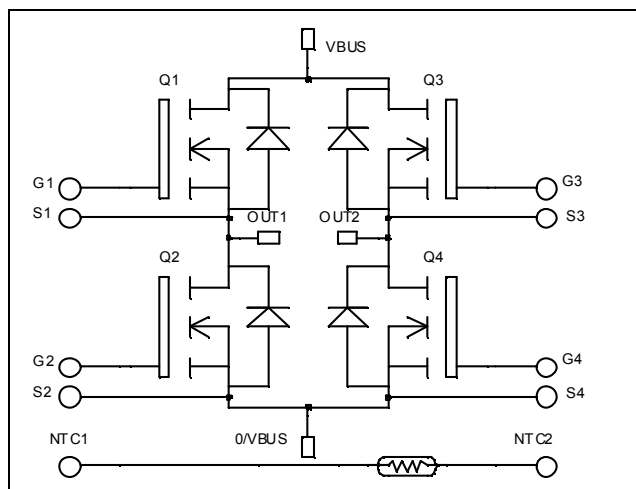


Full - Bridge MOSFET Power Module

$V_{DSS} = 100V$

$R_{DS(on)} = 9m\Omega$ typ @ $T_j = 25^\circ C$

$I_D = 139A$ @ $T_c = 25^\circ C$



Application

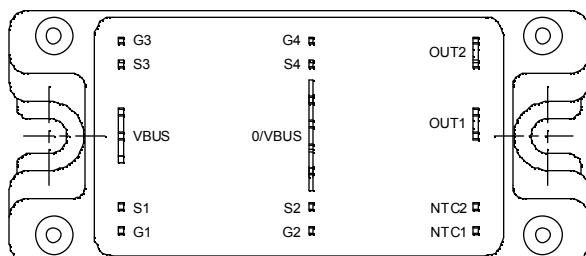
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Power MOS V[®] FREDFETs
 - Low $R_{DS(on)}$
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic diode
 - 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	$T_c = 25^\circ C$ 139	A
		$T_c = 80^\circ C$ 100	
I_{DM}	Pulsed Drain current	430	
V_{GS}	Gate - Source Voltage	± 30	V
$R_{DS(on)}$	Drain - Source ON Resistance	9.5	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$ 390	W
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	$V_{GS} = 0V, V_{DS} = 100V$ $T_j = 25^\circ\text{C}$			100	μA
		$V_{GS} = 0V, V_{DS} = 80V$ $T_j = 125^\circ\text{C}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 69.5A$		9	9.5	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	2		4	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		9875		pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		3940		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1470		
Q_g	Total gate Charge	$V_{GS} = 10V$		350		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 50V$		60		
Q_{gd}	Gate – Drain Charge	$I_D = 139A$		180		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 139A$ $R_G = 5\Omega$		35		ns
T_r	Rise Time			70		
$T_{d(off)}$	Turn-off Delay Time			95		
T_f	Fall Time			125		
E_{on}	Turn-on Switching Energy ❶	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 139A, R_G = 5\Omega$		552		μJ
E_{off}	Turn-off Switching Energy ❷			604		
E_{on}	Turn-on Switching Energy ❶	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 139A, R_G = 5\Omega$		608		μJ
E_{off}	Turn-off Switching Energy ❷			641		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			139	A
		$T_c = 80^\circ\text{C}$			100	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -139A$			1.3	V
dv/dt	Peak Diode Recovery ❸				8	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -139A$ $V_R = 66V$ $di/dt = 100A/\mu\text{s}$ $T_j = 25^\circ\text{C}$			190	ns
		$T_j = 125^\circ\text{C}$			370	
Q_{rr}	Reverse Recovery Charge	$I_S = -139A$ $V_R = 66V$ $di/dt = 100A/\mu\text{s}$ $T_j = 25^\circ\text{C}$		0.4		μC
		$T_j = 125^\circ\text{C}$		1.7		

❶ E_{on} includes diode reverse recovery.

❷ In accordance with JEDEC standard JESD24-1.

❸ dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$$I_S \leq -139A \quad di/dt \leq 700A/\mu\text{s} \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

Thermal and package characteristics

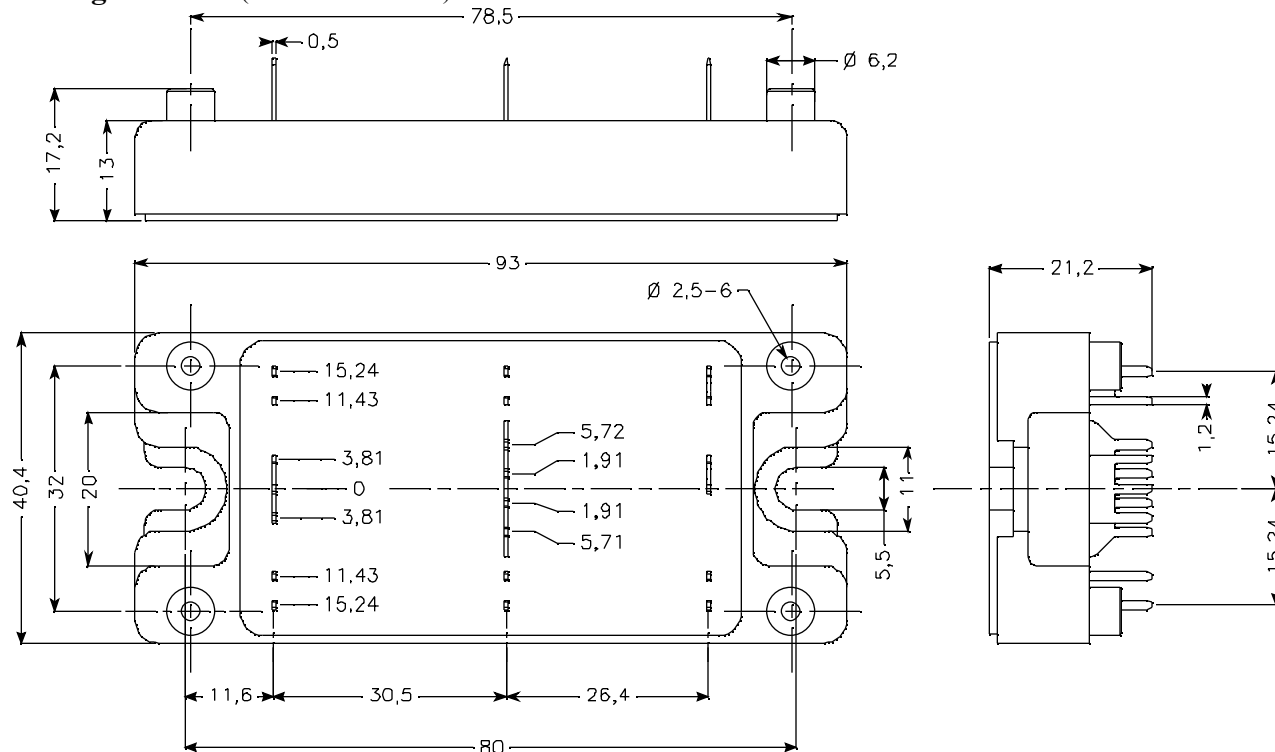
Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case					0.32	°C/W
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			2500			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To Heatsink	M5	1.5		4.7	N.m
Wt	Package Weight					160	g

Temperature sensor NTC (for more information see application note APT0406 on www.advancedpower.com).

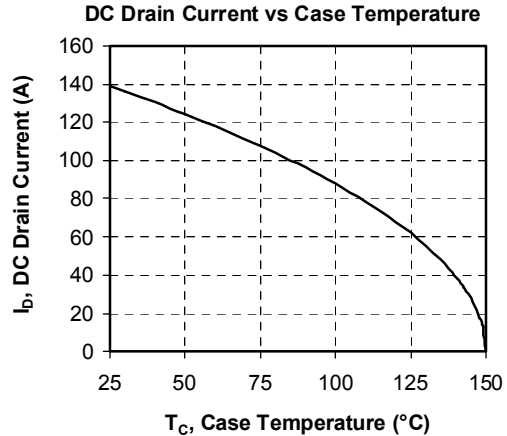
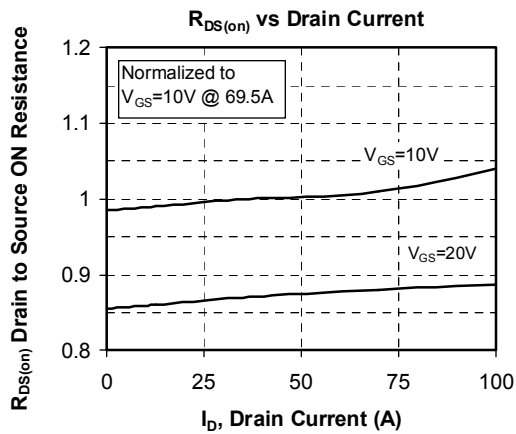
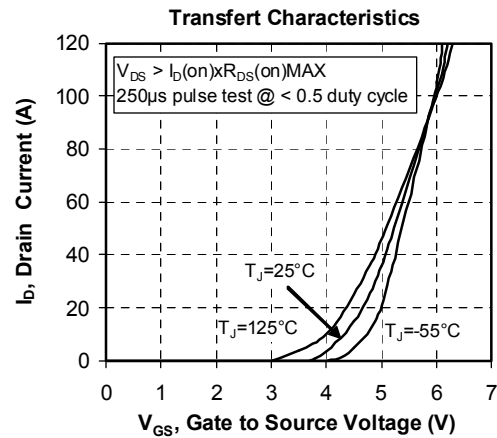
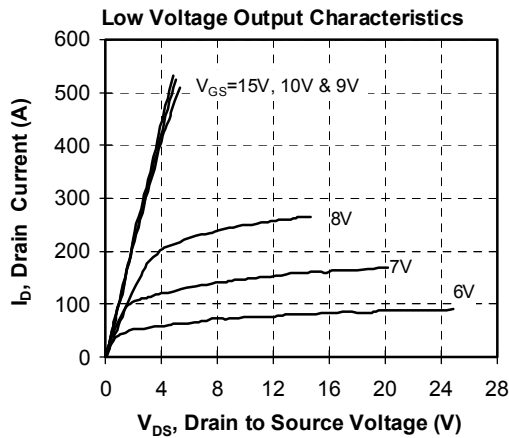
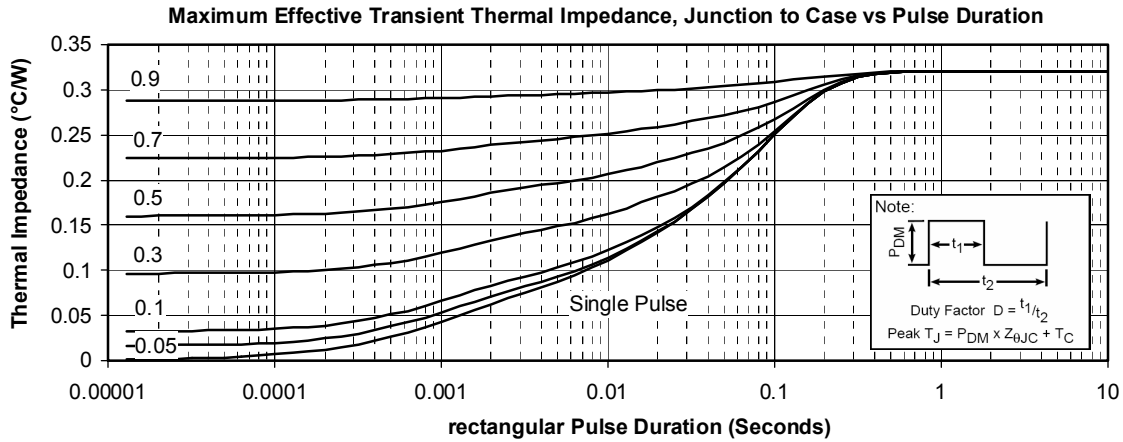
<i>Symbol</i>	<i>Characteristic</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

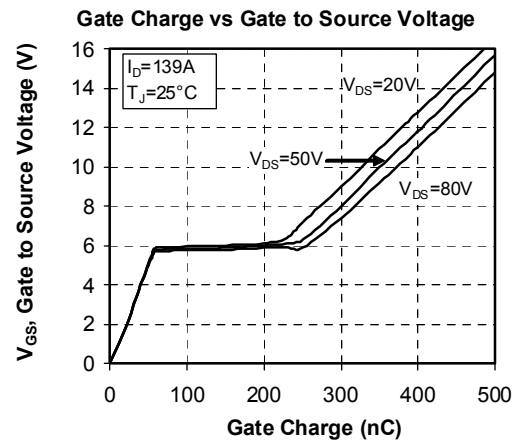
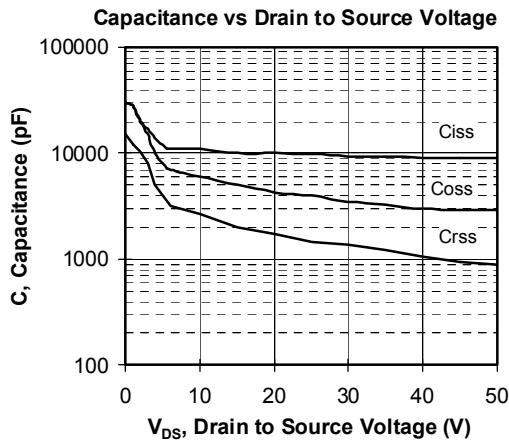
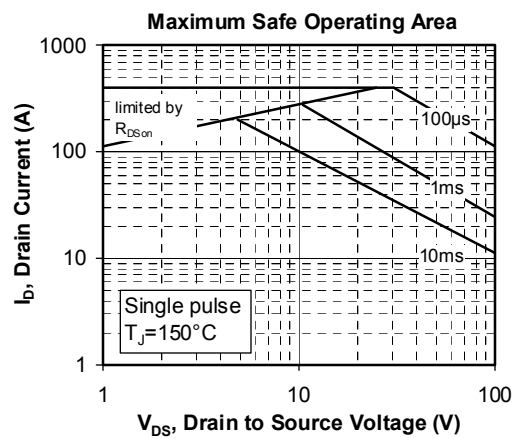
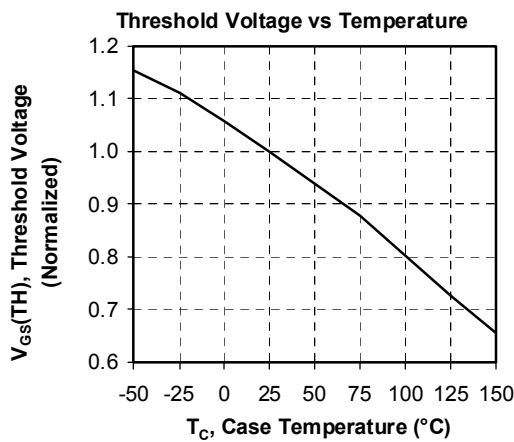
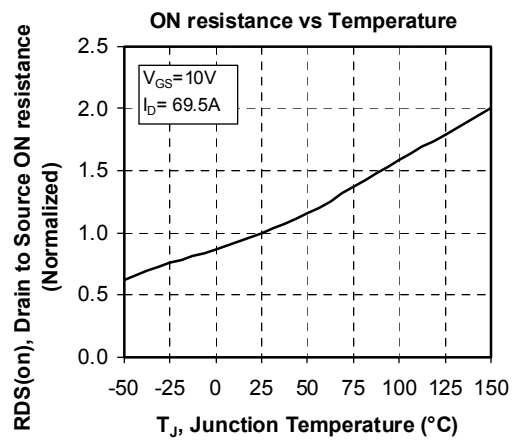
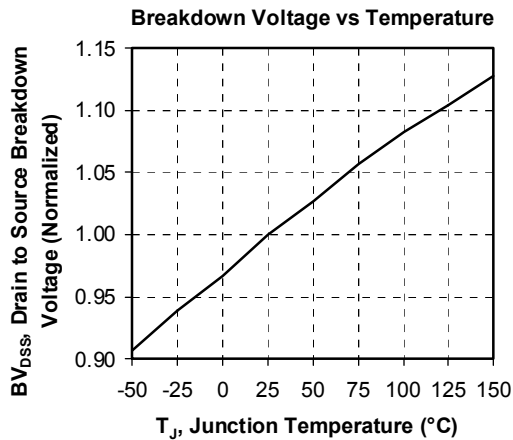
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

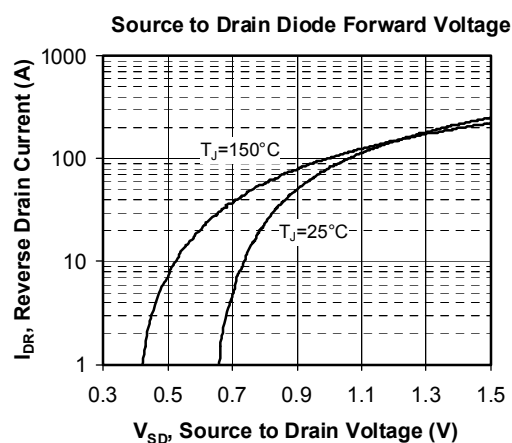
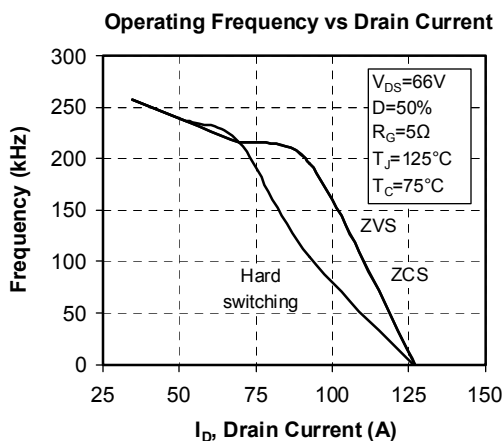
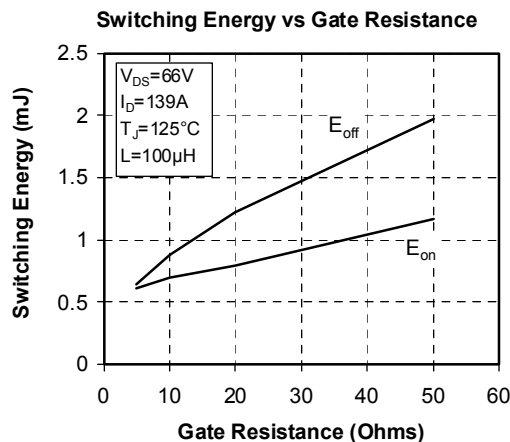
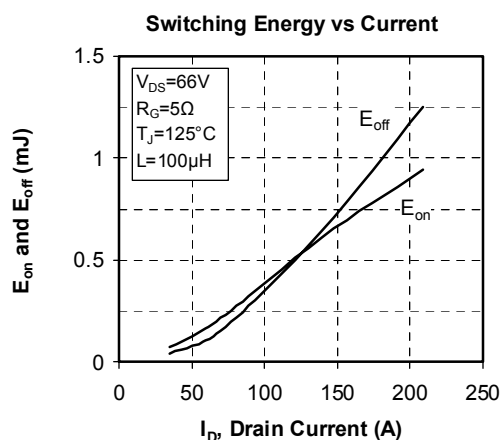
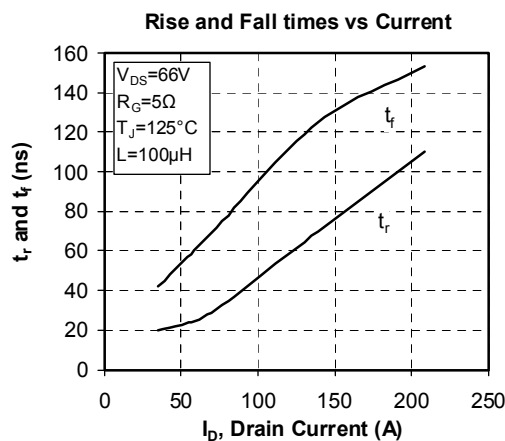
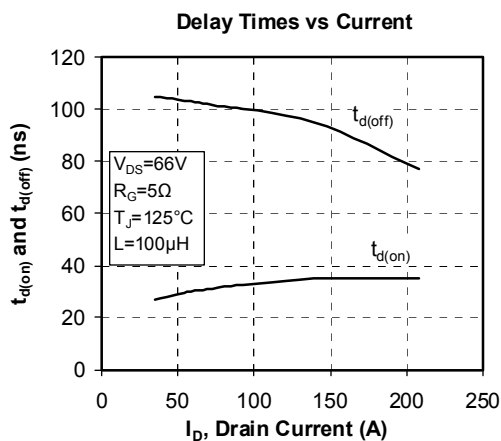
Package outline (dimensions in mm)



Typical Performance Curve







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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.