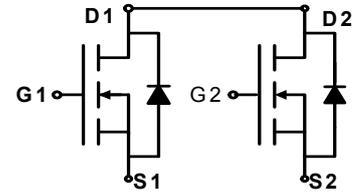


## 20V N+N hannel Enhancement Mode MOSFET

### 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.

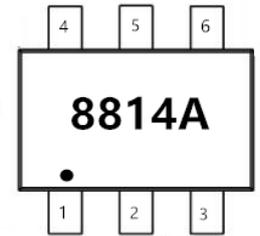


### General Features

$V_{DS} = 20V$   $I_D = 8A$

$R_{DS(ON)} < 17m\Omega$  @  $V_{GS}=4.5V$

$R_{DS(ON)} < 22m\Omega$  @  $V_{GS}=2.5V$



### 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: ( $T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	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	$^{\circ}C$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	$^{\circ}C/W$

## 20V N+N hannel Enhancement Mode MOSFET

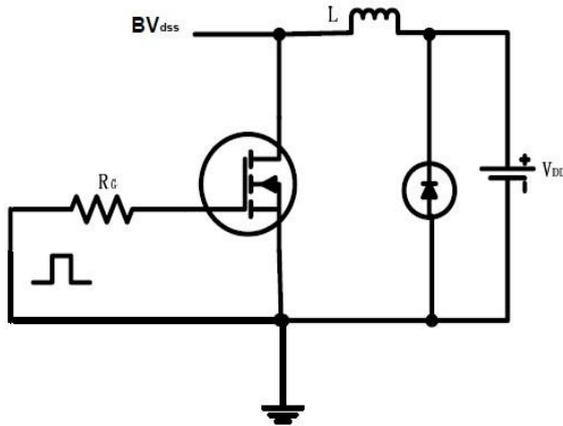
### Electrical Characterizes (@T<sub>c</sub>=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.8	1.2	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A		14	17	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A		18	20	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =4A		10		S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =8V, V <sub>GS</sub> =0V, F=1.0MHz		800		PF
Output Capacitance	C <sub>oss</sub>			155		PF
Reverse Transfer Capacitance	C <sub>rss</sub>			125		PF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =1A V <sub>GS</sub> =4V, R <sub>GEN</sub> =10Ω		18.3		nS
Turn-on Rise Time	t <sub>r</sub>			4.8		nS
Turn-Off Delay Time	t <sub>d(off)</sub>			43.5		nS
Turn-Off Fall Time	t <sub>f</sub>			20		nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =4A, V <sub>GS</sub> =4V		11		nC
Gate-Source Charge	Q <sub>gs</sub>			2.2		nC
Gate-Drain Charge	Q <sub>gd</sub>			2.5		nC
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =2A		0.8	1.2	V
Diode Forward Current (Note 2)	I <sub>S</sub>				2	A

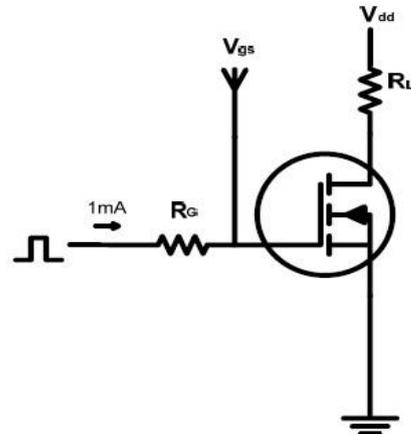
## 20V N+N hannel Enhancement Mode MOSFET

### Test circuits and Waveforms

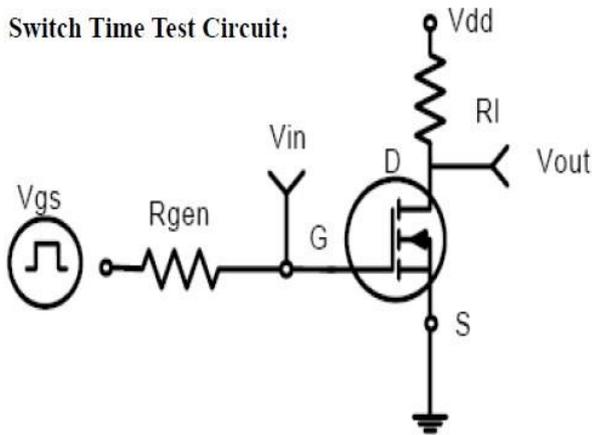
EAS test circuits:



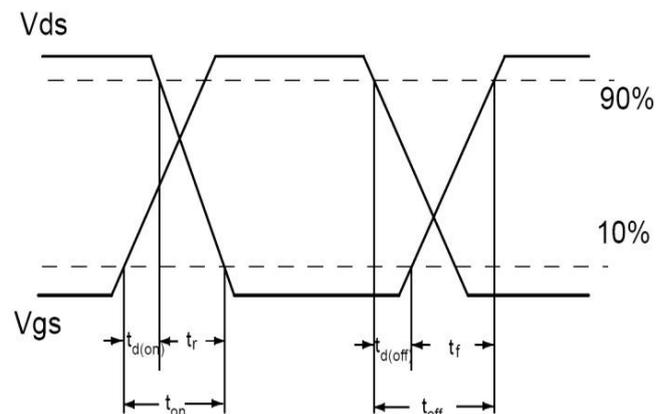
Gate charge test circuit:



Switch Time Test Circuit:



Waveforms:



**NOTES:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production testing.

## 20V N+N hannel Enhancement Mode MOSFET

### Typical electrical and thermal characteristics

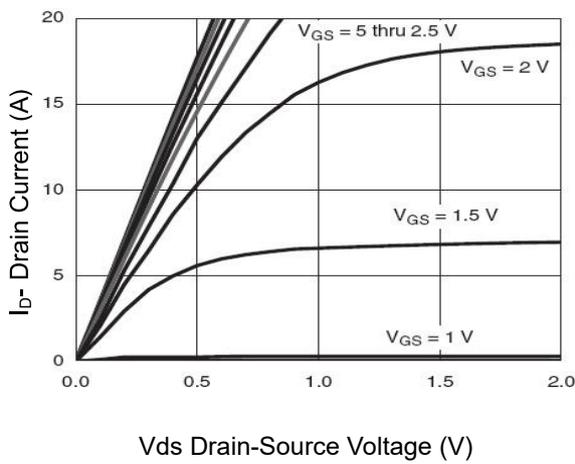


Figure 1: Typical Output Characteristics

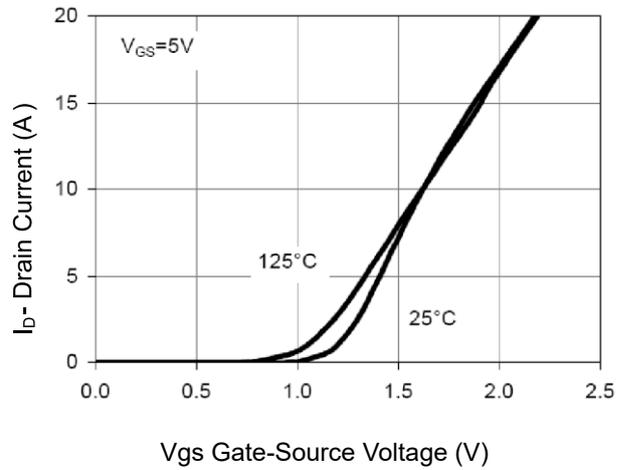


Figure 2: Transfer Characteristics

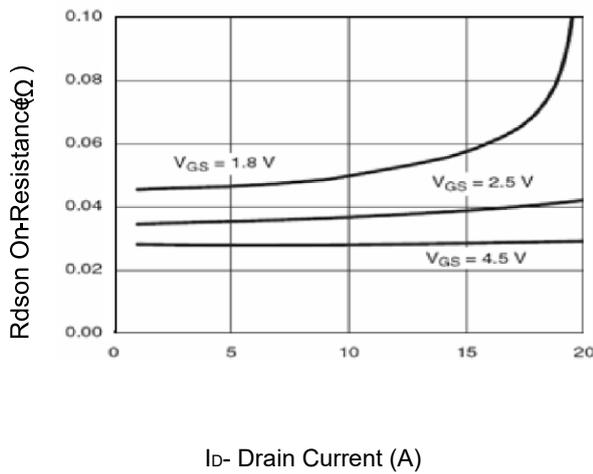


Figure 3: Drain-Source On-Resistance

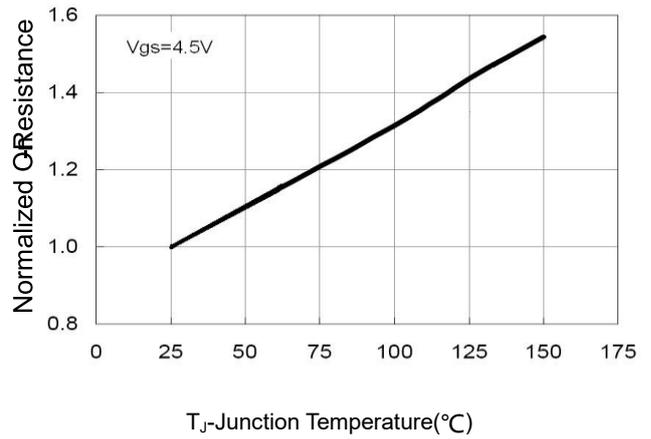


Figure 4: Drain-Source On-Resistance

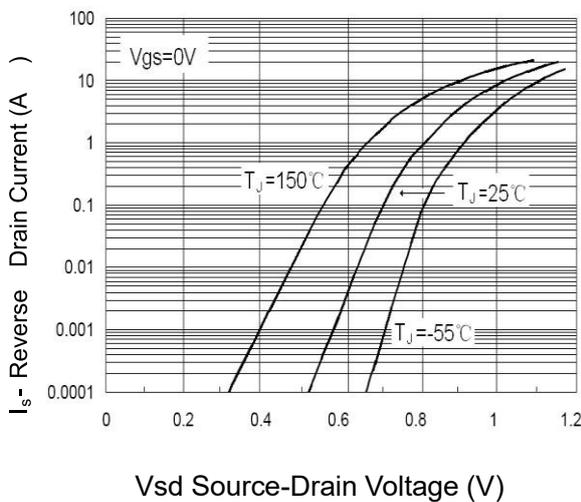


Figure 5 : Source- Drain Diode Forward

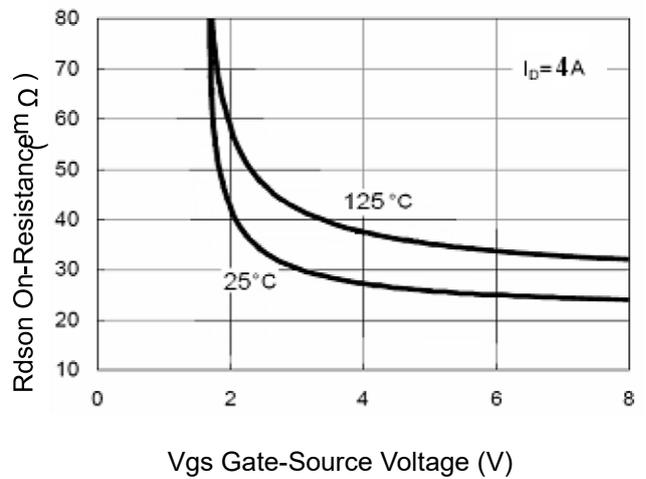
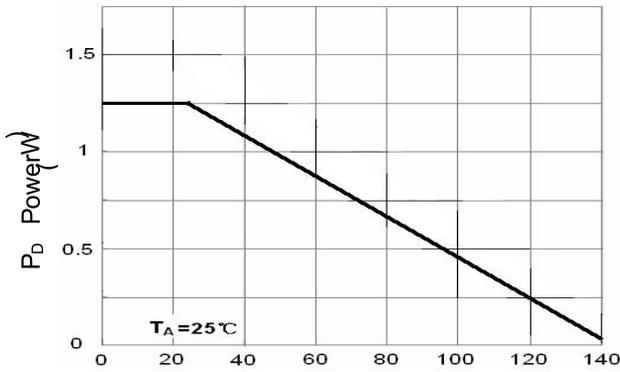
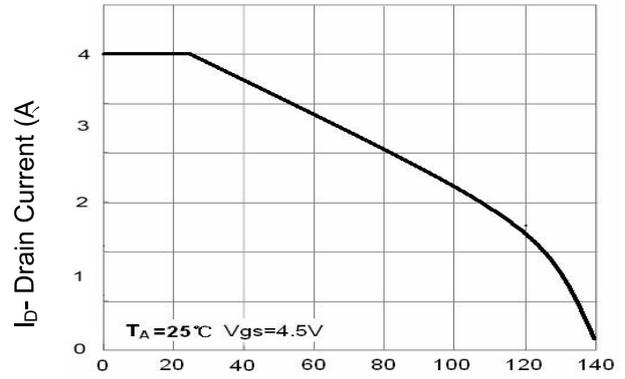


Figure 6: Rdson vs Vgs

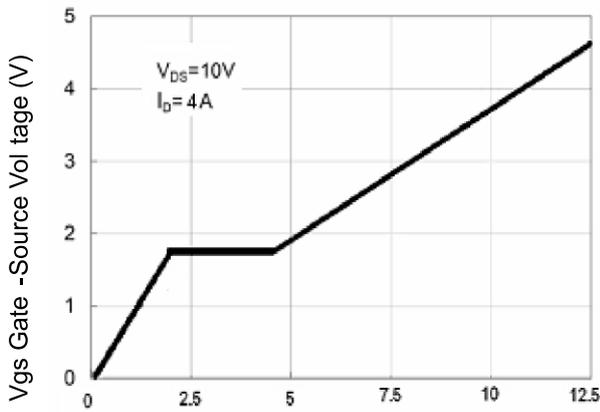
## 20V N+N hannel Enhancement Mode MOSFET



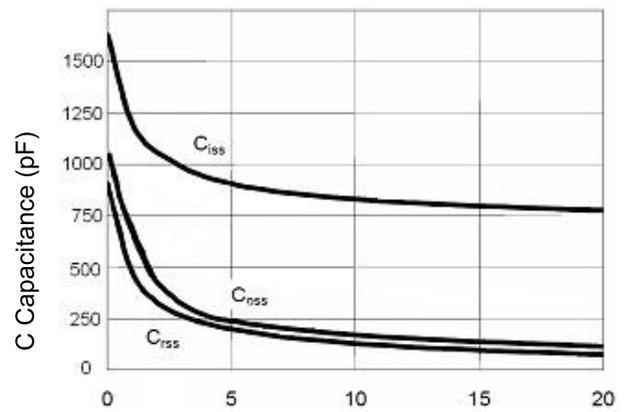
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 7: Power Dissipation**



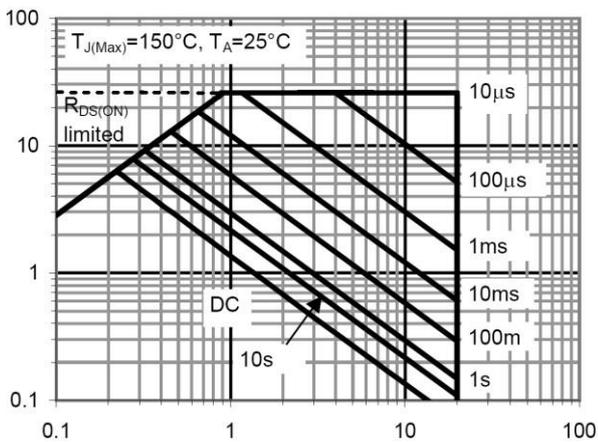
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 8: Drain Current**



Q<sub>g</sub> Gate Charge (nC)  
**Figure 9: Gate Charge**

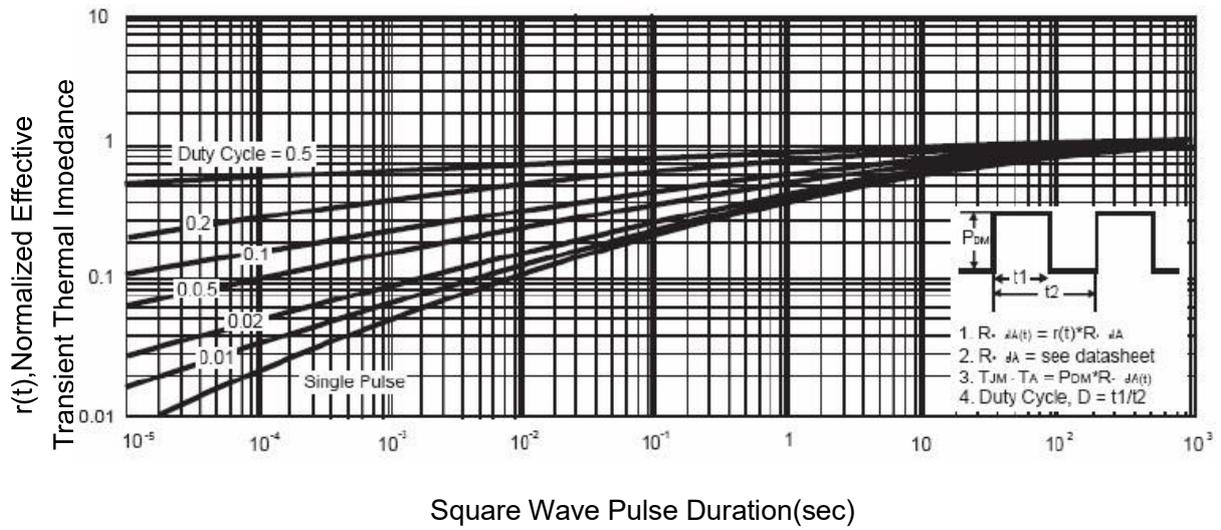


V<sub>ds</sub> Drain-Source Voltage (V)  
**Figure 10: Capacitance vs Vds**



**Figure 11: Safe Operation Area**

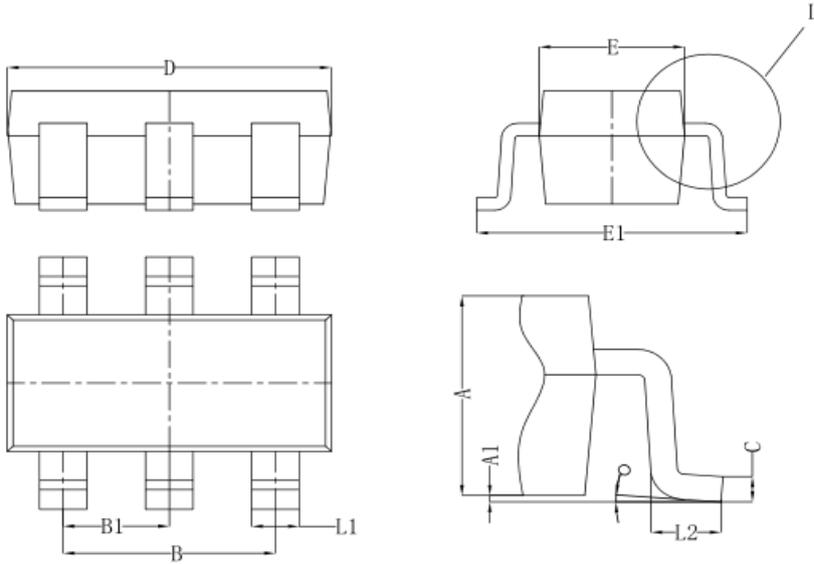
**20V N+N hannel Enhancement Mode MOSFET**



**Figure 12: Normalized Maximum Transient Thermal Impedance**

**20V N+N hannel Enhancement Mode MOSFET**

**PACK:SOT23-6**



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°

Detail L



## 20V N+N hannel Enhancement Mode MOSFET

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