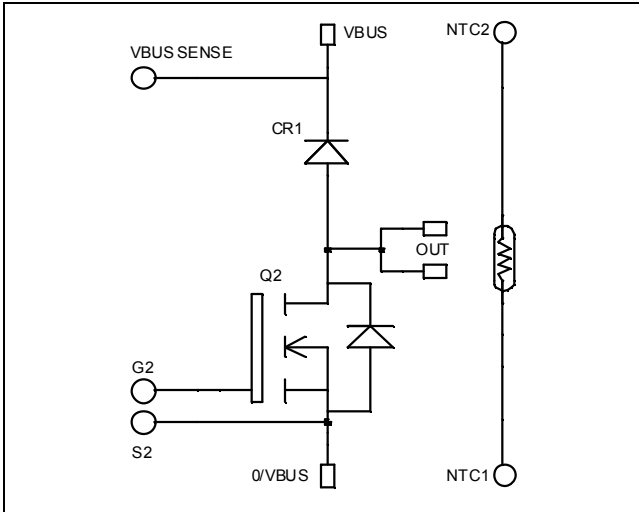


**Boost chopper  
MOSFET Power Module**

**$V_{DSS} = 100V$   
 $R_{DSon} = 4.5m\Omega$  typ @  $T_j = 25^\circ C$   
 $I_D = 278A$  @  $T_c = 25^\circ C$**



**Application**

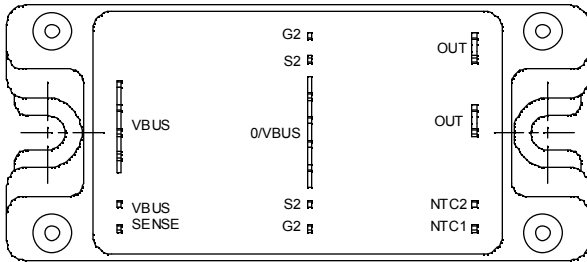
- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

**Features**

- Power MOS V<sup>®</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
  - Symmetrical design
  - Lead frames for power connections
- Internal thermistor for temperature monitoring
- High level of integration

**Benefits**

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile



**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	100	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	278
		$T_c = 80^\circ C$	207
$I_{DM}$	Pulsed Drain current	1100	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	5	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	780
$I_{AR}$	Avalanche current (repetitive and non repetitive)	100	A
$E_{AR}$	Repetitive Avalanche Energy	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy	3000	

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

## Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 100V$			200	$\mu\text{A}$
		$V_{GS} = 0V, V_{DS} = 80V$			1000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 125A$		4.5	5	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5\text{mA}$	2		4	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 200$	nA

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		20		nF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		8		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		2.9		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 50V$ $I_D = 250A$		700		nC
$Q_{gs}$	Gate – Source Charge			120		
$Q_{gd}$	Gate – Drain Charge			360		
$T_{d(on)}$	Turn-on Delay Time	<b>Resistive Switching</b> $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 250A$ $R_G = 2.5\Omega$		80		ns
$T_r$	Rise Time			165		
$T_{d(off)}$	Turn-off Delay Time			280		
$T_f$	Fall Time			135		
$E_{on}$	Turn-on Switching Energy ❶	<b>Inductive switching @ 25°C</b> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 250A, R_G = 2.5\Omega$		1.1		mJ
$E_{off}$	Turn-off Switching Energy ❷			1.2		
$E_{on}$	Turn-on Switching Energy ❶	<b>Inductive switching @ 125°C</b> $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 250A, R_G = 2.5\Omega$		1.22		mJ
$E_{off}$	Turn-off Switching Energy ❷			1.28		

❶  $E_{on}$  includes diode reverse recovery.

❷ In accordance with JEDEC standard JESD24-1.

## Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 200V$	$T_j = 25^\circ\text{C}$		350	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		600	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle		200		A
$V_F$	Diode Forward Voltage	$I_F = 200A$		1		V
		$I_F = 400A$		1.4		
		$I_F = 200A$	$T_j = 125^\circ\text{C}$		0.9	
$t_{rr}$	Reverse Recovery Time	$I_F = 200A$ $V_R = 133V$ $di/dt = 400A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	60		ns
	$T_j = 125^\circ\text{C}$			110		
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	400		nC
			$T_j = 125^\circ\text{C}$		1680	

**Thermal and package characteristics**

Symbol	Characteristic	Min	Typ	Max	Unit	
R <sub>thJC</sub>	Junction to Case	Transistor		0.16		
		Diode		0.29	°C/W	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <1mA, 50/60Hz	2500			V	
T <sub>J</sub>	Operating junction temperature range	-40		150	°C	
T <sub>STG</sub>	Storage Temperature Range	-40		125		
T <sub>C</sub>	Operating Case Temperature	-40		100		
Torque	Mounting torque	To Heatsink	M5	1.5	4.7	N.m
Wt	Package Weight				160	g

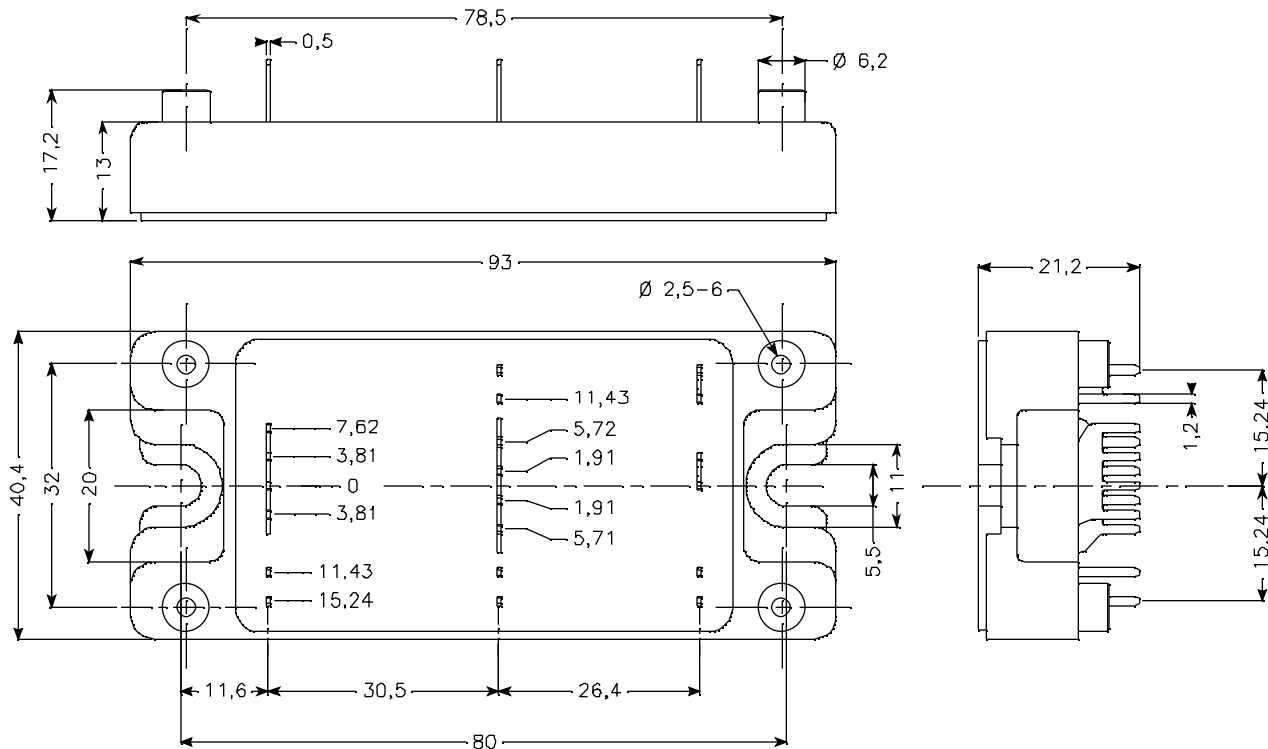
**Temperature sensor NTC** (see application note APT0406 on [www.advancedpower.com](http://www.advancedpower.com) for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		50		kΩ
B <sub>25/85</sub>	T <sub>25</sub> = 298.15 K		3952		K

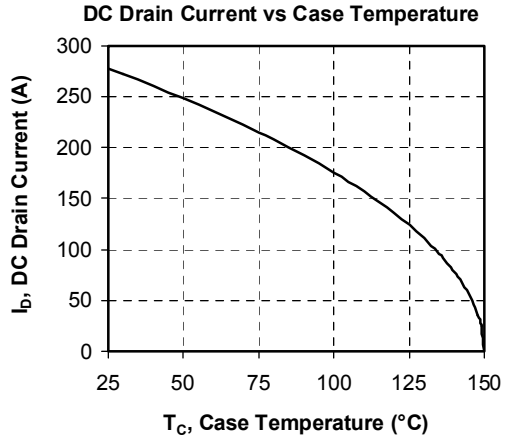
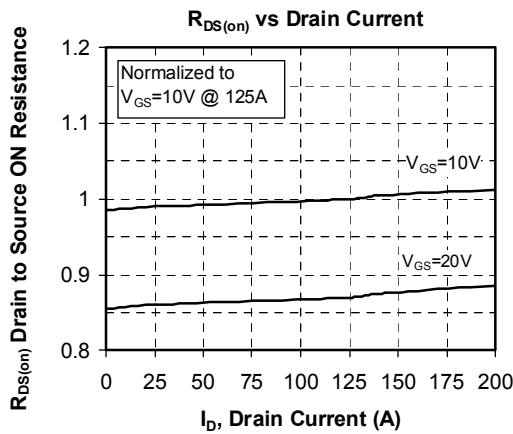
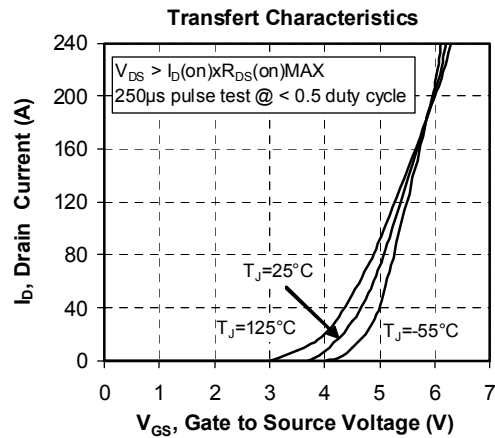
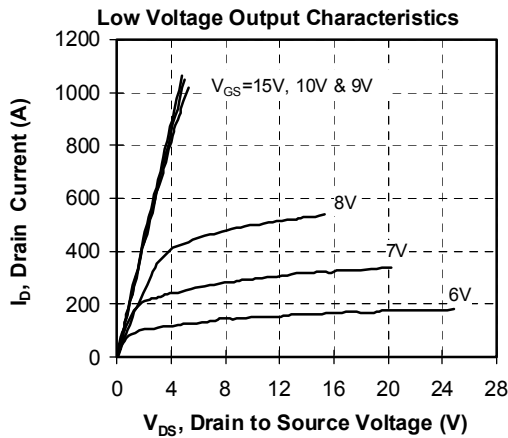
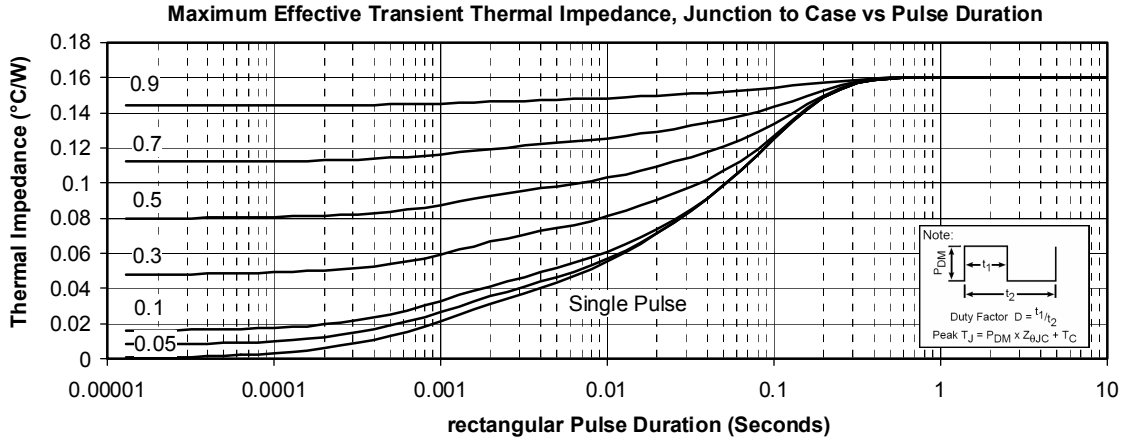
$$R_T = \frac{R_{25}}{\exp \left[ B_{25/85} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

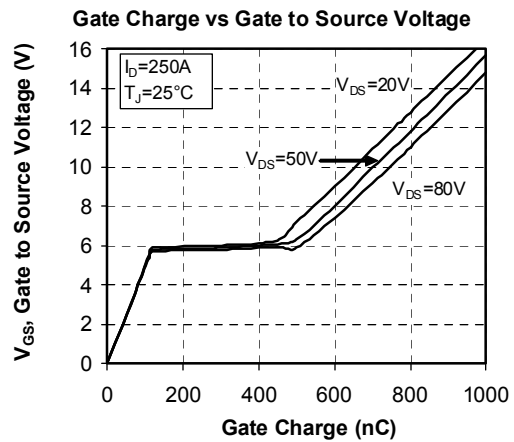
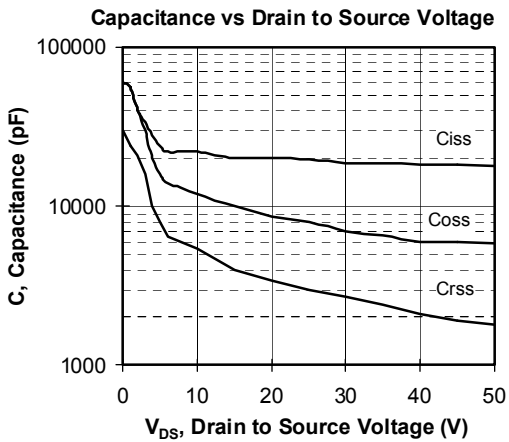
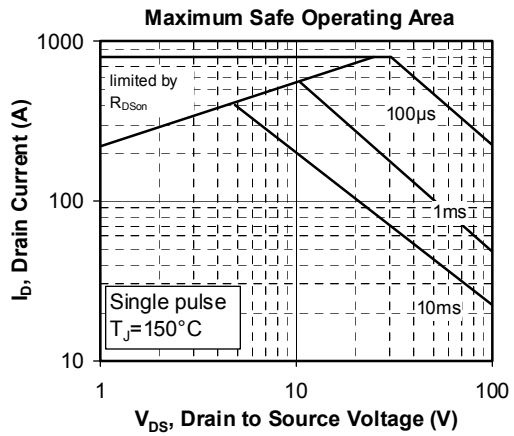
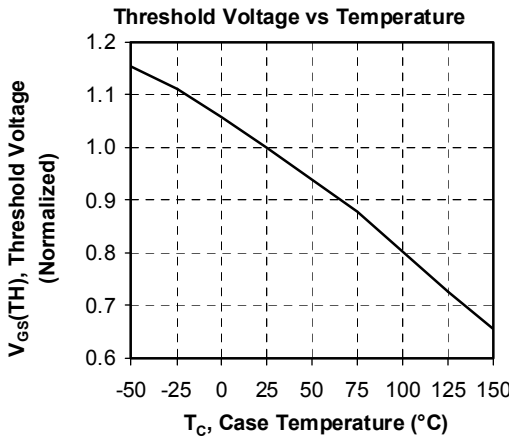
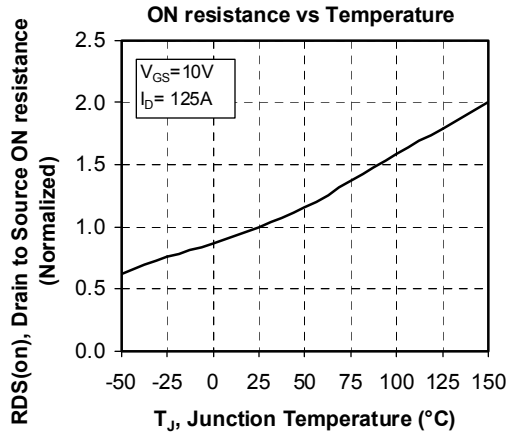
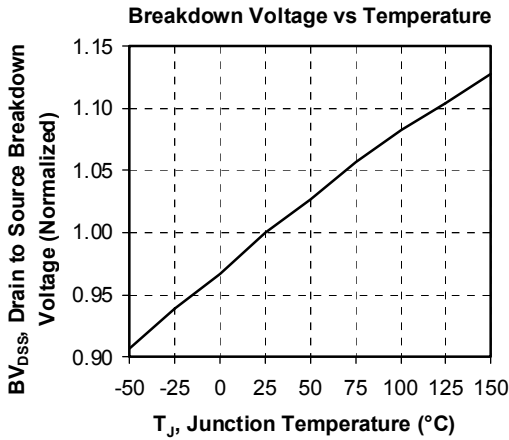
T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

**Package outline** (dimensions in mm)

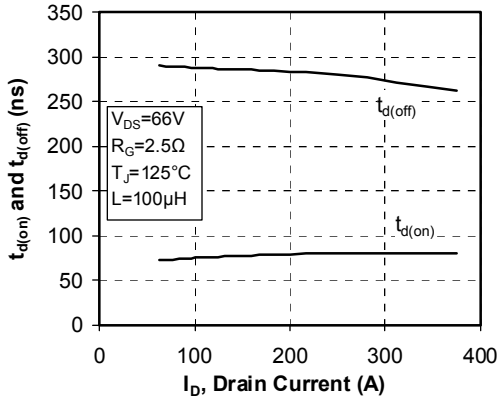


**Typical Performance Curve**

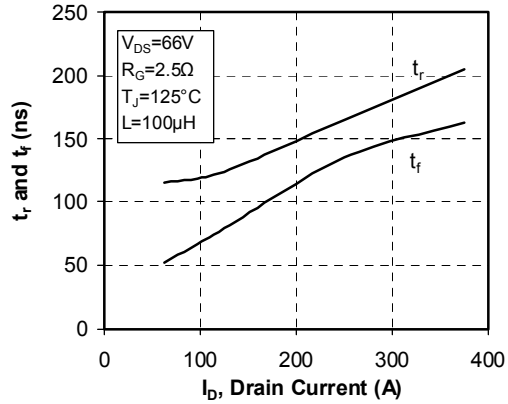




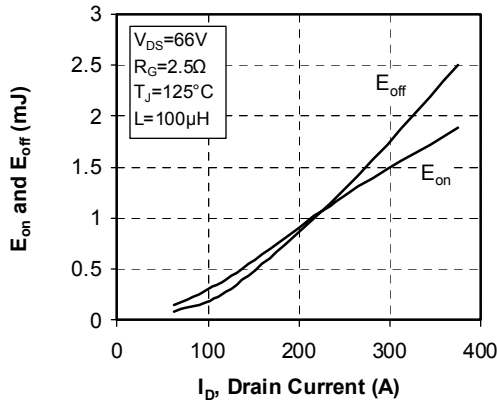
**Delay Times vs Current**



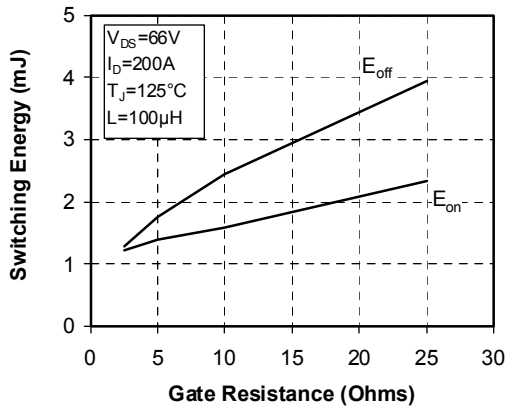
**Rise and Fall times vs Current**



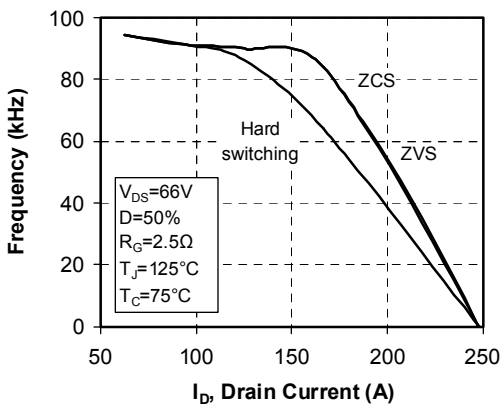
**Switching Energy vs Current**



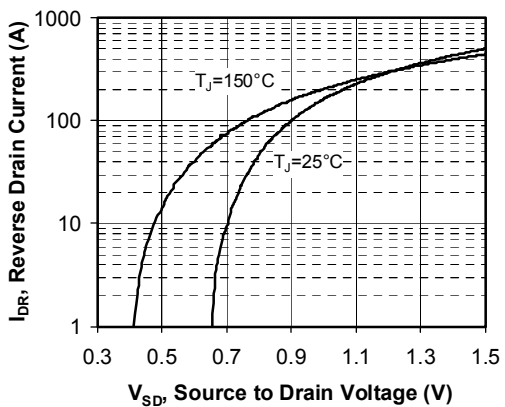
**Switching Energy vs Gate Resistance**



**Operating Frequency vs Drain Current**



**Source to Drain Diode Forward Voltage**



APT reserves the right to change, without notice, the specifications and information contained herein

APT's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.