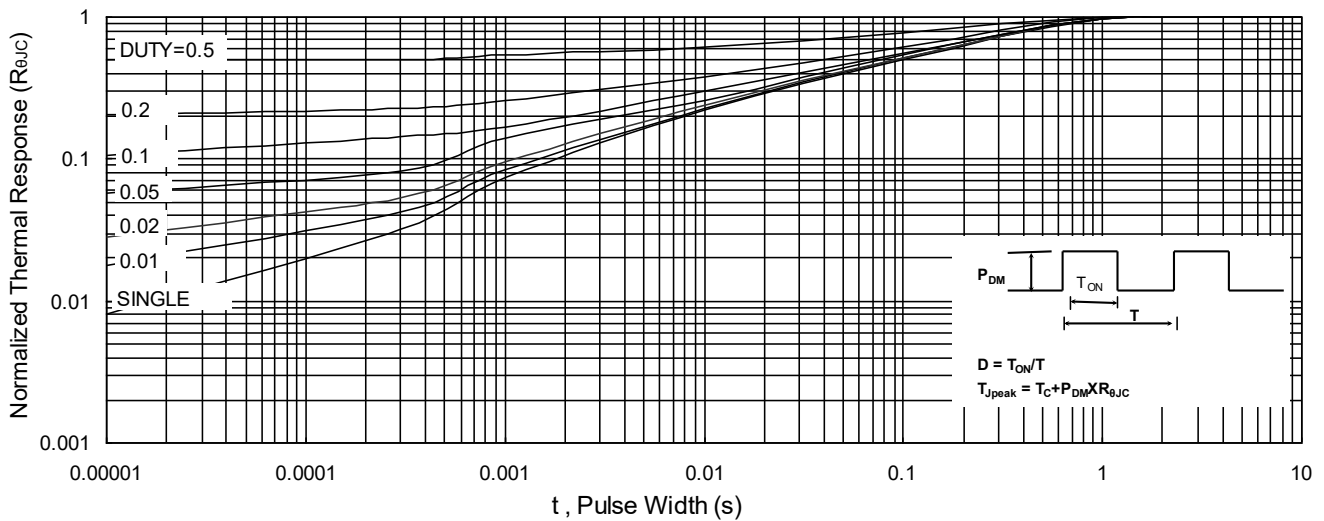


Fig.9 Normalized Maximum Transient Thermal Impedance

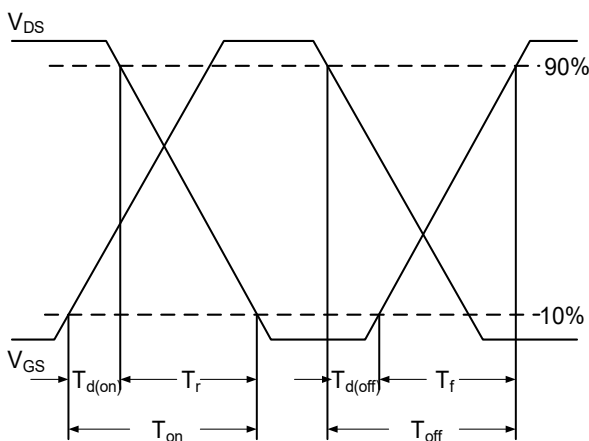


Fig.10 Switching Time Waveform

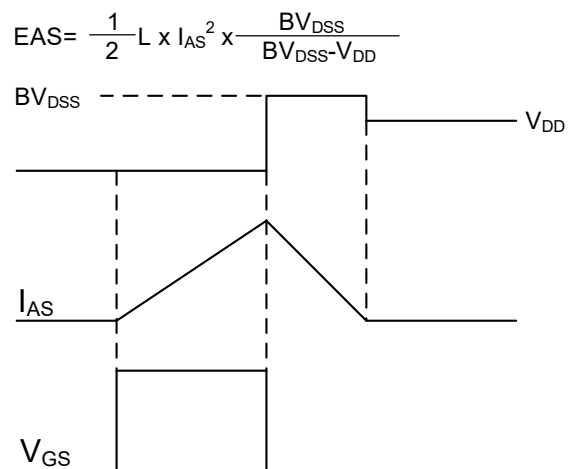
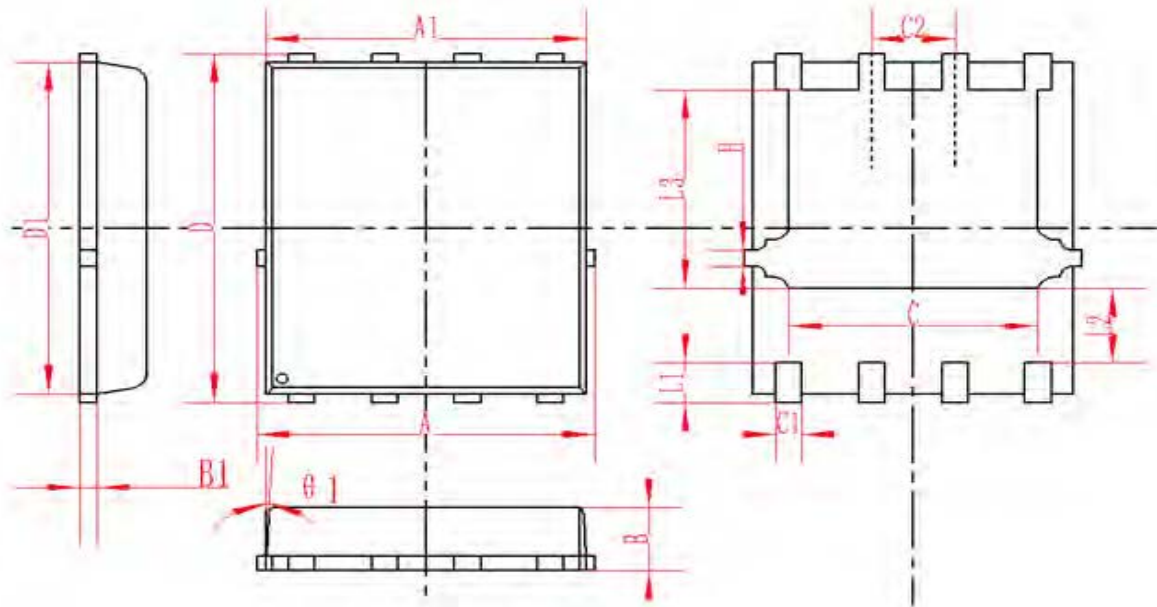


Fig.11 Unclamped Inductive Switching Waveform



### DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	5.3	5.5	5.7	0.208	0.216	0.224
A1	5.1	5.2	5.3	0.2	0.204	0.209
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.85	6.05	6.25	0.23	0.238	0.246
B	0.85	0.95	1.05	0.033	0.037	0.041
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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