Power Modules

Advanced Power Technology offers a comprehensive line of standard off the shelf module products as well as custom Application Specific Power Modules (ASPM®) designed specifically to meet your special needs using state of the art assembly techniques, materials and silicon. Our modules are used in a wide variety of markets and applications similar to our discrete products where their benefits provide our customers with superior value. Those benefits include:

The use of bare dice results in a high degree of integration and facilitates close spacing between devices. In such highly integrated power structures the number of external connections is kept to a bare minimum, four only in the case of a full bridge (+Vbus, 0Vbus, VOut1, VOut2). All other connections are internal and very short for minimum parasitic resistance and inductance. Low parasitics permit safe operation at high frequencies by improving efficiency and reducing voltage overshoots at device turn off. Lower overshoots also equate to less EMI/RFI and easier filtering.

Thanks to the compact nature of ASPM® modules, decoupling capacitors may be situated close to the power bus, thereby nullifying the effects of stray inductance between bus and module.

The attachment of bare dice onto a substrate results in excellent thermal management with full galvanic isolation to the base plate.

The substrate (Insulated Metal Substrate or ceramic either alumina Al2O3 or aluminium nitride AlN) and the type and number of semiconductor chips are carefully chosen based on the required electrical and thermal performance as well as on cost.

Kelvin connections to gates and sources can be implemented directly on-chip, thereby separating control signals from the power paths for optimum noise immunity.

For special applications like linear, RF and Hi-Rel, power semiconductor chips may be pre-sorted into narrow bands of VGS(th) or leakage current, to improve system performance through parameter matching.

Circuit functions that generate substantial losses are integrated onto substrates for external cooling, while drivers and protection elements dissipating little power are assembled in SMD form onto PCBs inside the housing.

Galvanic isolation of the input signals may be realized via internal optocouplers or transformers with an integrated DC-DC converter furnishing isolated LV power. Such a module is driven by low-level ground-referenced signals.

RCD snubber networks may also be integrated into an ASPM® module, their close proximity to the power semiconductors guaranteeing effectiveness.

Because all internal power connections are mask defined during substrate manufacture, reproducibility of both thermal and electrical characteristics is near perfect, both within a given batch and from lot to lot.

Summarizing, better voltage safety margins together with first class and reproducible thermal and electrical performance lead to improved reliability of ASPM® modules compared to discrete assemblies.

The thermal cycling capability of the module can be dramatically extended by replacing the copper base plate with engineered materials such as AlSiC due to the closely matched Temperature Coefficients of Expansion compared to the internal ceramic substrates.

Both the size and weight of a power function are shrunk drastically as a result of integration. Most wiring is internal and little hardware is needed to assemble the module onto its heat sink and to connect it electrically.

Depending on the circuit complexity and on the power to be dissipated it is sometimes possible to dispense entirely with a costly and heavy base plate.

For larger modules where a base plate is nonetheless obligatory, it may be advantageous to specify a Metal-Matrix-Composite material (AlSiC). Such a baseplate permits significant weight reduction (AlSiC density = 3, Copper density = 8.6).

Using a power module greatly reduces the amount of required external hardware — busbars, screws, wire, etc.

Procurement costs for the complete circuit function are much less, as only a single macro-component is sourced instead of the multitude of parts needed for a discrete solution.

Labor costs for system assembly at the end customer are much lower.

Time to market is shortened, thereby benefiting the customer's Return-on-Investment. APT Europe provides the engineering of the complete power function, allowing the customer to concentrate on system and packaging considerations.

The Customer-Specific-Module approach offers great flexibility. An ASPM® module is easily upgradeable through design improvements, substitution of more advanced semiconductors, better manufacturing techniques and so on in order to maintain state-of-the-art performance at competitive costs.

Modules are compatible with standard of the industry, easy to market and price competitive. Full product range is offered including PT, NPT and Trench gate IGBTs, Power MOS V®, Power MOS 7® MOSFETs and FREDFETs, Coolmos™ and SiC diodes in a comprehensive range of electrical configurations. Low profile modules combined with state of the art devices permit enhanced electrical, thermal and mechanical ratings.

ASPM® modules integrate the exact customer electrical configuration (power and driver) including device part number (mix of silicon sources possible). Specific silicon (sorted on specific parameters), specific material and assembly processes, dedicated shape of connectors and package combined with the implementation of screening procedures make the ASPM® module to meet thermal, electrical, quality and reliability requirements of the customer.
The ASPM® module is designed to meet 100% of the customer needs. It provides the customer with a unique solution.

APT has development, design and engineering competencies, analytical and modeling tools, manufacturing technologies, multi-site infrastructure to satisfy your requirements in power integration, providing design for manufacturability, and improvement in performance and reliability.

3 PHASE BRIDGE

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	20	2.1	40	NPT	E2	-	APTGF20X60E2
	30	2.1	40	NPT	E2	-	APTGF30X60E2
	50	2.1	40	NPT	E2	-	APTGF50X60E2
1200	10	3.2	100	NPT	E2	-	APTGF10X120E2
	15	3.2	100	NPT	E2	-	APTGF15X120E2
	25	3.2	100	NPT	E2	-	APTGF25X120E2
	50	3.2	100	NPT	E2	-	APTGF50X120E2
1700	50	3.2	30	NPT	E2	-	APTGS50X170E2
600	20	2.1	40	NPT	P2	-	APTGF20X60P2
	20	2.1	40	NPT	P2	YES	APTGF20X60TP2
	30	2.1	40	NPT	P2	-	APTGF30X60P2
	30	2.1	40	NPT	P2	YES	APTGF30X60TP2
	50	2.1	40	NPT	P2	-	APTGF50X60P2
	50	2.1	40	NPT	P2	YES	APTGF50X60TP2
	90	2.1	40	NPT	E3	-	APTGF90X60E3
	90	2.1	50	NPT	E3	YES	APTGF90X60TE3
	125	2.0	40	NPT	E3	-	APTGF125X60E3
	125	2.0	40	NPT	E3	YES	APTGF125X60TE3
	150	2.1	50	NPT	E3	-	APTGF150X60E3
	150	2.1	50	NPT	E3	YES	APTGF150X60TE3
1200	10	3.2	100	NPT	P2	-	APTGF10X120P2
	10	3.2	100	NPT	P2	YES	APTGF10X120TP2
	15	3.2	100	NPT	P2	-	APTGF15X120P2
	15	3.2	100	NPT	P2	YES	APTGF15X120TP2
	25	3.2	100	NPT	P2	-	APTGF25X120P2
	25	3.2	100	NPT	P2	YES	APTGF25X120TP2
	50	3.2	100	NPT	P2	-	APTGF50X120P2
	50	3.2	100	NPT	P2	YES	APTGF50X120TP2
	50	3.2	100	NPT	E3	-	APTGF50X120E3
	50	3.2	100	NPT	E3	YES	APTGF50X120TE3
	75	1.7	90	TRENCH	E3	-	APTGT75X120E3
	75	1.7	90	TRENCH	E3	YES	APTGT75X120TE3
	100	1.7	90	TRENCH	E3	-	APTGT100X120E3
	100	1.7	90	TRENCH	E3	YES	APTGT100X120TE3
	150	1.7	90	TRENCH	E3	-	APTGT150X120E3
	150	1.7	90	TRENCH	E3	YES	APTGT150X120TE3
1700	50	3.2	30	NPT	E3	-	APTGS50X170E3
	50	3.2	30	NPT	E3	YES	APTGS50X170TE3
	75	3.5	60	NPT	E3	-	APTGS75X170E3
	75	3.5	60	NPT	E3	YES	APTGS75X170TE3

Long pin package

E2

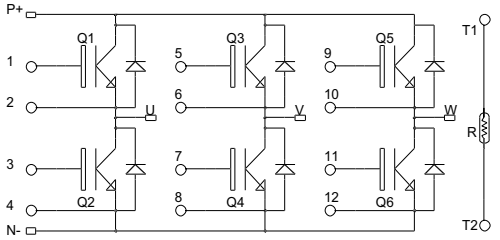
Short pin package

P2

E3

Note: Any reference can be built in full bridge configuration instead of 3 phase bridge

NTC is optional: APTG . . . . E3 (w/o NTC)
APTG . . . .TE3 (with NTC)



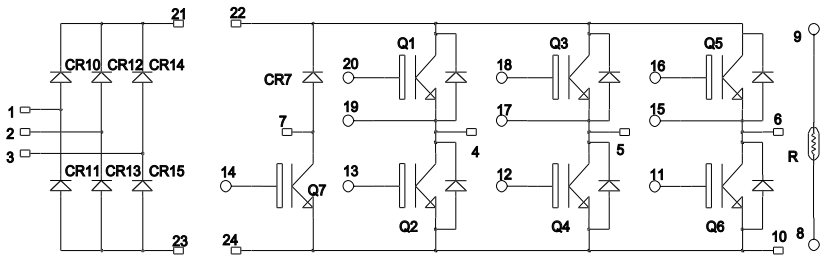
(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

IGBT Power Modules

3 PHASE BRIDGE + RECTIFIER

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	10	2.1	40	NPT	P2	YES	APTGF10X60RTP2
	10	2.1	40	NPT	P2	YES	APTGF10X60BTP2
	15	2.1	40	NPT	P2	YES	APTGF15X60RTP2
	15	2.1	40	NPT	P2	YES	APTGF15X60BTP2
	20	2.1	40	NPT	P2	YES	APTGF20X60RTP2
	20	2.1	40	NPT	P2	YES	APTGF20X60BTP2
	30	2.1	40	NPT	P2	YES	APTGF30X60RTP2
	30	2.1	40	NPT	P2	YES	APTGF30X60BTP2
	50	2.1	40	NPT	P3	YES	APTGF50X60RTP3
	50	2.1	40	NPT	P3	YES	APTGF50X60BTP3
1200	10	2.5	75	NPT	P2	YES	APTGS10X120RTP2
	10	2.5	75	NPT	P2	YES	APTGS10X120BTP2
	15	2.5	75	NPT	P2	YES	APTGS15X120RTP2
	15	2.5	75	NPT	P2	YES	APTGS15X120BTP2
	25	2.5	80	NPT	P2	YES	APTGS25X120RTP2
	25	2.1	80	NPT	P2	YES	APTGS25X120BTP2
	35	1.7	90	TRENCH	P3	YES	APTGT35X120RTP3
	35	1.7	90	TRENCH	P3	YES	APTGT35X120BTP3
	50	1.7	90	TRENCH	P3	YES	APTGT50X120RTP3
	50	1.7	90	TRENCH	P3	YES	APTGT50X120BTP3
	75	1.7	90	TRENCH	P3	YES	APTGT75X120RTP3
	75	1.7	90	TRENCH	P3	YES	APTGT75X120BTP3
1700	50	2.0	-	TRENCH	P3	YES	APTGT50X170RTP3
	50	2.0	-	TRENCH	P3	YES	APTGT50X170BTP3

Brake switch is optional:
APTG . . . . RTP2 (w/o brake)
APTG . . . . BTP2 (with brake)

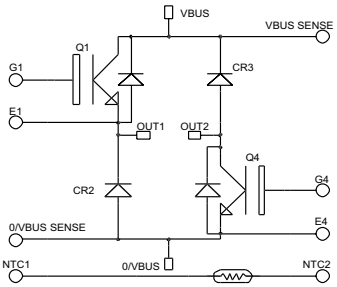


Note: Any reference can be built in full bridge configuration instead of 3 phase bridge

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

ASYMMETRICAL BRIDGE

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	40	2.2	50	PT	SP4	YES	APTGU40DH60T
	70	2.2	50	PT	SP4	YES	APTGU70DH60T
	90	2.1	50	NPT	SP4	YES	APTGF90DH60T
	100	2.2	50	PT	SP6	-	APTGU100DH60
	180	2.1	50	NPT	SP6	-	APTGF180DH60
1200	30	3.3	75	PT	SP4	YES	APTGU30DH120T
	50	3.2	50	NPT	SP4	YES	APTGF50DH120T
	60	3.3	75	PT	SP4	YES	APTGU60DH120T
	90	3.3	75	PT	SP6	-	APTGU90DH120
	150	3.2	50	NPT	SP6	-	APTGF150DH120

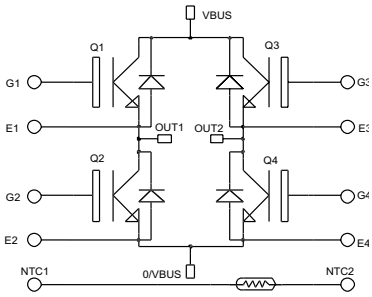


SP6

FULL BRIDGE

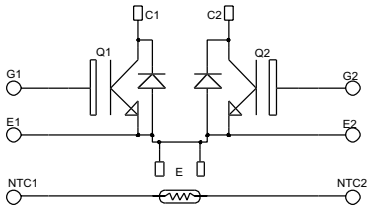
V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	40	2.2	50	PT	SP4	YES	APTGU40H60T
	70	2.2	50	PT	SP4	YES	APTGU70H60T
	90	2.1	50	NPT	SP4	YES	APTGF90H60T
	100	2.2	50	PT	SP6	-	APTGU100H60
	180	2.1	50	NPT	SP6	-	APTGF180H60
1200	30	3.3	75	PT	SP4	YES	APTGU30H120T
	50	3.2	50	NPT	SP4	YES	APTGF50H120T
	60	3.3	75	PT	SP4	YES	APTGU60H120T
	90	3.3	75	PT	SP6	-	APTGU90H120
	150	3.2	50	NPT	SP6	-	APTGF150H120

SP4



DUAL COMMON SOURCE

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	70	2.2	50	PT	SP4	YES	APTGU70DU60T
	90	2.1	50	NPT	SP4	YES	APTGF90DU60T
	140	2.2	50	PT	SP4	YES	APTGU140DU60T
	180	2.1	50	NPT	SP4	YES	APTGF180DU60T
	200	2.2	50	PT	SP6	-	APTGU200DU60
	350	2.1	50	NPT	SP6	-	APTGF350DU60
1200	50	3.2	50	NPT	SP4	YES	APTGF50DU120T
	60	3.3	75	PT	SP4	YES	APTGU60DU120T
	100	3.2	50	NPT	SP4	YES	APTGF100DU120T
	120	3.3	75	PT	SP4	YES	APTGU120DU120T
	180	3.3	75	PT	SP6	-	APTGU180DU120
	300	3.2	50	NPT	SP6	-	APTGF300DU120



SP6

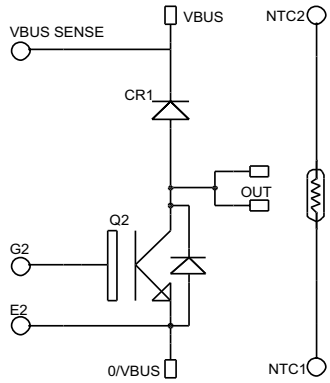
SP4

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

IGBT Power Modules

BOOST CHOPPER

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	50	2.1	40	NPT	D1	-	APTGF50DA60D1
	70	2.2	50	PT	SP4	YES	APTGU70DA60T
	75	2.1	40	NPT	D1	-	APTGF75DA60D1
	90	2.0	50	NPT	D1	-	APTGF90DA60D1
	90	2.1	50	NPT	SP4	YES	APTGF90DA60T
	125	2.0	40	NPT	D1	-	APTGF125DA60D1
	140	2.2	50	PT	SP4	YES	APTGU140DA60T
	165	2.0	50	NPT	D1	-	APTGF165DA60D1
	180	2.0	50	NPT	D3	-	APTGF180DA60D3
	180	2.1	50	NPT	SP4	YES	APTGF180DA60T
	200	2.2	50	PT	SP6	-	APTGU200DA60
	250	2.0	40	NPT	D3	-	APTGF250DA60D3
	330	2.0	50	NPT	D3	-	APTGF330DA60D3
	350	2.1	50	NPT	SP6	-	APTGF350DA60
1200	25	1.7	90	Trench	D1	-	APTGT25DA120D1
	35	1.7	90	Trench	D1	-	APTGT35DA120D1
	50	1.7	90	Trench	D1	-	APTGT50DA120D1
	50	3.2	50	NPT	SP4	YES	APTGF50DA120T
	60	3.3	75	PT	SP4	YES	APTGU60DA120T
	75	1.7	90	Trench	D1	-	APTGT75DA120D1
	100	1.7	90	Trench	D1	-	APTGT100DA120D1
	100	3.2	50	NPT	SP4	YES	APTGF100DA120T
	120	3.3	75	PT	SP4	YES	APTGU120DA120T
	150	1.7	90	Trench	D1	-	APTGT150DA120D1
	150	1.7	90	Trench	D3	-	APTGT150DA120D3
	180	3.3	75	PT	SP6	-	APTGU180DA120
	200	1.7	90	Trench	D3	-	APTGT200DA120D3
	300	1.7	90	Trench	D3	-	APTGT300DA120D3
	300	3.2	50	NPT	SP6	-	APTGF300DA120
1700	30	2.0	-	Trench	D1	-	APTGT30DA170D1
	50	2.0	-	Trench	D1	-	APTGT50DA170D1
	75	2.0	200	Trench	D1	-	APTGT75DA170D1
	100	2.0	200	Trench	D1	-	APTGT100DA170D1
	150	2.0	200	Trench	D1	-	APTGT150DA170D1
	150	2.0	200	Trench	D3	-	APTGT150DA170D3
	200	2.0	200	Trench	D3	-	APTGT200DA170D3
	300	2.0	200	Trench	D3	-	APTGT300DA170D3




D1


D3

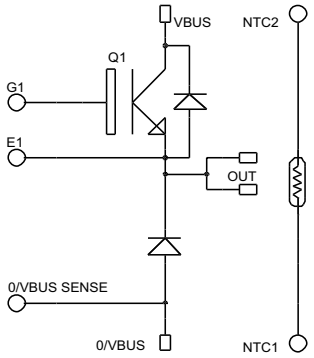

SP4


SP6

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

BUCK CHOPPER

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	50	2.1	40	NPT	D1	-	APTGF50SK60D1
	70	2.2	50	PT	SP4	YES	APTGU70SK60T
	75	2.1	40	NPT	D1	-	APTGF75SK60D1
	90	2.0	50	NPT	D1	-	APTGF90SK60D1
	90	2.1	50	NPT	SP4	YES	APTGF90SK60T
	125	2.0	40	NPT	D1	-	APTGF125SK60D1
	140	2.2	50	PT	SP4	YES	APTGU140SK60T
	165	2.0	50	NPT	D1	-	APTGF165SK60D1
	180	2.0	50	NPT	D3	-	APTGF180SK60D3
	180	2.1	50	NPT	SP4	YES	APTGF180SK60T
	200	2.2	50	PT	SP6	-	APTGU200SK60
	250	2.0	40	NPT	D3	-	APTGF250SK60D3
	330	2.0	50	NPT	D3	-	APTGF330SK60D3
	350	2.1	50	NPT	SP6	-	APTGF350SK60
1200	25	1.7	90	Trench	D1	-	APTGT25SK120D1
	35	1.7	90	Trench	D1	-	APTGT35SK120D1
	50	1.7	90	Trench	D1	-	APTGT50SK120D1
	50	3.2	50	NPT	SP4	YES	APTGF50SK120T
	60	3.3	75	PT	SP4	YES	APTGU60SK120T
	75	1.7	90	Trench	D1	-	APTGT75SK120D1
	100	1.7	90	Trench	D1	-	APTGT100SK120D1
	100	3.2	50	NPT	SP4	YES	APTGF100SK120T
	120	3.3	75	PT	SP4	YES	APTGU120SK120T
	150	1.7	90	Trench	D1	-	APTGT150SK120D1
	150	1.7	90	Trench	D3	-	APTGT150SK120D3
	180	3.3	75	PT	SP6	-	APTGU180SK120
	200	1.7	90	Trench	D3	-	APTGT200SK120D3
	300	1.7	90	Trench	D3	-	APTGT300SK120D3
	300	3.2	50	NPT	SP6	-	APTGF300SK120
1700	30	2.0	-	Trench	D1	-	APTGT30SK170D1
	50	2.0	-	Trench	D1	-	APTGT50SK170D1
	75	2.0	200	Trench	D1	-	APTGT75SK170D1
	100	2.0	200	Trench	D1	-	APTGT100SK170D1
	150	2.0	200	Trench	D1	-	APTGT150SK170D1
	150	2.0	200	Trench	D3	-	APTGT150SK170D3
	200	2.0	200	Trench	D3	-	APTGT200SK170D3
	300	2.0	200	Trench	D3	-	APTGT300SK170D3




D1


D3


SP4

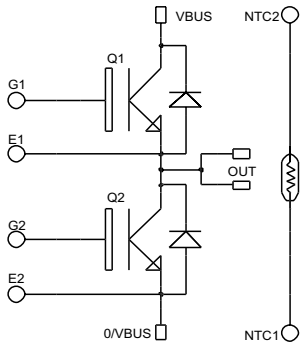

SP6

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

IGBT Power Modules

PHASE LEG

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	50	2.1	40	NPT	D1	-	APTGF50A60D1
	70	2.2	50	PT	SP4	YES	APTGU70A60T
	75	2.1	40	NPT	D1	-	APTGF75A60D1
	90	2.0	50	NPT	D1	-	APTGF90A60D1
	90	2.1	50	NPT	SP4	YES	APTGF90A60T
	125	2.0	40	NPT	D1	-	APTGF125A60D1
	140	2.2	50	PT	SP4	YES	APTGU140A60T
	165	2.0	50	NPT	D1	-	APTGF165A60D1
	180	2.0	50	NPT	D3	-	APTGF180A60D3
	180	2.1	50	NPT	SP4	YES	APTGF180A60T
	200	2.2	50	PT	SP6	-	APTGU200A60
	250	2.0	40	NPT	D3	-	APTGF250A60D3
	330	2.0	50	NPT	D3	-	APTGF330A60D3
	350	2.1	50	NPT	SP6	-	APTGF350A60
1200	25	1.7	90	Trench	D1	-	APTGT25A120D1
	35	1.7	90	Trench	D1	-	APTGT35A120D1
	50	1.7	90	Trench	D1	-	APTGT50A120D1
	50	3.2	50	NPT	SP4	YES	APTGF50A120T
	60	3.3	75	PT	SP4	YES	APTGU60A120T
	75	1.7	90	Trench	D1	-	APTGT75A120D1
	100	1.7	90	Trench	D1	-	APTGT100A120D1
	100	3.2	50	NPT	SP4	YES	APTGF100A120T
	120	3.3	75	PT	SP4	YES	APTGU120A120T
	150	1.7	90	Trench	D1	-	APTGT150A120D1
	150	1.7	90	Trench	D3	-	APTGT150A120D3
	180	3.3	75	PT	SP6	-	APTGU180A120
	200	1.7	90	Trench	D3	-	APTGT200A120D3
	300	1.7	90	Trench	D3	-	APTGT300A120D3
	300	3.2	50	NPT	SP6	-	APTGF300A120
1700	30	2.0	-	Trench	D1	-	APTGT30A170D1
	50	2.0	-	Trench	D1	-	APTGT50A170D1
	75	2.0	200	Trench	D1	-	APTGT75A170D1
	100	2.0	200	Trench	D1	-	APTGT100A170D1
	150	2.0	200	Trench	D1	-	APTGT150A170D1
	150	2.0	200	Trench	D3	-	APTGT150A170D3
	200	2.0	200	Trench	D3	-	APTGT200A170D3
	300	2.0	200	Trench	D3	-	APTGT300A170D3




D1


D3

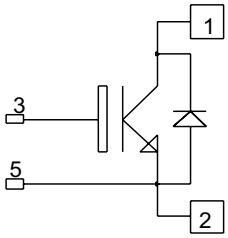

SP4


SP6

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

SINGLE SWITCH

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
600	200	2.1	40	NPT	D4	-	APTGF200U60D4
	300	2.1	40	NPT	D4	-	APTGF300U60D4
	360	2.0	50	NPT	D4	-	APTGF360U60D4
	500	2.0	40	NPT	D4	-	APTGF500U60D4
	660	2.0	50	NPT	D4	-	APTGF660U60D4
1200	200	1.7	90	Trench	D4	-	APTGT200U120D4
	300	1.7	90	Trench	D4	-	APTGT300U120D4
	400	1.7	90	Trench	D4	-	APTGT400U120D4
	600	1.7	90	Trench	D4	-	APTGT600U120D4
1700	200	2.0	-	Trench	D4	-	APTGT200U170D4
	300	2.0	200	Trench	D4	-	APTGT300U170D4
	400	2.0	200	Trench	D4	-	APTGT400U170D4
	600	2.0	200	Trench	D4	-	APTGT600U170D4



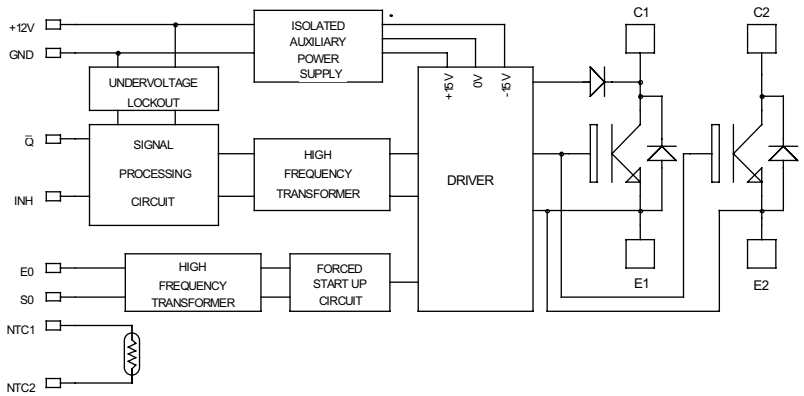
D4

SINGLE SWITCH, INTELLIGENT POWER MODULE

V_{CES} (V)	I_C(A) T_C=80° C	$V_{CE(ON)}$ at rated Ic	Tf(Ic)(ns) at rated Ic	IGBT Type	Package Style	NTC	Part Number
1200	70	3.2	50	NPT	LP8	YES	APTLGF70U120T
	75	3.2	50	NPT	LP8	YES	APTLGF75U120T*
	140	3.2	50	NPT	LP8	YES	APTLGF140U120T
	150	3.2	50	NPT	LP8	YES	APTLGF150U120T*
	210	3.2	50	NPT	LP8	YES	APTLGF210U120T
	225	3.2	50	NPT	LP8	YES	APTLGF225U120T*
	280	3.2	50	NPT	LP8	YES	APTLGF280U120T
	300	3.2	50	NPT	LP8	YES	APTLGF300U120T*

LP8

* AlSiC base plate for extended reliability and AlN substrate for improved thermal performance



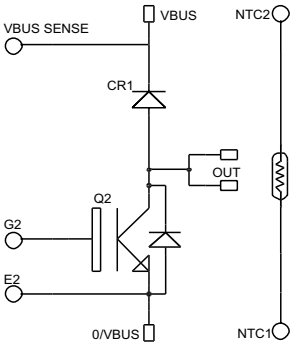
Single switch IGBT module with integrated driver and isolated power supplies dedicated to operate in ZVS (zero voltage switching) operation at 80 KHz.

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

MOSFET Power Modules

BOOST CHOPPER

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	10	125	10	MOS 7	SP4	YES	APTM20DAM10T
	8	147	10	MOS 7	SP4	YES	APTM20DAM08T
	5	250	10	MOS 7	SP6	-	APTM20DAM05
	4	300	10	MOS 7	SP6	-	APTM20DAM04
500	38	64	10	MOS 7	SP4	YES	APTM50DAM38T
	35	70	30	MOS 7	SP4	YES	APTM50DAM35T
	19	125	10	MOS 7	SP6	-	APTM50DAM19
	17	140	30	MOS 7	SP6	-	APTM50DAM17

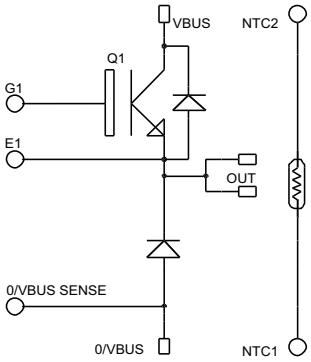



SP4


SP6

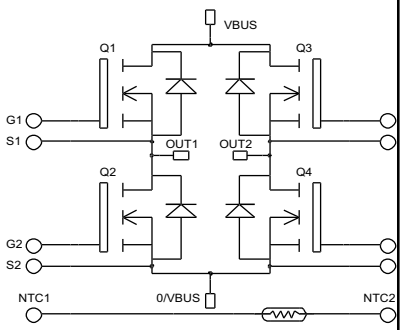
BUCK CHOPPER

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	10	125	10	MOS 7	SP4	YES	APTM20SKM10T
	8	147	10	MOS 7	SP4	YES	APTM20SKM08T
	5	250	10	MOS 7	SP6	-	APTM20SKM05
	4	300	10	MOS 7	SP6	-	APTM20SKM04
500	38	64	10	MOS 7	SP4	YES	APTM50SKM38T
	35	70	30	MOS 7	SP4	YES	APTM50SKM35T
	19	125	10	MOS 7	SP6	-	APTM50SKM19
	17	140	30	MOS 7	SP6	-	APTM50SKM17



FULL BRIDGE

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	20	62	10	FREDFET 7	SP4	YES	APTM20HM20FT
	16	74	10	FREDFET 7	SP4	YES	APTM20HM16FT
	10	125	10	FREDFET 7	SP6	-	APTM20HM10F
	8	147	10	FREDFET 7	SP6	-	APTM20HM08F
500	75	32	10	FREDFET 7	SP4	YES	APTM50HM75FT
	65	37	30	FREDFET 7	SP4	YES	APTM50HM65FT
	38	64	10	FREDFET 7	SP6	-	APTM50HM38F
	35	70	30	FREDFET 7	SP6	-	APTM50HM35F



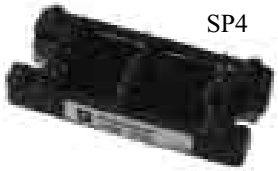

SP4

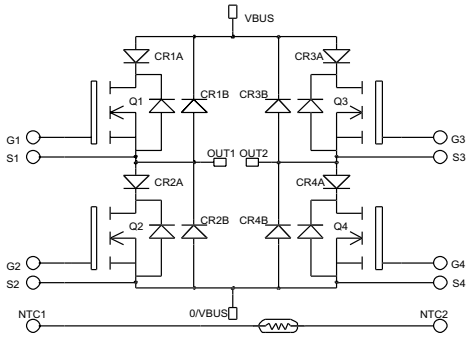

SP6

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

FULL BRIDGE + SERIES AND PARALLEL DIODES

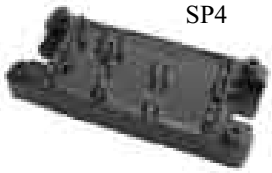
V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	20	62	10	MOS 7	SP4	YES	APTM20HM20ST
500	75	32	10	MOS 7	SP4	YES	APTM50HM75ST
1000	450	13	10	MOS 7	SP4	YES	APTM100H45ST

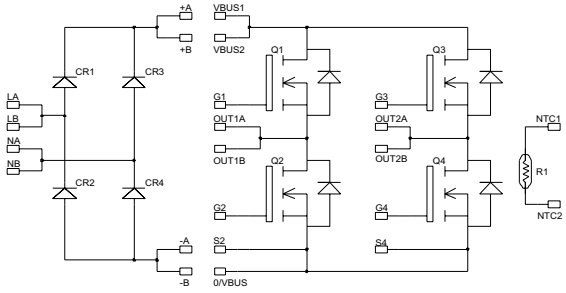




FULL BRIDGE + RECTIFIER BRIDGE

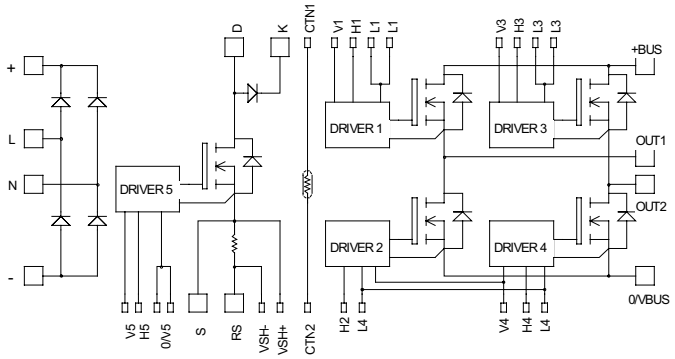
V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
500	75	32	10	FREDFET 7	SP4	YES	APTM50HM75FRT





FULL BRIDGE, INTELLIGENT POWER MODULE

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
500	100	37	60	FREDFET 5	LP8W	YES	APTLM50H10FRT
	75	32	5	FREDFET 7	LP8W	YES	APTLM50HM75FRT

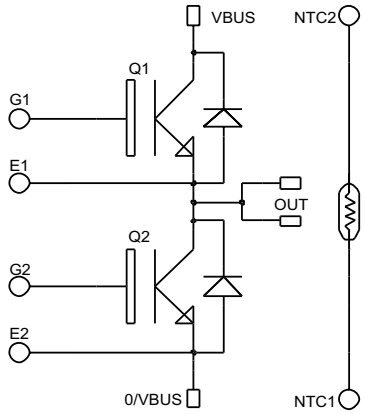


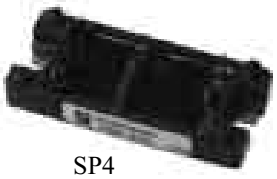
(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

MOSFET Power Modules

PHASE LEG

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	10	125	10	FREDFET 7	SP4	YES	APTM20AM10FT
	8	147	10	FREDFET 7	SP4	YES	APTM20AM08FT
	5	250	10	FREDFET 7	SP6	-	APTM20AM05F
	5	250	10	FREDFET 5	LP8	YES	APTM20AM05FT
	4	300	10	FREDFET 7	SP6	-	APTM20AM04F
500	38	64	10	FREDFET 7	SP4	YES	APTM50AM38FT
	35	70	30	FREDFET 7	SP4	YES	APTM50AM35FT
	25	110	10	FREDFET 5	LP8	YES	APTM50AM25FT
	19	125	10	FREDFET 7	SP6	-	APTM50AM19F
	17	140	30	FREDFET 7	SP6	-	APTM50AM17F





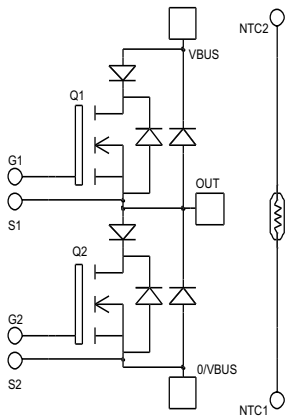
SP4

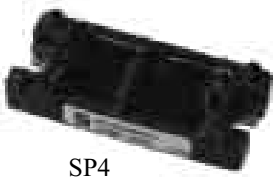
SP6

LP8

PHASE LEG + SERIES AND PARALLEL DIODES

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	10	125	10	MOS 7	SP4	YES	APTM20AM10ST
	6	225	40	MOS 7	SP6	-	APTM20AM06S
500	38	64	10	MOS 7	SP4	YES	APTM50AM38ST
	24	110	5	MOS 7	SP6	-	APTM50AM24S
	19	125	5	MOS 7	LP8W	YES	APTM50AM19ST
1000	230	26	10	MOS 7	SP4	YES	APTM100A23ST
	130	49	15	MOS 7	SP6	-	APTM100A13S
	120	50	10	MOS 5	LP8W	YES	APTM100A12ST





SP4

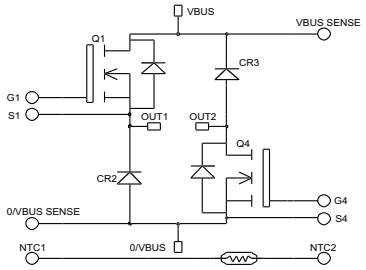
SP6

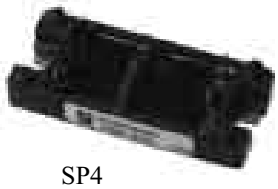
LP8W

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

ASYMMETRICAL BRIDGE

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	20	62	10	MOS 7	SP4	YES	APTM20DHM20T
	16	74	10	MOS 7	SP4	YES	APTM20DHM16T
	10	125	10	MOS 7	SP6	-	APTM20DHM10
	8	147	10	MOS 7	SP6	-	APTM20DHM08
500	75	32	10	MOS 7	SP4	YES	APTM50DHM75T
	65	37	30	MOS 7	SP4	YES	APTM50DHM65T
	38	64	10	MOS 7	SP6	-	APTM50DHM38
	35	70	30	MOS 7	SP6	-	APTM50DHM35



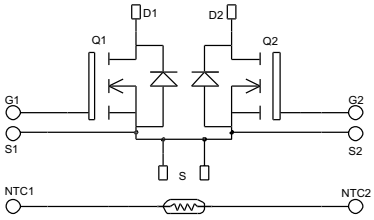


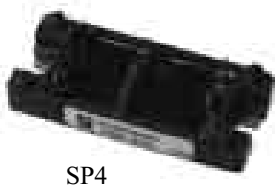
SP4

SP6

DUAL COMMON SOURCE

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	10	125	10	MOS 7	SP4	YES	APTM20DUM10T
	8	147	10	MOS 7	SP4	YES	APTM20DUM08T
	5	250	10	MOS 7	SP6	-	APTM20DUM05
	5	250	10	MOS 5	LP8	YES	APTM20DUM05T
	4	300	10	MOS 7	SP6	-	APTM20DUM04
500	38	64	10	MOS 7	SP4	YES	APTM50DUM38T
	35	70	30	MOS 7	SP4	YES	APTM50DUM35T
	25	110	10	MOS 5	LP8	YES	APTM50DUM25T
	19	125	10	MOS 7	SP6	-	APTM50DUM19
	17	140	30	MOS 7	SP6	-	APTM50DUM17





SP4

SP6

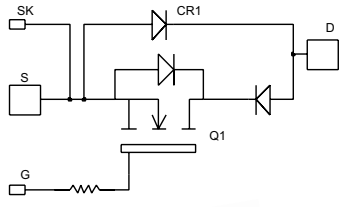
LP8

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

MOSFET Power Modules

SINGLE SWITCH + SERIES AND PARALLEL DIODES

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
200	9	145	40	MOS 7	J3	-	APTM20UM09S
	5	237	5	MOS 7	J3	-	APTM20UM05S
500	25	110	10	MOS 7	J3	-	APTM50UM25S
	19	122	5	MOS 7	J3	-	APTM50UM19S
1000	130	48	10	MOS 5	J3	-	APTM100U13S

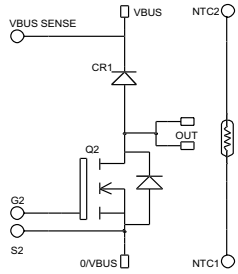


J3

MOSFET with SiC Diodes Power Modules

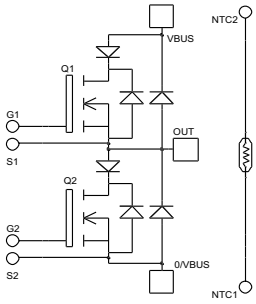
BOOST CHOPPER W/SILICON CARBIDE PARALLEL DIODES

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
500	38	67	5	MOS 7	SP4	YES	APTM50DAM38CT



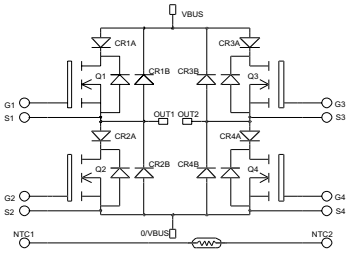
PHASE LEG + SERIES W/SILICON CARBIDE PARALLEL DIODES

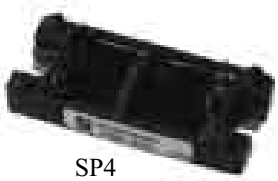
V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
500	38	67	5	MOS 7	SP4	YES	APTM50AM38SCT
	24	110	5	MOS 7	SP6	-	APTM50AM24SC
1000	230	27	10	MOS 7	SP4	YES	APTM100A23SCT
	130	49	15	MOS 7	SP6	-	APTM100A13SC



FULL BRIDGE + SERIES W/SILICON CARBIDE PARALLEL DIODES

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
500	75	34	5	MOS 7	SP4	YES	APTM50HM75SCT
1000	450	14	10	MOS 7	SP4	YES	APTM100H45SCT





SP4

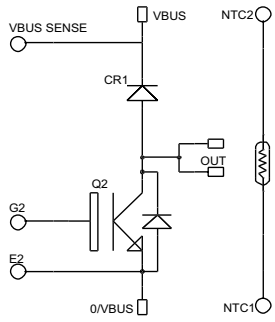
SP6

(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

COOLMOS™ with SiC Diodes Power Modules

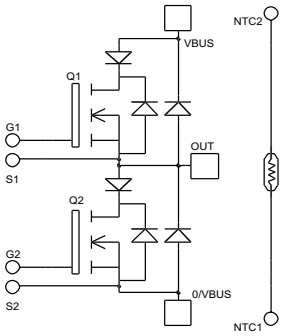
BOOST CHOPPER W/SILICON CARBIDE PARALLEL DIODES

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
600	18	107	10	COOLMOS	SP4	YES	APTC60DAM18CT



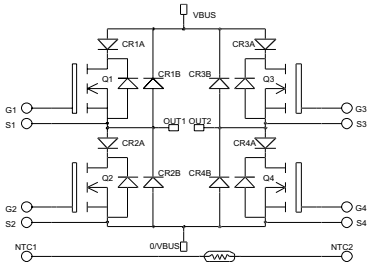
PHASE LEG + SERIES W/SILICON CARBIDE PARALLEL DIODES

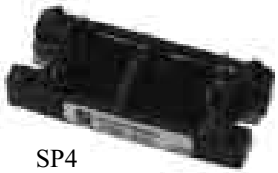
V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
600	35	54	10	COOLMOS	SP4	YES	APTC60AM35SCT
	18	107	10	COOLMOS	SP6	-	APTC60AM18SC
800	150	21	10	COOLMOS	SP4	YES	APTC80A15SCT
	100	32	10	COOLMOS	SP4	YES	APTC80A10SCT
	75	43	10	COOLMOS	SP6	-	APTC80AM75SC



FULL BRIDGE + SERIES W/SILICON CARBIDE PARALLEL DIODES

V_{DSS} (V)	$R_{DS(ON)}$ m Ohms	I_D(A) T_C=80° C	Tf(Id)(ns) at rated Ic	MOSFET Type	Package Style	NTC	Part Number
600	70	29	10	COOLMOS	SP4	YES	APTC60HM70SCT
800	290	11	10	COOLMOS	SP4	YES	APTC80H29SCT





SP4

SP6

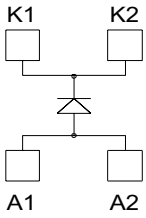
"CoolMOS™" comprise a new family of transistors developed by Infineon Technologies AG. "CoolMOS™" is a trademark of Infineon Technologies AG".

DIODE Power Modules

SINGLE DIODE

V_{RRM} (V)	VF(V) Tj=25° C	I_F(A) T_C80° C	DIODE Type	Package Style	Part Number
200	1.1	500	FRED	LP4	APTDF500U20
400	1.5	500	FRED	LP4	APTDF500U40
600	1.8	450	FRED	LP4	APTDF450U60
1000	2.3	430	FRED	LP4	APTDF430U100
1200	2.5	400	FRED	LP4	APTDF400U120

LP4



(for detailed ratings and pin-out location, refer to the product datasheet at www.advancedpower.com)

Application Specific Power Modules (ASPM®)

Whatever your application needs are including . . .

Power Supplies	Lighting Control	Welding Systems
UPS	Induction Heating	Laser Control
Medical Imaging	Battery Charger	RF Amplifiers
Solid State Relays	Linear Amplifiers	Inverters/Speed Controllers

Our custom approach provides you with a fully integrated solution designed to meet your specific requirements with an optimized balance between performance and cost without compromising quality and reliability.

We work closely with you using the latest technologies and innovative circuit and mechanical design to provide the competitive advantage you need.

FEATURES AND BENEFITS

A mix of the latest silicon & packaging technologies combined with innovative circuit design enables APT to deliver high performance products that meet or exceed our customer requirements in terms of:

POWER DENSITY AND SIZE REDUCTION

- High level of integration
  - -Power Stage (H-Bridge, 3 Phase Bridge, etc.)
  - -Control & protection functions located on internal PCB
  - -Opto coupler, fiber optic or transformer for isolation of driver circuits
- Minimum number of external connections
- Reduced overall system size and weight

ELECTRICAL CHARACTERISTICS ENHANCEMENT:

- Short internal connections minimize parasitic resistance and inductance
  - -Allows high oprating frequencies
  - -Reduced voltage overshoot
  - -Low EMI and RFI
  - -Improved efficiency
- Decoupling capacitors to nullify effects of stray inductance
- Die can be pre-sorted to enhance performance

THERMAL MANAGEMENT:

- Power devices mounted directly on thermally conductive substrates
- Choice of substrates for optimum performance and cost
- Full isolation to baseplate
- Engineered materials such as AlSiC, Cu/W, Cu/Mo extend thermal cycling capability

PACKAGES AND MATERIALS

- Standard or Custom Package Outlines
- Wide Variety of Materials for Baseplates, Substrates, Terminals, and Connectors
- Leading Edge APT Silicon and Other Chip/Component Suppliers
- Integrated Liquid Cooling Option

PROCESS CAPABILITES

Thick Film
Copper
Silver
Resistors
Multi-Layer

Solder Reflow
Vacuum Furnace
N2/Forming Gas/H2 Furnace
Various Solder Alloys

Surface Mount
SMD Auto Placement
Through Hole Insertion

Encapsulation
Die Coat
Potting Compounds
Hard Top Resins/Epoxies

Wire Bond
Auto
Manual
Heavy Gauge Al Wire

If you have a specific electrical, mechanical, thermal, or reliability challenge, submit a technical support request from our website.