Product Profile

Advanced Power Technology

New Power MOS 7® IGBTs for SMPS Applications

Product Description

IGBT products offered by APT utilize both NPT and PT technologies to cover the widest range of applications and design requirements. They can be used as a cost effective alternative to MOSFETs in many applications with high efficiency, improved power density, and lower cost. Recently, APT has announced a new generation of 600 and 1200 volt PT-Type IGBTs utilizing its advanced proprietary Power MOS 7® Technology. The 600 volt IGBTs are designed to replace 500 and 600 volt MOSFETs and the 1200 volt IGBTs are designed to replace 1000 and 1200 volt MOSFETs in switch mode power supply (SMPS), power factor correction (PFC), and other high-power applications. The gate-drive voltage requirement is similar to a MOSFET. This allows larger die size power MOSFETs, or multiple MOSFETs in parallel to be replaced with just one power MOS 7® IGBT. This new generation technology enables operation up to 150 kHz without current de-rating. Products range from approximately 10 to 100 amps in TO-220, TO-247, T-MAX™, TO-264, 264 MAX™, and Isotop® packages.

Features and Benefits

Metal Gate - these IGBTs utilize a proprietary planar stripe metal gate design providing internal chip gate resistance one to two orders of magnitude lower than comparable industry standard polysilicon gate devices. This enables very uniform and fast switching across the entire chip with uniform heat distribution. The metal gate minimizes chip gate resistance variation from batch to batch providing the user with more consistent switching performance. In addition, the low chip gate resistance allows the designer maximum range of switching speed and increases the immunity to dv/dt induced turn-on.

Lower Cost Alternative to MOSFETS

High Current Density – the IGBT advantage in current density over MOSFETs facilitates higher output power, provides for smaller and lower cost components, and allows for smaller and higher power density designs. The die size for the IGBT is often 1 or 2 die sizes smaller than a MOSFET solution.

Higher Threshold Voltage and Reduced "Miller Capacitance" - this provides for increased noise and spurious turn-on immunity and eliminates the need for a negative gate voltage for turn-off. This eliminates the need for an auxiliary power supply and simplifies the use of gate driver ICs.

Low Forward Voltage - conduction losses are dramatically lower, especially at high temperatures.

Low Gate Charge – this reduces gate drive power losses and enables fast switching.

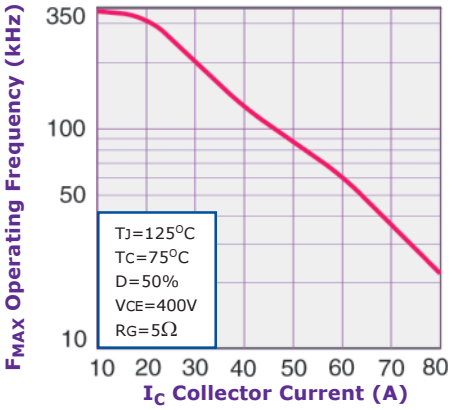
Low Thermal Resistance – maximizing power dissipation capabilities.

Combis - Power MOS 7® IGBTs are available co-packaged with a fast-recovery, antiparallel diode optimized for low reverse recovery charge, further enhancing performance in power switching applications. Co-packaging the Power MOS 7® IGBTs with these rectifiers reduces EMI, switching losses, and conduction losses, while reducing component count and cost.

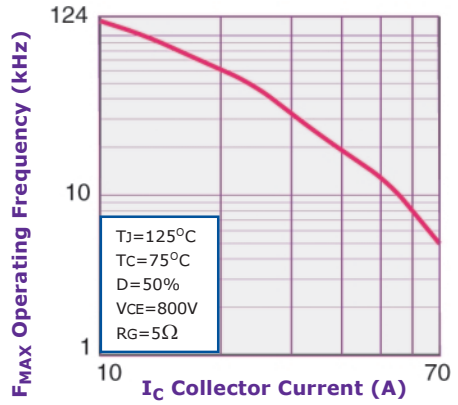
Low Switching Energies – this enables very low inductive switching losses. In combination with the low conduction losses and the low thermal resistance, new levels of high frequency capability for a given current is achieved.

Data sheets now include a graph of frequency vs. current for an IGBT Combi. This graph comprehends both conduction and switching losses and allows the designer to properly select the best device for the application. Examples are shown in the following graphs:

600 Volt Size 6 - APT40GP60B2D1



1200 Volt Size 6 - APT35GP120B2D2

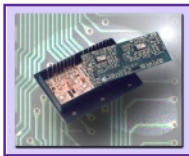


Hermetic and Hi-Rel

APT is ISO9001 registered, MIL-PRF-19500 certified, and can offer TX, TXV, and space level processing. Custom testing and screening as well as plastic upscreening is also available.

Power Modules

Products cover a wide range of power and complexity.



POWER MODULES

ASPMs-Application Specific Power Modules utilizing multi chip and hybrid technologies for custom power circuit solutions.

Die Products - are available.

www.advancedpower.com
Nasdaq: APTI

ADVANCED POWER TECHNOLOGY®

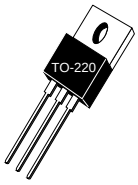
Switching Power	(541) 382-8028	USA
Power Modules	33 337 92 1515	France
RF Power	(408) 986-8031	USA

Power MOS 7 The Coolest FET Yet!

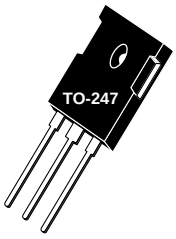
Advanced Power Technology

Insulated Gate Bipolar Transistors (IGBTs)

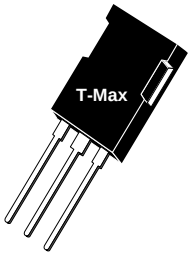
Volt	$V_{CE(ON)}$ (25°C)	I_{C2} 110°C	$R_{\theta JC}$ (°C/watt)	Part Number	Package Style
Single					
1200	3.9	21	0.43	APT13GP120K	TO-220
600	2.7	30	0.43	APT15GP60K	TO-220
1200	3.9	21	0.43	APT13GP120B	TO-247
	3.9	36	0.27	APT25GP120B	TO-247
	3.9	46	0.23	APT35GP120B	TO-247
	3.9	54	0.20	APT45GP120B	TO-247
600	2.7	30	0.43	APT15GP60B	TO-247
	2.7	49	0.27	APT30GP60B	TO-247
	2.7	62	0.23	APT40GP60B	TO-247
	2.7	70	0.20	APT50GP60B	TO-247
1200	3.9	61	0.12	APT75GP120B2	T-MAX™
600	2.7	96	0.15	APT65GP60B2	T-MAX™
	2.7	100	0.12	APT80GP60B2	T-MAX™
1200	3.9	29	0.44	APT35GP120J	ISOTOP®
	3.9	34	0.38	APT45GP120J	ISOTOP®
	3.9	41	0.23	APT75GP120J	ISOTOP®
600	2.7	40	0.44	APT40GP60J	ISOTOP®
	2.7	46	0.38	APT50GP60J	ISOTOP®
	2.7	60	0.29	APT65GP60J	ISOTOP®
	2.7	68	0.27	APT80GP60J	ISOTOP®
Combi (IGBT & FRED)					
1200	3.9	21	0.43	APT13GP120BD1	TO-247
600	2.7	30	0.43	APT15GP60BD1	TO-247
	2.7	49	0.27	APT30GP60BD1	TO-247
1200	3.9	36	0.27	APT25GP120B2D1	T-MAX™
	3.9	46	0.23	APT35GP120B2D2	T-MAX™
	3.9	54	0.23	APT45GP120B2D2	T-MAX™
600	2.7	62	0.23	APT40GP60B2D1	T-MAX™
	2.7	72	0.20	APT50GP60B2D2	T-MAX™
600	2.7	96	0.15	APT65GP60L2D2	264-MAX™
1200	3.9	29	0.44	APT35GP120JD2	ISOTOP®
	3.9	34	0.44	APT45GP120JD2	ISOTOP®
	3.9	41	0.23	APT75GP120JD2	ISOTOP®
600	2.7	31	0.51	APT30GP60JD1	ISOTOP®
	2.7	40	0.44	APT40GP60JD1	ISOTOP®
	2.7	46	0.38	APT50GP60JD2	ISOTOP®
	2.7	60	0.29	APT65GP60JD2	ISOTOP®
	2.7	68	0.27	APT80GP60JD3	ISOTOP®



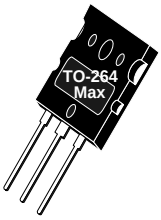
TO-220[K]



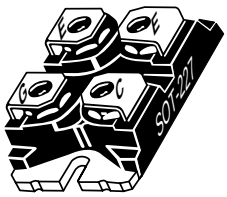
TO-247[B]



T-MAX™[B2]



264 MAX™ [L2]



ISOTOP®[J]