

• **General Description**

- AP8810DY combines advanced MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is most suitable for Li-ion battery management applications.
- ESD Protected

• **Applications**

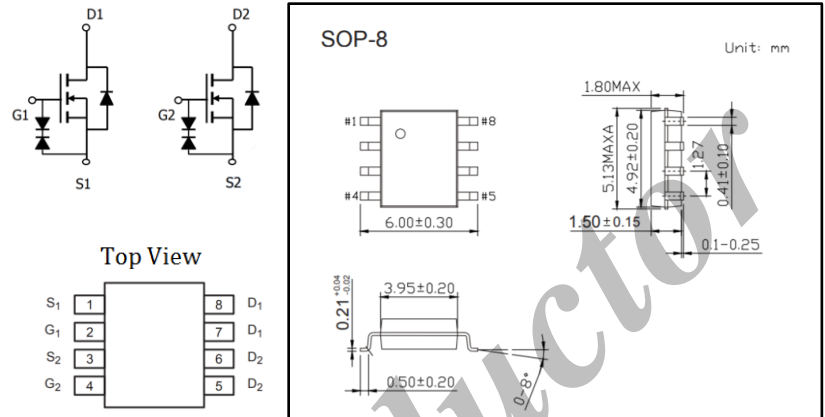
- Li-ion battery management applications

• **Product Summary**

$V_{DS}$	20V
$I_D$	7A
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$ )	< 20m $\Omega$
$R_{DS(ON)}$ (at $V_{GS} = 2.5V$ )	< 30m $\Omega$
$R_{DS(ON)}$ (at $V_{GS} = 1.8V$ )	< 50m $\Omega$
ESD Protection	2kV HBM

• **Absolute Maximum Ratings  $T_a = 25^\circ C$**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current	$I_D$	$T_a = 25^\circ C$	7
		$T_a = 70^\circ C$	5.7
Pulsed Drain Current	$I_{DM}$	25	A
Power Dissipation	$P_D$	$T_a = 25^\circ C$	1.25
		$T_a = 70^\circ C$	0.8
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$
Thermal Characteristics			
Thermal Resistance. Junction-to-Ambient	$R_{\theta JA}$	$t \leq 10s$	100
		Steady State	156
Thermal Resistance. Junction-to-Lead	$R_{\theta JL}$	57.6	$^\circ C/W$



• **Electrical Characteristics Ta = 25°C**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	$V_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
		$V_{DS}=20V, V_{GS}=0V, T_J=55^\circ C$			5	
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 8V$			$\pm 10$	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.7	1.1	V
On-State Drain Current	$I_{D(ON)}$	$V_{GS}=4.5V, V_{DS}=5V$	25			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=7A$			20	m $\Omega$
		$V_{GS}=2.5V, I_D=5.5A$			30	
		$V_{GS}=1.8V, I_D=5A$			50	
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=7A$		12		S
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$			1	V
Maximum Body-Diode Continuous Current	$I_S$				2	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=10V, f=1MHz$		1200		pF
Output Capacitance	$C_{oss}$			160		
Reverse Transfer Capacitance	$C_{rss}$			80		
<b>Switching Parameters</b>						
Total Gate Charge (4.5V)	$Q_g$	$V_{GS}=4.5V, V_{DS}=10V, I_D=7A$			14	nC
Gate Source Charge	$Q_{gs}$			4.2		
Gate Drain Charge	$Q_{gd}$			2.6		
Turn-On Delay Time	$t_{D(on)}$	$V_{GS}=4.5V, V_{DS}=10V, R_L=1.54\Omega, R_{GEN}=3\Omega$		270		ns
Turn-On Rise Time	$t_r$			320		
Turn-Off Delay Time	$t_{D(off)}$			3		
Turn-Off Fall Time	$t_f$			2.2		
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=18A, d_i/d_t=100A/\mu s$		30		
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F=18A, d_i/d_t=100A/\mu s$		6.5		nC

• **Ordering Information**

Ordering Part Number	Package	MOQ
AP8810DY	SOP-8	2,500 pcs / reel

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• Typical Electrical and Thermal Characteristics

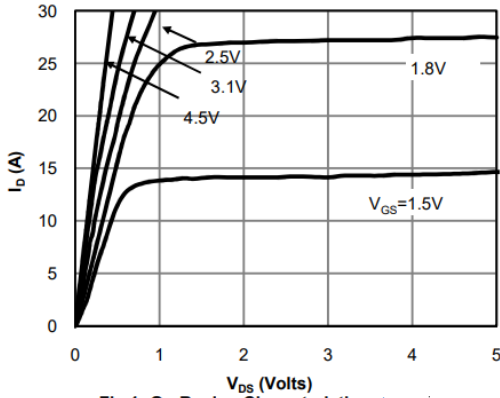


Fig 1: On-Region Characteristics

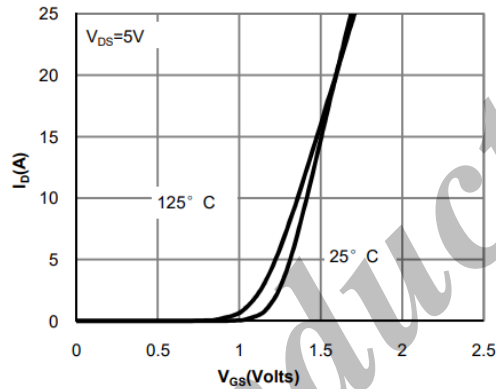


Figure 2: Transfer Characteristics

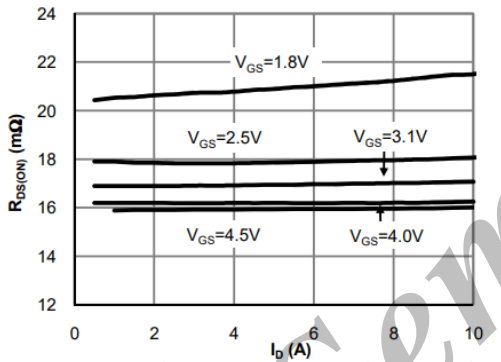


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

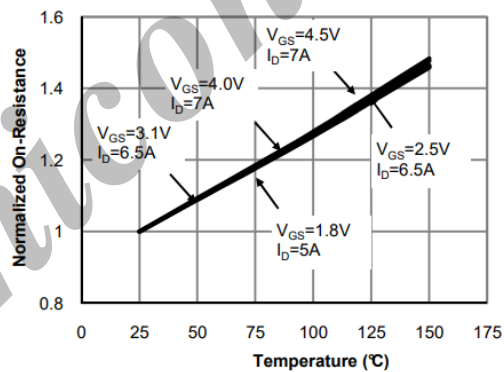


Figure 4: On-Resistance vs. Junction Temperature

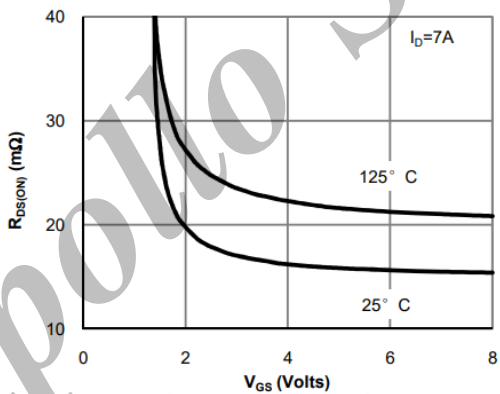


Figure 5: On-Resistance vs. Gate-Source Voltage

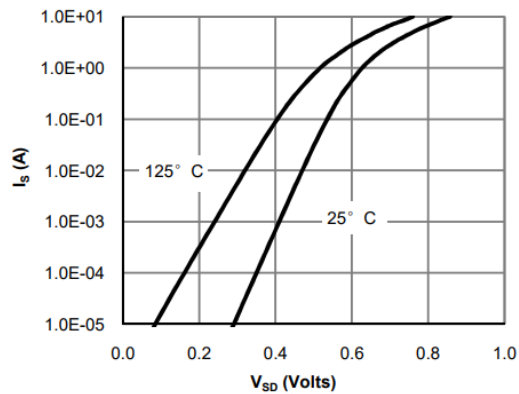


Figure 6: Body-Diode Characteristics

Note 1: The static characteristics in Figure 1 to 6 are obtained using <math><300\mu\text{A}</math> pulses, duty cycle 0.5% max.

• Typical Electrical and Thermal Characteristics

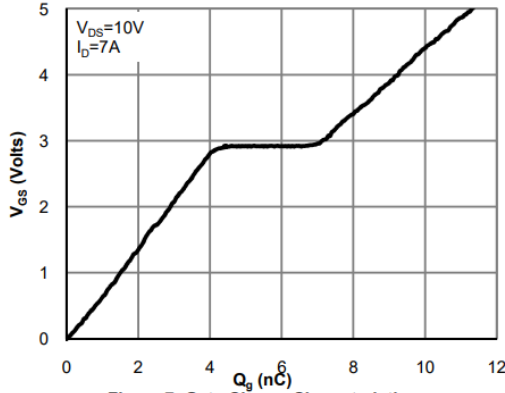


Figure 7: Gate-Charge Characteristics

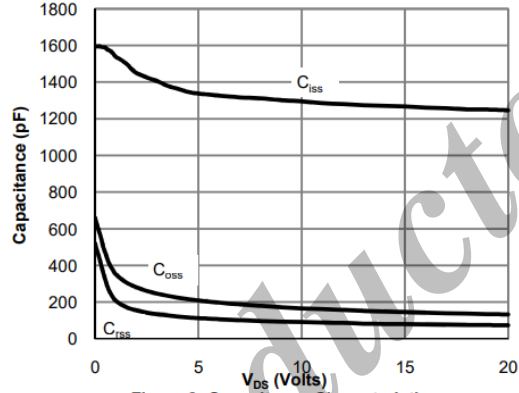


Figure 8: Capacitance Characteristics

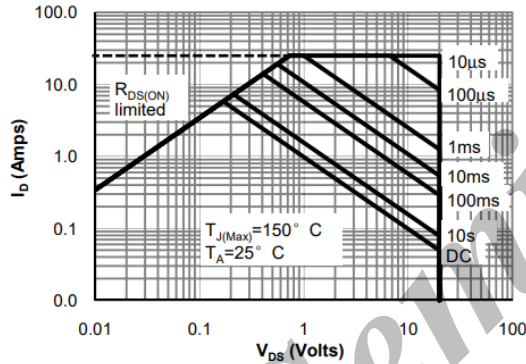


Figure 9: Maximum Forward Biased Safe Operating Area

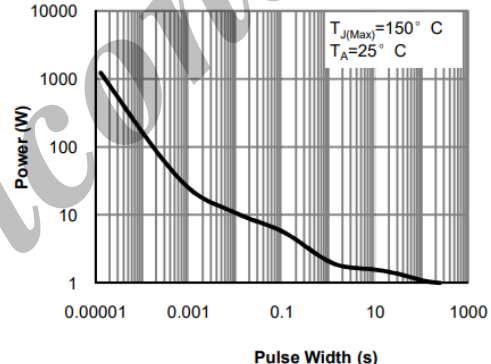


Figure 10: Single Pulse Power Rating Junction-to-Ambient

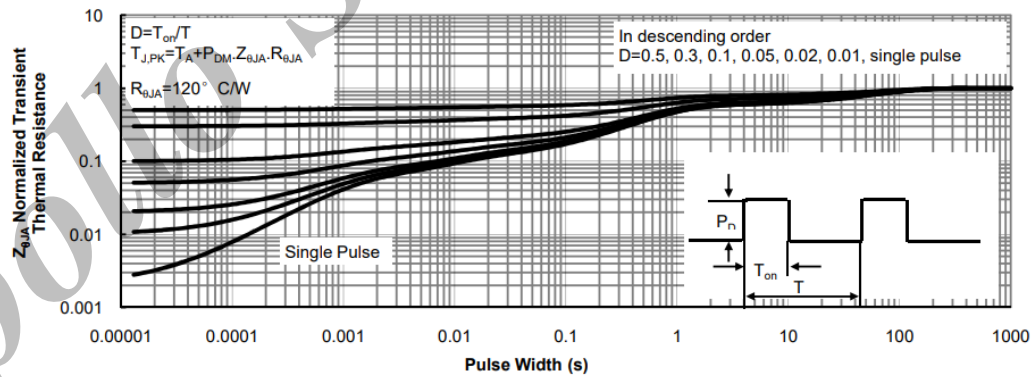


Figure 11: Normalized Maximum Transient Thermal Impedance

Note 2: The curves in Figure 9 to 11 are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. copper, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150°C. The SOA curve provides a single pulse rating.

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