



## Description

The FDS6570A 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

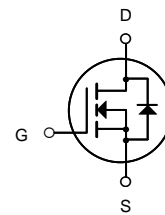
$V_{DS} = 20V$   $I_D = 20A$   
 $R_{DS(ON)} < 5.5m\Omega @ V_{GS}=4.5V$

## Application

Battery protection  
Load switch  
Uninterruptible power supply



SOP-8



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
FDS6570A	SOP-8	HXY MOSFET	3000

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )	20	A
	Drain Current – Continuous ( $T_C=70^\circ\text{C}$ )	16	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	140	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	162	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	57	A
$P_D$	Power Dissipation ( $T_C=25^\circ\text{C}$ )	3.1	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 to ambient	40	$^\circ\text{C/W}$



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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{DS}$	$I_D=250\text{ }\mu\text{A}$ , $V_{GS}=0\text{V}$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
		$V_{DS}=20\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=55\text{ }^\circ\text{C}$			5	
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 12\text{V}$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ , $I_D=250\text{ }\mu\text{A}$	0.5		1.6	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{V}$ , $I_D=20\text{A}$			5.5	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=20\text{A}$ , $T_J=125\text{ }^\circ\text{C}$			7	
		$V_{GS}=2.5\text{V}$ , $I_D=18\text{A}$			7	
On State Drain Current	$I_{D(on)}$	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	140			A
Forward Transconductance	$g_{FS}$	$V_{DS}=5\text{V}$ , $I_D=20\text{A}$		105		S
Input Capacitance	$C_{iss}$	$V_{GS}=0\text{V}$ , $V_{DS}=10\text{V}$ , $f=1\text{MHz}$	3080		4630	$\text{pF}$
Output Capacitance	$C_{oss}$		520		960	
Reverse Transfer Capacitance	$C_{rss}$		350		810	
Gate Resistance	$R_g$	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$	0.6		2.1	$\Omega$
Total Gate Charge	$Q_g$	$V_{GS}=10\text{V}$ , $V_{DS}=10\text{V}$ , $I_D=20\text{A}$	28		43	nC
Gate Source Charge	$Q_{gs}$		7		11	
Gate Drain Charge	$Q_{gd}$		7		17	
Turn-On DelayTime	$t_{d(on)}$	$V_{GS}=10\text{V}$ , $V_{DS}=10\text{V}$ , $R_L=0.5\Omega$ , $R_{GEN}=3\Omega$		7		ns
Turn-On Rise Time	$t_r$			8		
Turn-Off DelayTime	$t_{d(off)}$			70		
Turn-Off Fall Time	$t_f$			18		
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=20\text{A}$ , $di/dt=500\text{A}/\mu\text{s}$	13		20	nC
Body Diode Reverse Recovery Charge	$Q_{rr}$		29		43	
Maximum Body-Diode Continuous Current	$I_S$				4	A
Diode Forward Voltage	$V_{SD}$	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$			1	V

Note : The static characteristics in Figures 1 to 6 are obtained using  $<300\text{ }\mu\text{s}$  pulses, duty cycle 0.5% max.



### Typical Characteristics

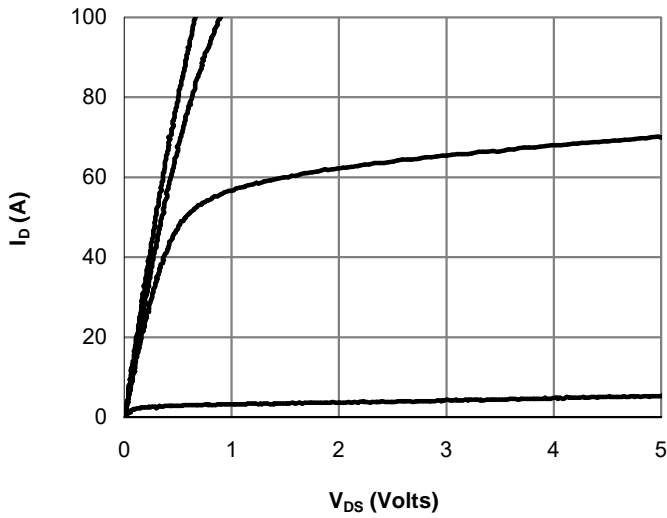


Fig 1: On-Region Characteristics (Note E)

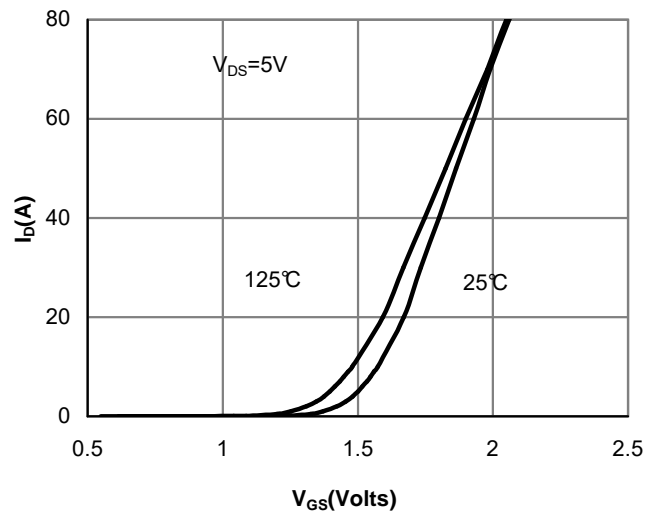


Figure 2: Transfer Characteristics (Note E)

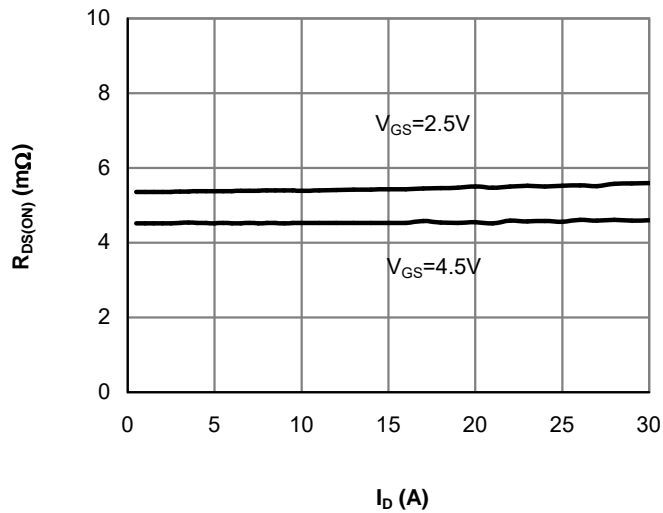


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

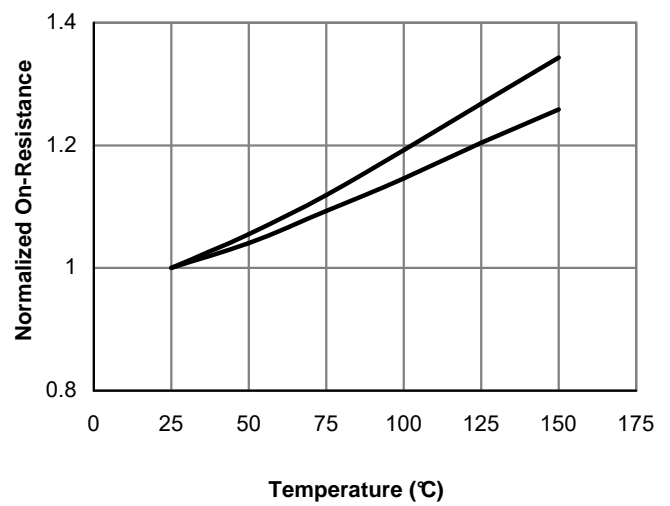


Figure 4: On-Resistance vs. Junction Temperature (Note E)

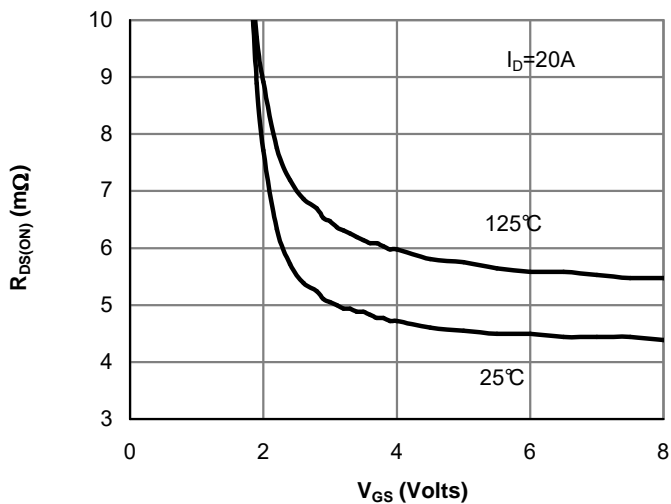


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

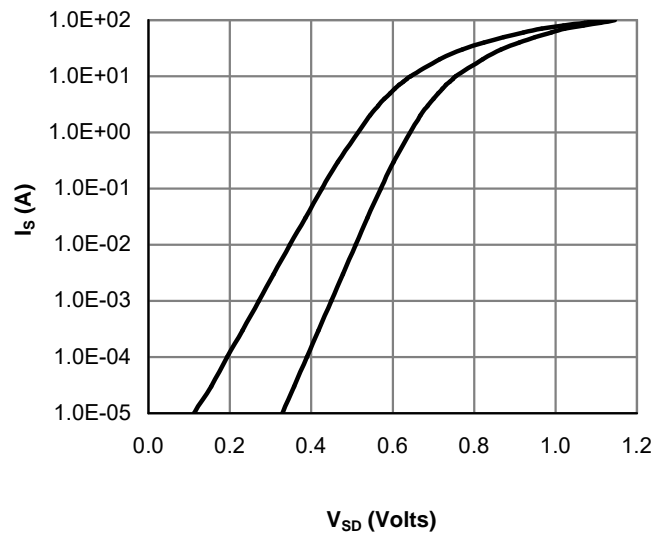


Figure 6: Body-Diode Characteristics (Note E)



### Typical Characteristics

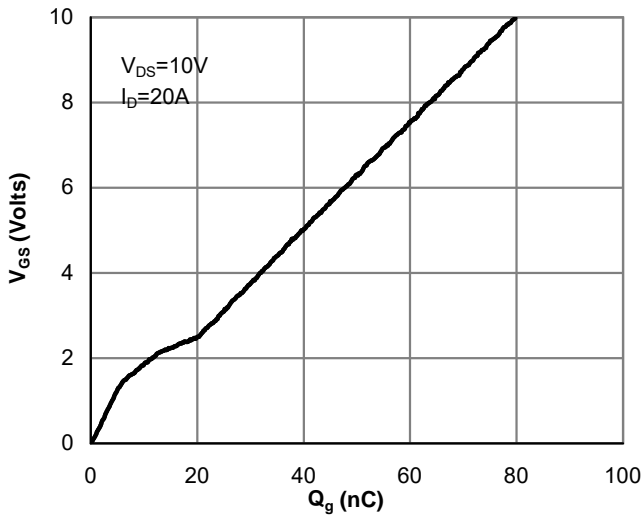


Figure 7: Gate-Charge Characteristics

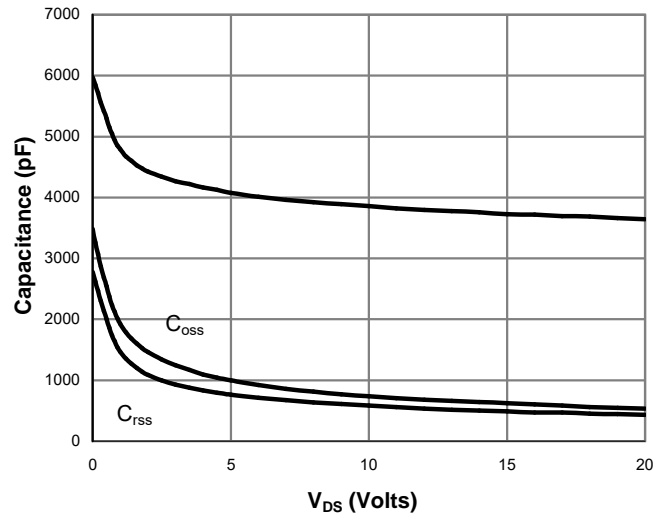


Figure 8: Capacitance Characteristics

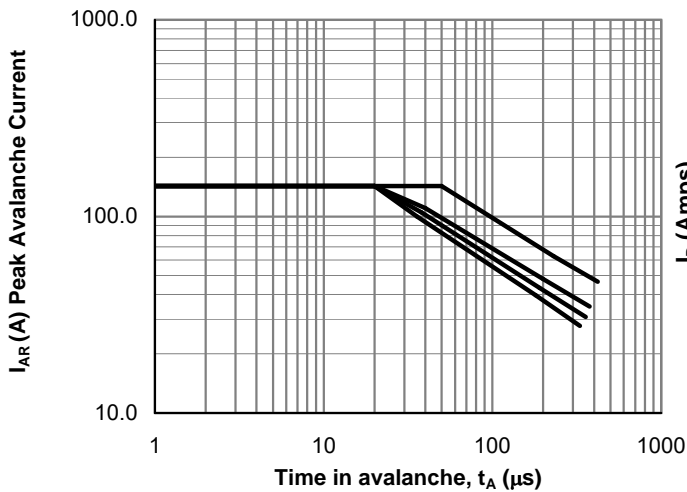


Figure 9: Single Pulse Avalanche capability (Note C)

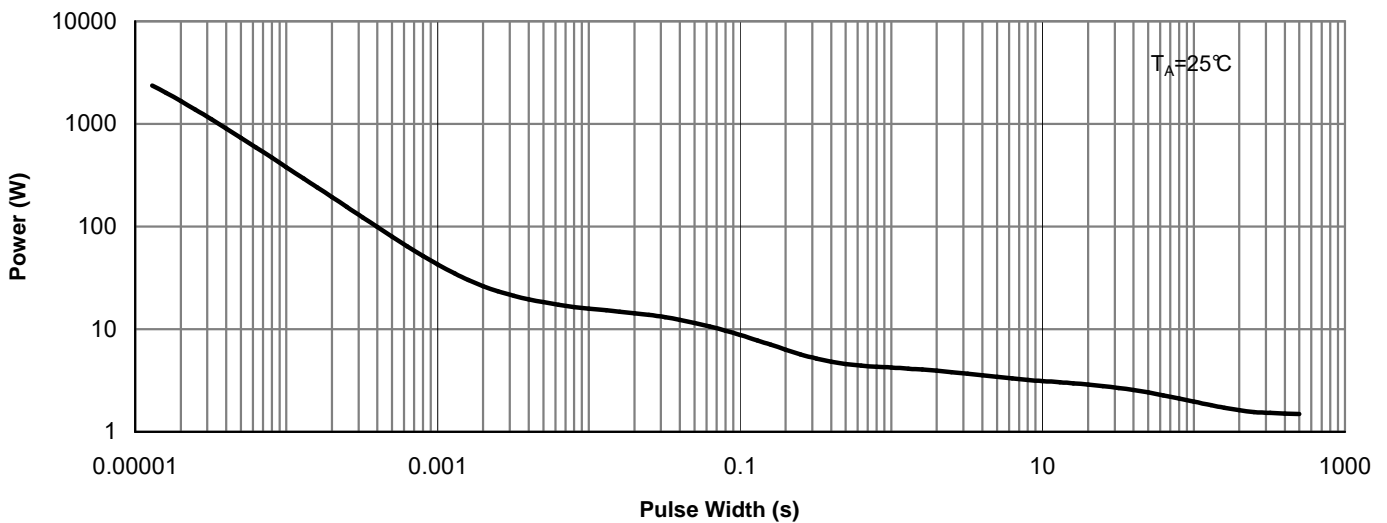
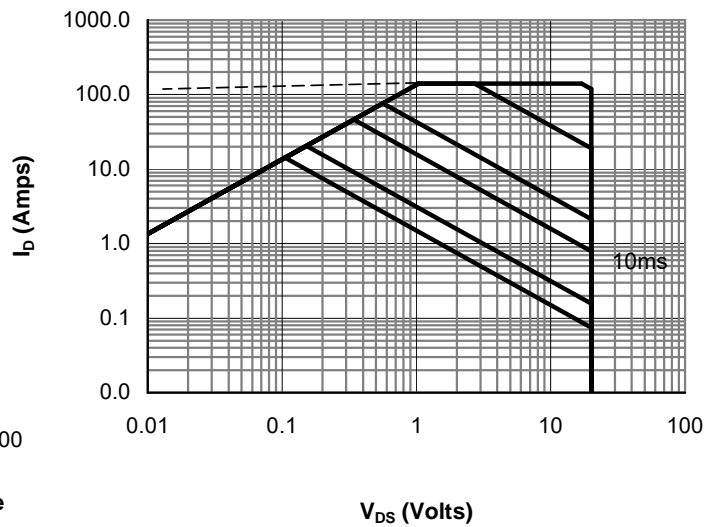


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)



### Typical Characteristics

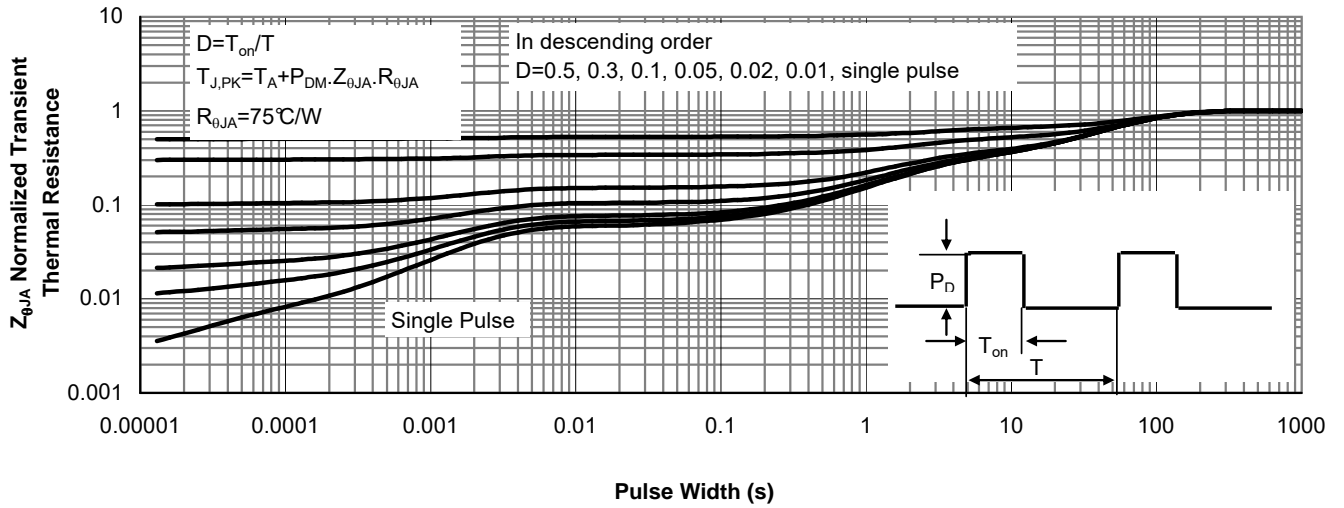
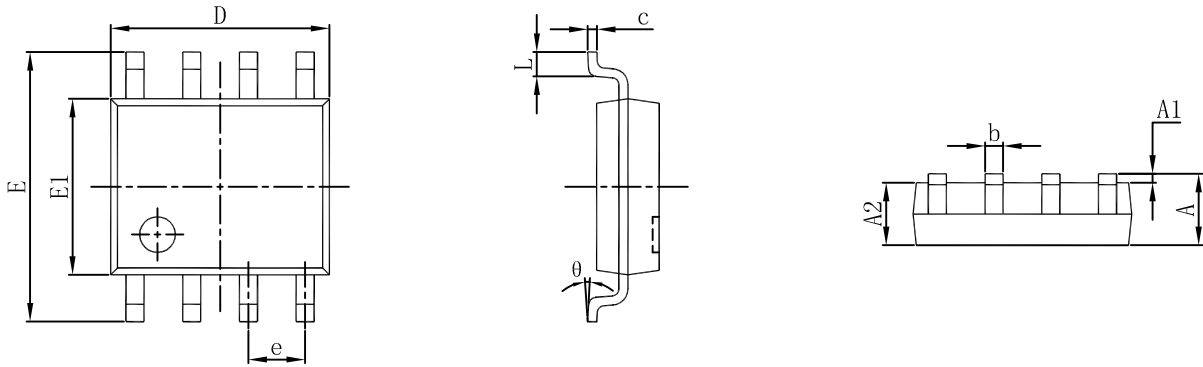


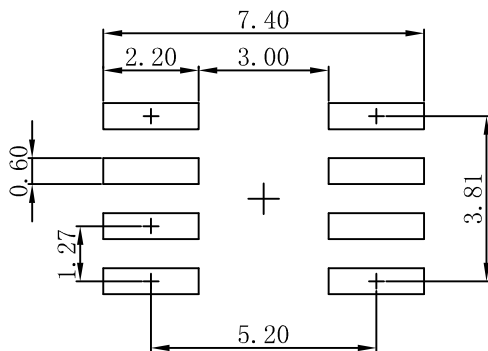
Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)



### SOP-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Note:  
 1. Controlling dimension: in millimeters.  
 2. General tolerance:  $\pm 0.05\text{mm}$ .  
 3. The pad layout is for reference purposes only.



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