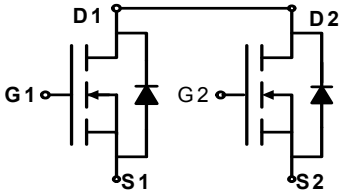
AP8814A

20V N+N hannel Enhancement Mode MOSFET

Description

The AP8814A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

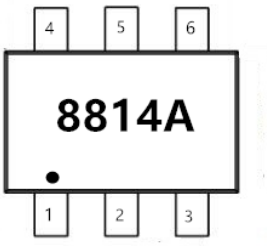


General Features

V_{DS} = 20V I_D = 8A

$R_{DS(ON)}$ < 17mΩ @ V_{GS}=4.5V

$R_{DS(ON)}$ < 22mΩ @ V_{GS}=2.5V



Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP8814A	SOT-23-6L	8814A	3000

Absolute max Rating: (TA=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D	8	A
	I_{DM}	25	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	℃/W

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Electrical Characterizes (@T_C=25℃ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.8	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4A		14	17	mΩ
		V_{GS}=2.5V, I_D=3A		18	20	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=4A		10		S
Input Capacitance	C_{lss}	V_{DS}=8V,V_{GS}=0V, F=1.0MHz		800		PF
Output Capacitance	C_{oss}			155		PF
Reverse Transfer Capacitance	C_{rss}			125		PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=1A V_{GS}=4V,R_{GEN}=10Ω		18.3		nS
Turn-on Rise Time	t_r			4.8		nS
Turn-Off Delay Time	$t_{d(off)}$			43.5		nS
Turn-Off Fall Time	t_f			20		nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=4A, V_{GS}=4V		11		nC
Gate-Source Charge	Q_{gs}			2.2		nC
Gate-Drain Charge	Q_{gd}			2.5		nC
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=2A		0.8	1.2	V
Diode Forward Current (Note 2)	I_S				2	A

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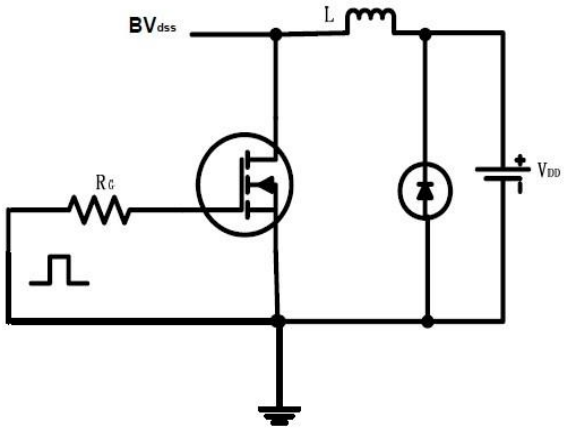
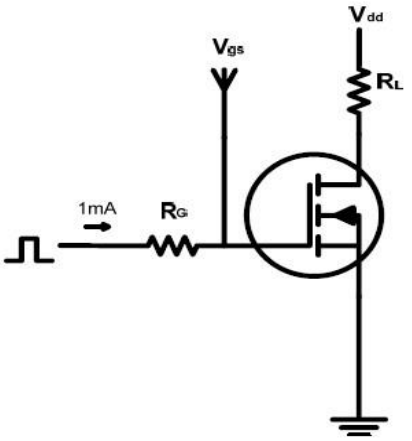
Test circuits and Waveforms

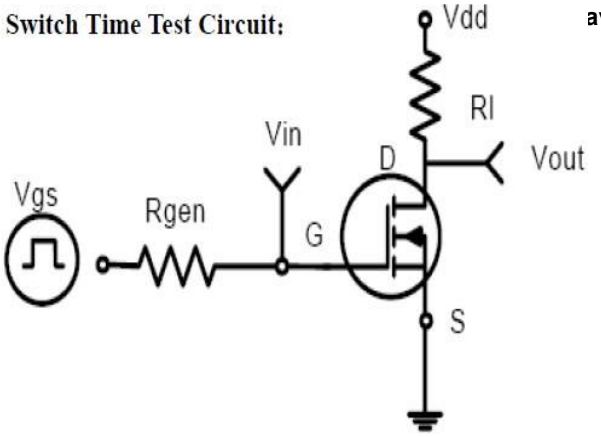
EAS test circuits:



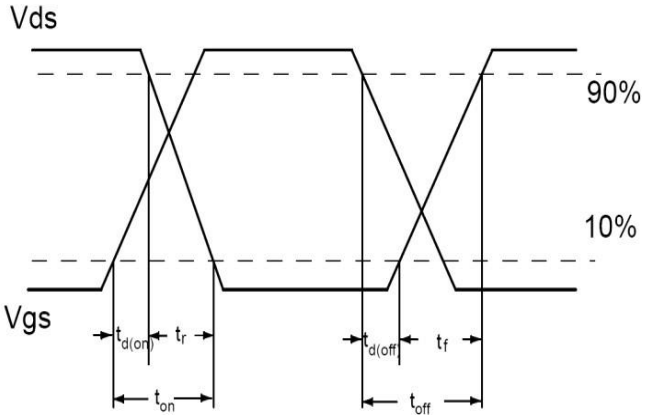
Gate charge test circuit:



Switch Time Test Circuit:



aveforms:



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 testing.

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Typical electrical and thermal characteristics

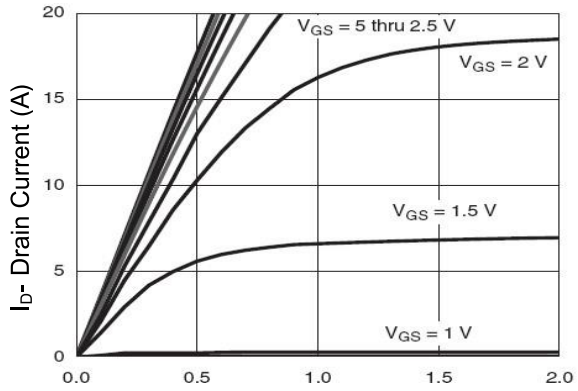


Figure 1: Typical Output Characteristics

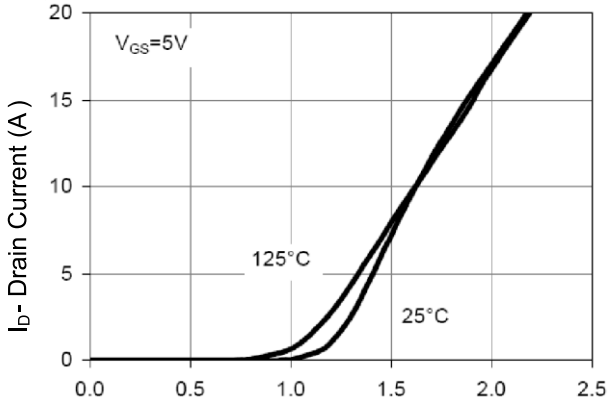


Figure 2: Transfer Characteristics

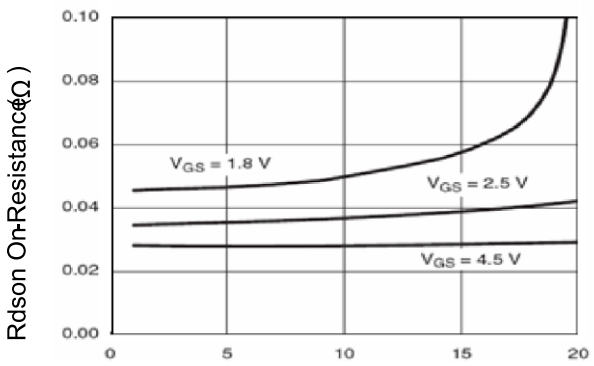


Figure 3: Drain-Source On-Resistance

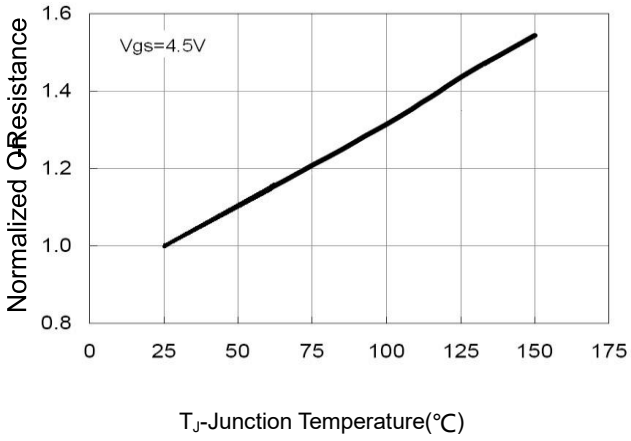


Figure 4: Drain-Source On-Resistance

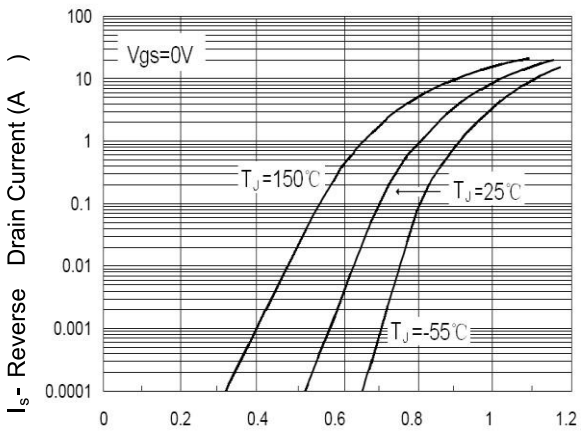


Figure 5 : Source- Drain Diode Forward

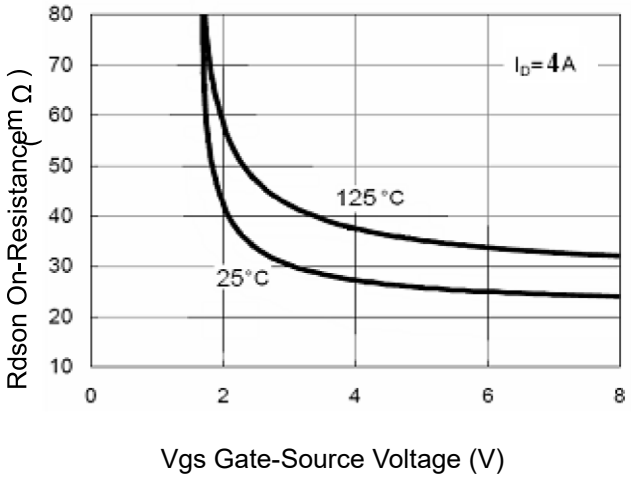
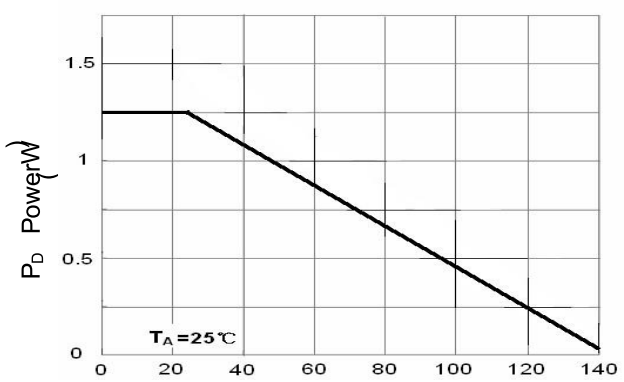
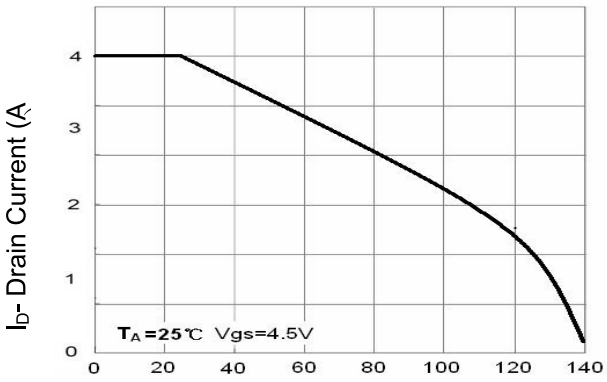


Figure 6: Rdson vs Vgs



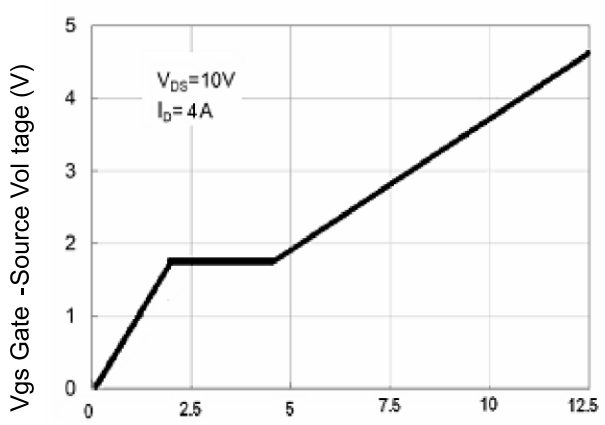
T_J-Junction Temperature(℃)

Figure 7: Power Dissipation



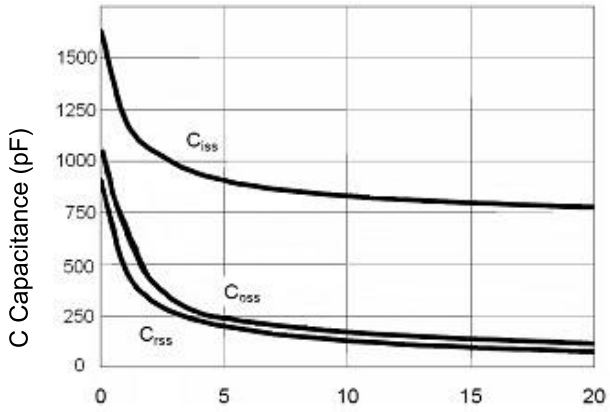
T_J-Junction Temperature(℃)

Figure 8： Drain Current



Qg Gate Charge (nC)

Figure 9： Gate Charge



Vds Drain-Source Voltage (V)

Figure 10: Capacitance vs Vds

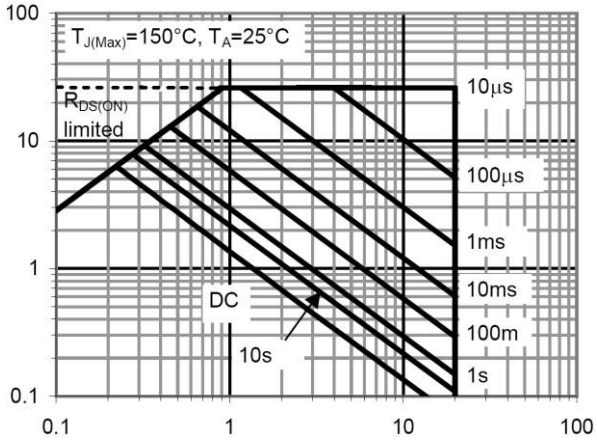
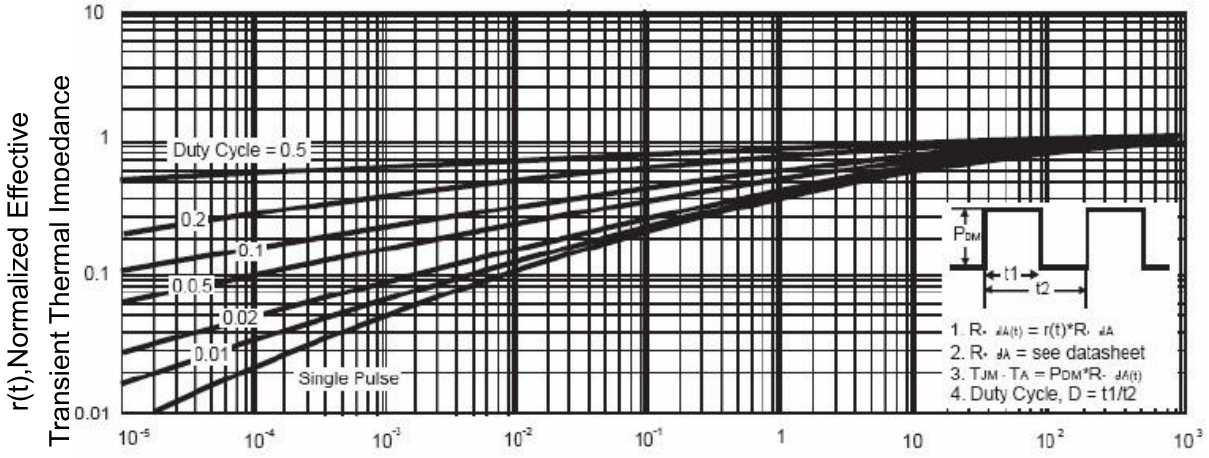


Figure 11: Safe Operation Area



Square Wave Pulse Duration(sec)

Figure 12: Normalized Maximum Transient Thermal Impedance

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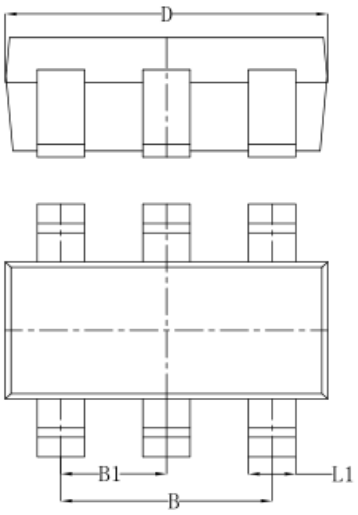
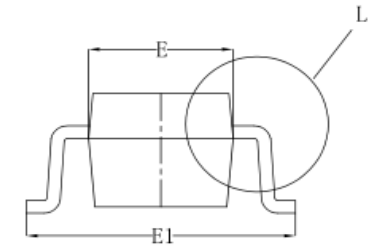
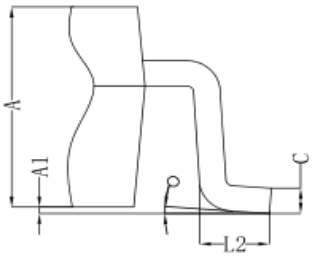
PACK:SOT23-6







Detial L

Symbol	Dim in mm		
	Min	Nor	Max
A	1.050	1.100	1.150
A1	0.000	0.050	0.100
L1	0.300	0.400	0.500
C	0.100	0.150	0.200
D	2.820	2.920	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
B	1.800	1.900	2.000
B1	0.950 TYP		
L2	0.300	0.450	0.600
o	0°	4°	8°

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