Dual N-CH Fast Switching MOSFETs

❖ GENERAL DESCRIPTION

The AMBA4810 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The AMBA4810 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

❖ FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

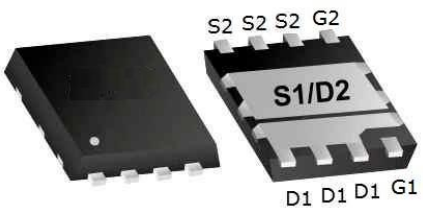
Applications

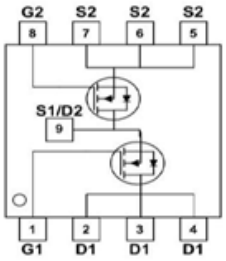
- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- CCFL Back-light Inverter

Product Summery

BVDSS	RDSON	ID
40V	17mΩ	39A
40V	8.5mΩ	54A

PRPAK5X6 Pin configuration





❖ ABSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Rating		Units
		Die1	Die2	
Drain-Source Voltage	V_{DS}	40	40	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current, V_{GS} @ 10V (Note 1)	I_D@T_C=25°C	39	54	A
Continuous Drain Current, V_{GS} @ 10V (Note 1)	I_D@T_C=100°C	25	34	A
Continuous Drain Current, V_{GS} @ 10V (Note 1)	I_D@T_A=25°C	8.7	11.8	
Continuous Drain Current, V_{GS} @ 10V (Note 1)	I_D@T_A=70°C	6.9	9.5	
Pulsed Drain Current (Note 2)	I_{DM}	78	108	A
Single Pulse Avalanche Energy (Note 3)	EAS	55	166	mJ
Avalanche Current	I_{AS}	25	39	A
Total Power Dissipation (Note 4)	P_D@T_C=25°C	41	41	W
Total Power Dissipation (Note 4)	P_D@T_A=25°C	2	2	W
Storage Temperature Range	T_{STG}	-55 to 150	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	-55 to 150	°C
Thermal Resistance Junction-Ambient (Note 1)	$R_{\theta JA}$	62		°C/W
Thermal Resistance Junction-Case (Note 1)	$R_{\theta JC}$	3		°C/W

Note 1: The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
Note 2: The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note 3: The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=25A
Note 4: The power dissipation is limited by 150°C junction temperature
Note 5: The Min. value is 100% EAS tested guarantee.
Note 6: The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

❖ ELECTRICAL CHARACTERISTICS

(T_J=25 °C, unless otherwise noted)

Die1 N-Channel						
Characteristics	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	40	-	-	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1mA	-	-	-	V/°C
Static Drain-Source On-Resistance (Note 2)	$R_{DS(ON)}$	V_{GS}=10V , I_D=12A	-	14	17	mΩ
		V_{GS}=4.5V , I_D=10A	-	18	22	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-	-	mV/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=32V , V_{GS}=0V , T_J=25°C	-	-	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55°C	-	-	5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	-	-	±100	nA
Forward Transconductance	gfs	V_{DS}=5V , I_D=12A	-	34	-	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	-	2.1	-	Ω
Total Gate Charge (4.5V)	Q_g	V_{DS}=32V , V_{GS}=4.5V, I_D=12A	-	10	-	nC
Gate-Source Charge	Q_{gs}		-	2.55	-	
Gate-Drain Charge	Q_{gd}		-	4.8	-	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=20V , V_{GS}=10V, R_G=3.3Ω I_D=12A	-	2.8	-	ns
Rise Time	T_r		-	12.8	-	
Turn-Off Delay Time	$T_{d(off)}$		-	21.2	-	
Fall Time	T_f		-	6.4	-	
Input Capacitance	C_{iss}	V_{DS}=15V , V_{GS}=0V, f=1MHz	-	1013	-	pF
Output Capacitance	C_{oss}		-	107	-	
Reverse Transfer Capacitance	C_{rss}		-	76	-	
Guaranteed Avalanche Characteristics						
Single Pulse Avalanche Energy (Note 5)	EAS	V_{DD}=25V , L=0.1mH , I_{AS}=15A	20	-		mJ
Diode Characteristics						
Continuous Source Current (Note 1, 6)	I_S	V_G=V_D=0V , Force Current	-	-	39	A
Pulsed Source Current (Note 2, 6)	I_{SM}		-	-	78	A
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25°C	-	-	1	V

Note 1: The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
Note 2: The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note 3: The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=25A
Note 4: The power dissipation is limited by 150°C junction temperature
Note 5: The Min. value is 100% EAS tested guarantee.
Note 6: The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

❖ ELECTRICAL CHARACTERISTICS (COUNTINOUS)

(T_J=25 °C, unless otherwise noted)

Die2 N-Channel						
Characteristics	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	40	-	-	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1mA	-	-	-	V/°C
Static Drain-Source On-Resistance (Note 2)	$R_{DS(ON)}$	V_{GS}=10V , I_D=12A	-	6.5	8.5	mΩ
		V_{GS}=4.5V , I_D=10A	-	8.5	12	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-	-	mV/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=32V , V_{GS}=0V , T_J=25°C	-	-	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55°C	-	-	5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	-	-	±100	nA
Forward Transconductance	gfs	V_{DS}=5V , I_D=12A	-	32	-	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	-	1.6	-	Ω
Total Gate Charge (4.5V)	Q_g	V_{DS}=32V , V_{GS}=4.5V, I_D=12A	-	18.8	-	nC
Gate-Source Charge	Q_{gs}		-	4.7	-	
Gate-Drain Charge	Q_{gd}		-	8.2	-	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=20V , V_{GS}=10V, R_G=3.3Ω I_D=12A	-	14.3	-	ns
Rise Time	T_r		-	2.6	-	
Turn-Off Delay Time	$T_{d(off)}$		-	77	-	
Fall Time	T_f		-	4.8	-	
Input Capacitance	C_{iss}	V_{DS}=15V , V_{GS}=0V, f=1MHz	-	2332	-	pF
Output Capacitance	C_{oss}		-	193	-	
Reverse Transfer Capacitance	C_{rss}		-	138	-	
Guaranteed Avalanche Characteristics						
Single Pulse Avalanche Energy (Note 5)	EAS	V_{DD}=25V , L=0.1mH , I_{AS}=24A	63	-	-	mJ
Diode Characteristics						
Continuous Source Current (Note 1, 6)	I_S	V_G=V_D=0V , Force Current	-	-	54	A
Pulsed Source Current (Note 2, 6)	I_{SM}		-	-	108	A
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25°C	-	-	1	V

Note 1: The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
Note 2: The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note 3: The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=39A
Note 4: The power dissipation is limited by 150°C junction temperature
Note 5: The Min. value is 100% EAS tested guarantee.
Note 6: The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.