



PROGRAMMABLE SHOCK DURATION

POWER. UNDER CONTROL.

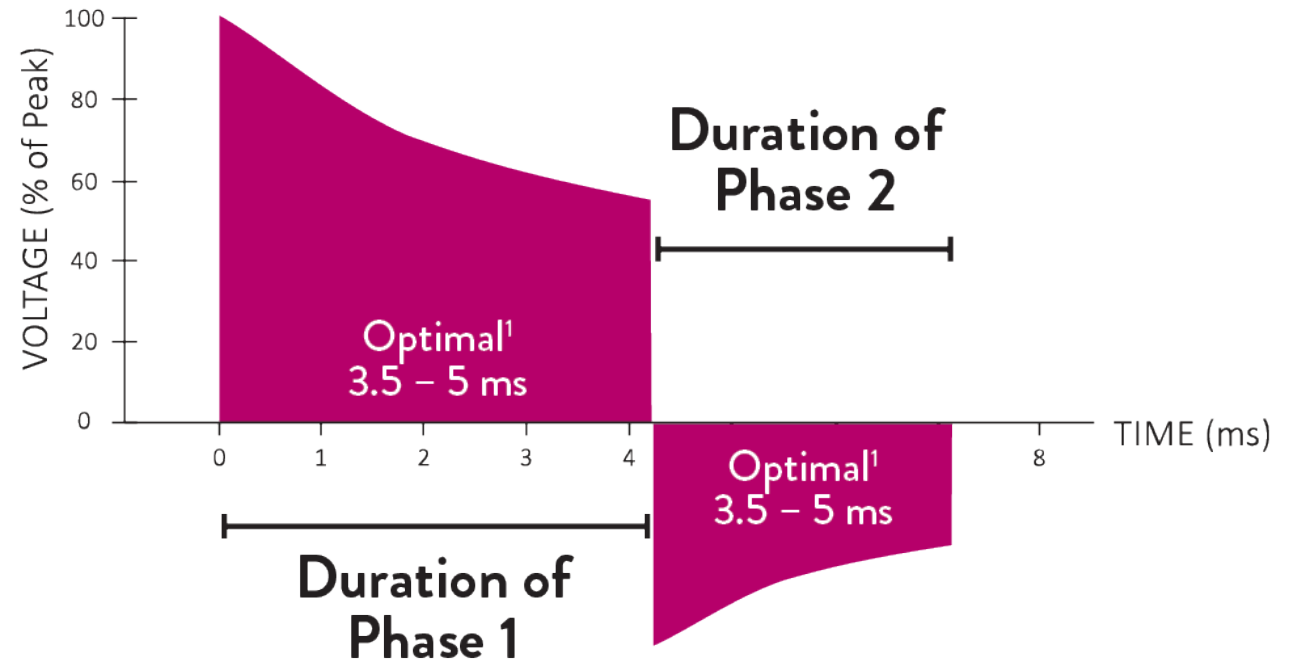
Pulse Width Matters.

Programmable pulse width shocks provide non-invasive programming options to rapidly optimize therapy performance to each patient's unique needs, **exclusively from Abbott.**

SHOCK OPTIMIZATION has never been more important

DFT testing is less common.

More implanters are choosing single coil leads, which may lead to higher impedances and **LONGER, SUB-OPTIMAL** shock durations.

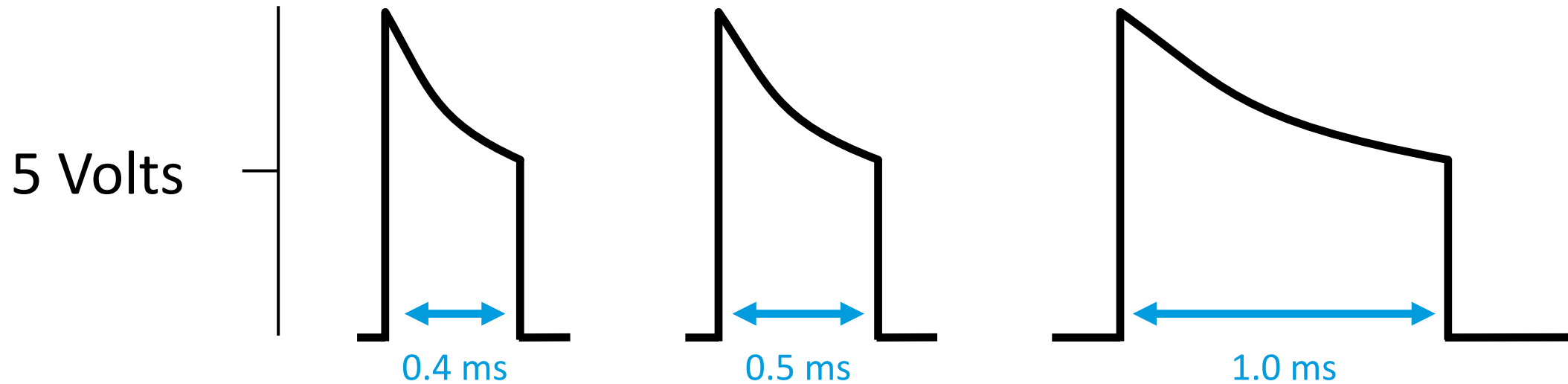


Think about it...

You implant
pacemakers with
**programmable
pulse widths.**

Why not do the
same with your
ICDs?

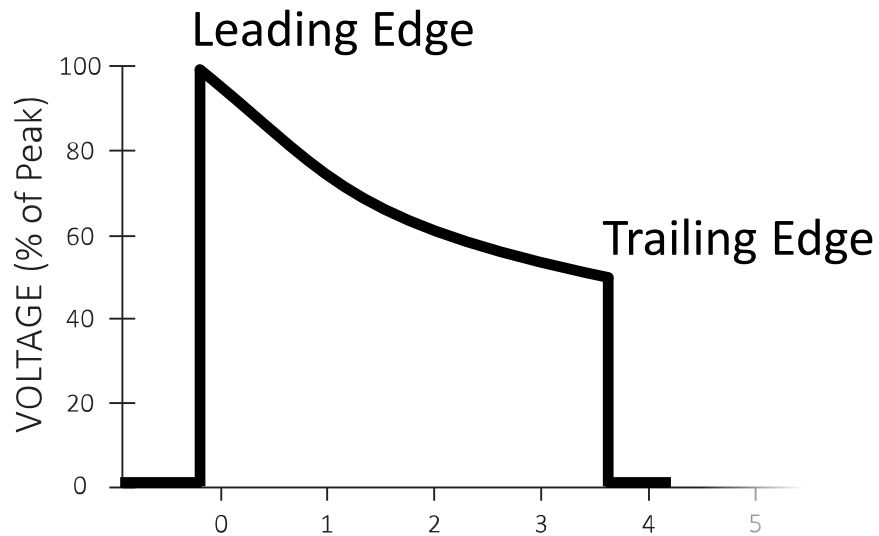
Pacemakers are often programmed with different pulse widths, applying voltage for a varying amount of time.



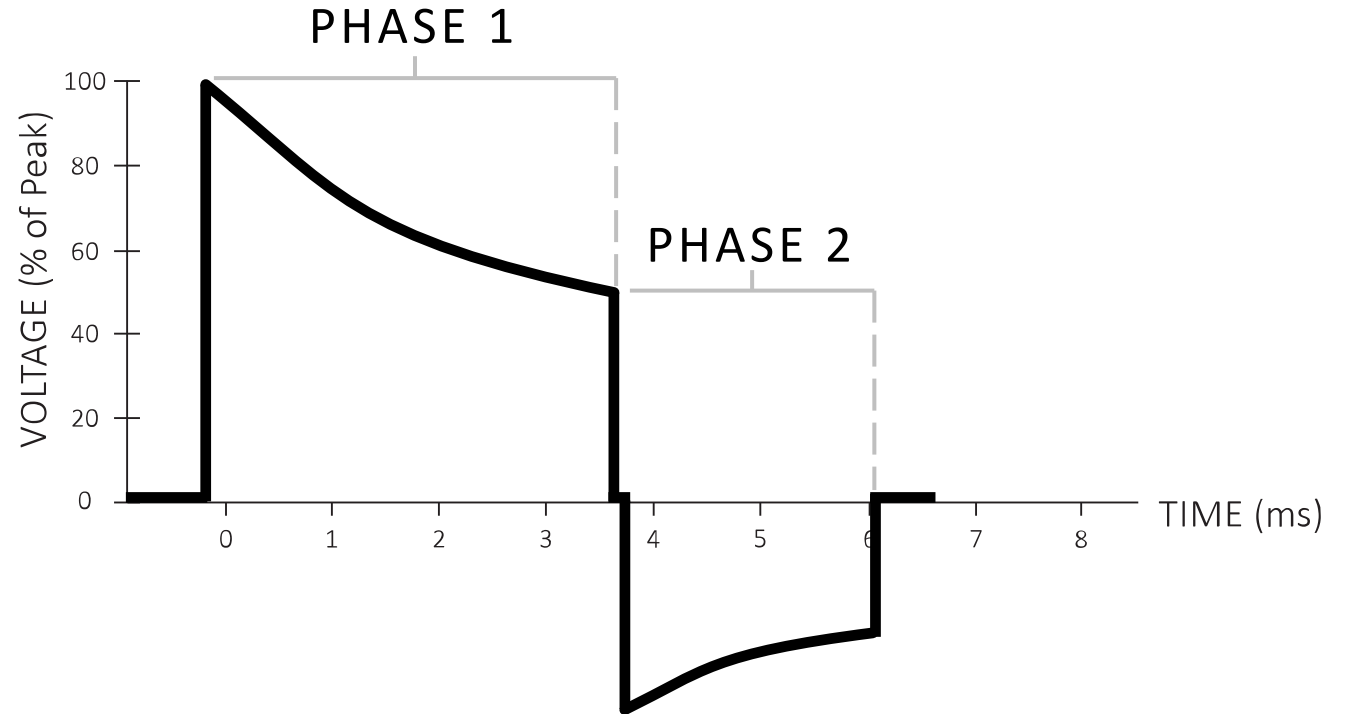
Longer pulse widths are typically used to manage high thresholds.

All modern defibrillation systems use **BIPHASIC WAVEFORMS**.

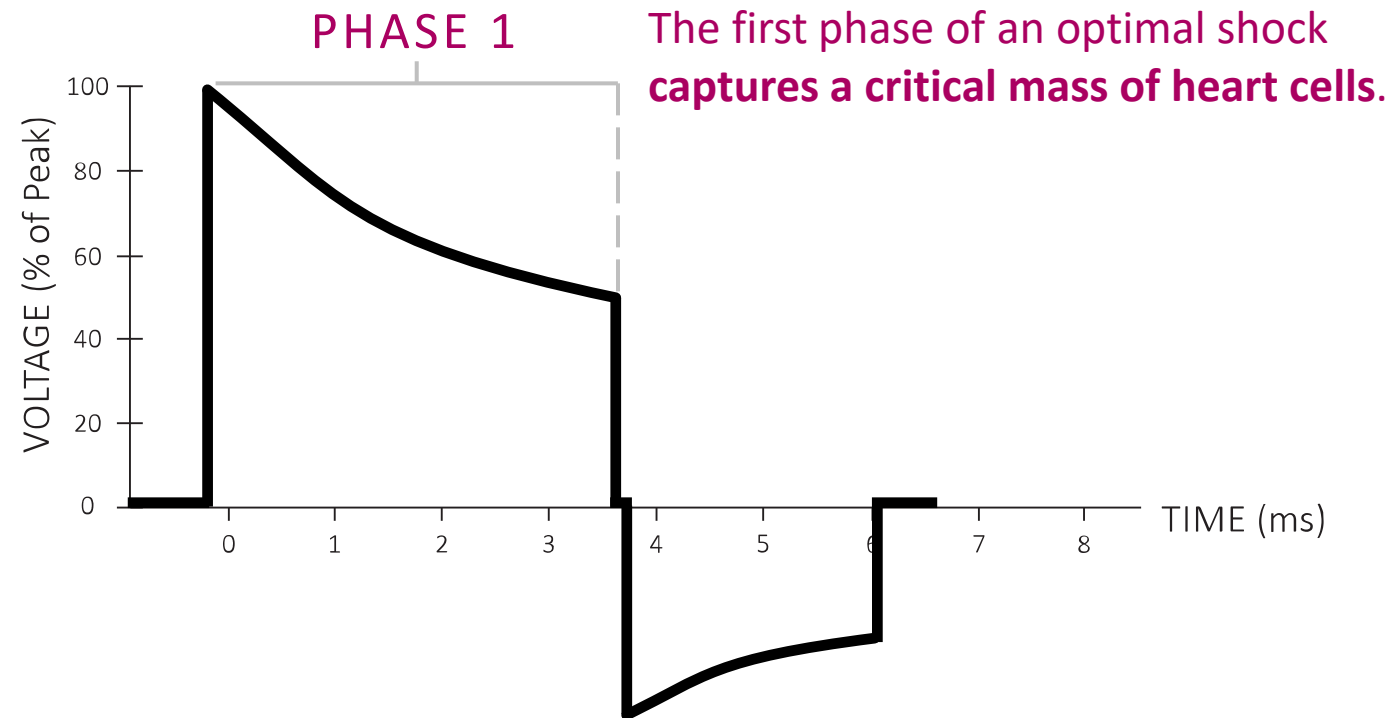
MONOPHASIC



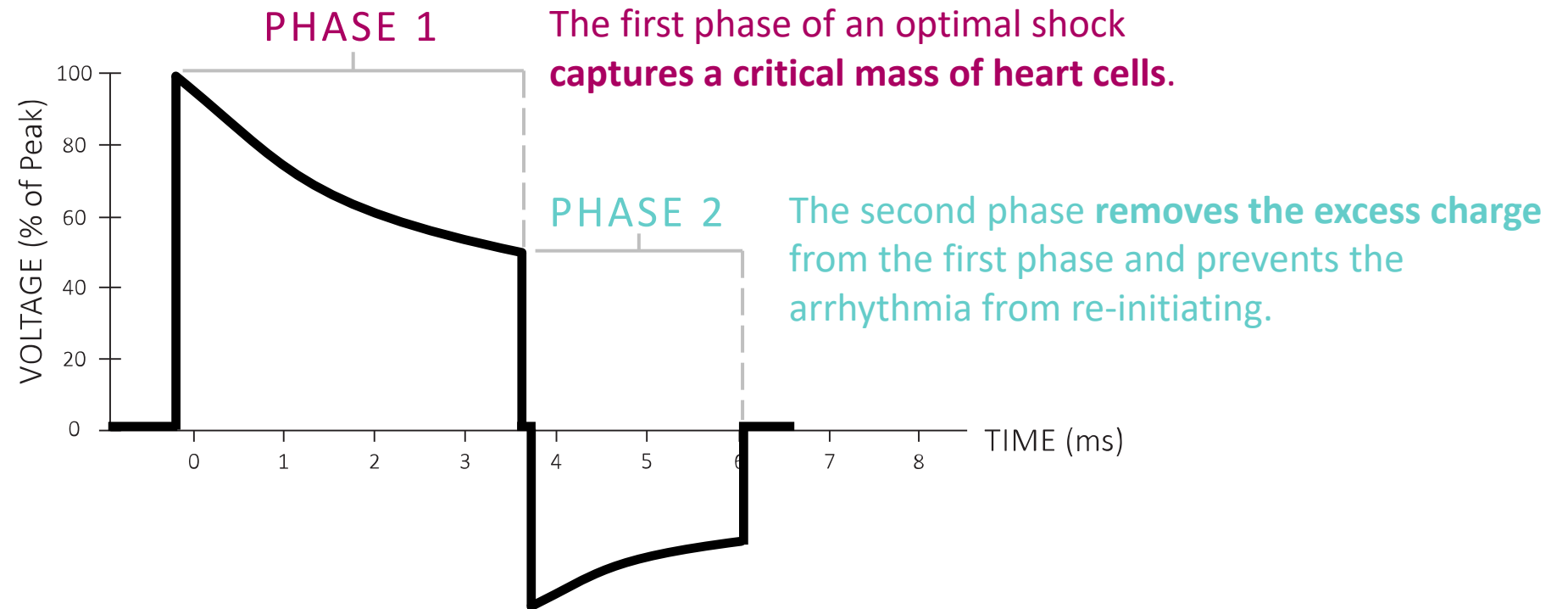
BIPHASIC

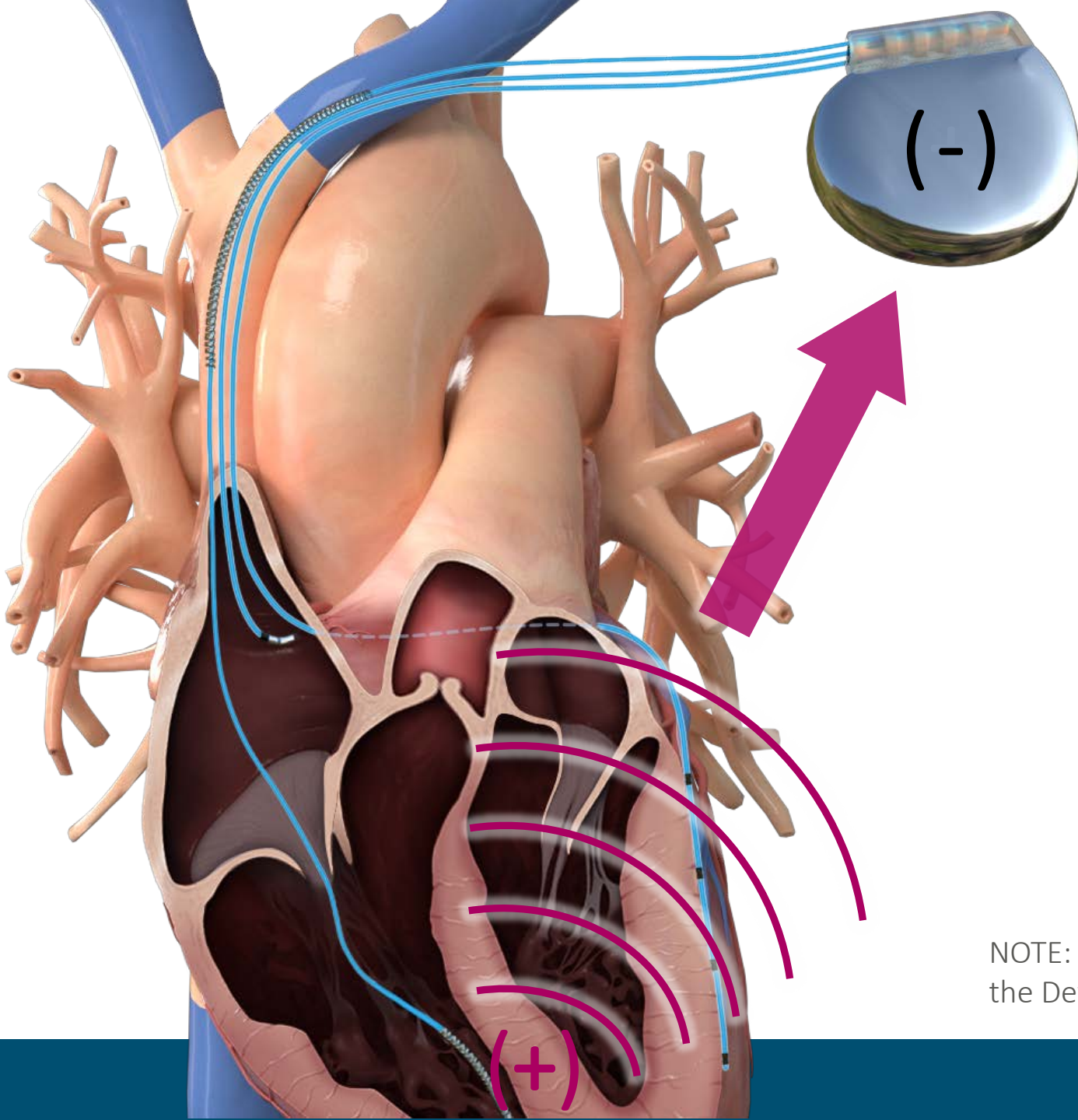


Understanding the BIPHASIC SHOCK WAVEFORM



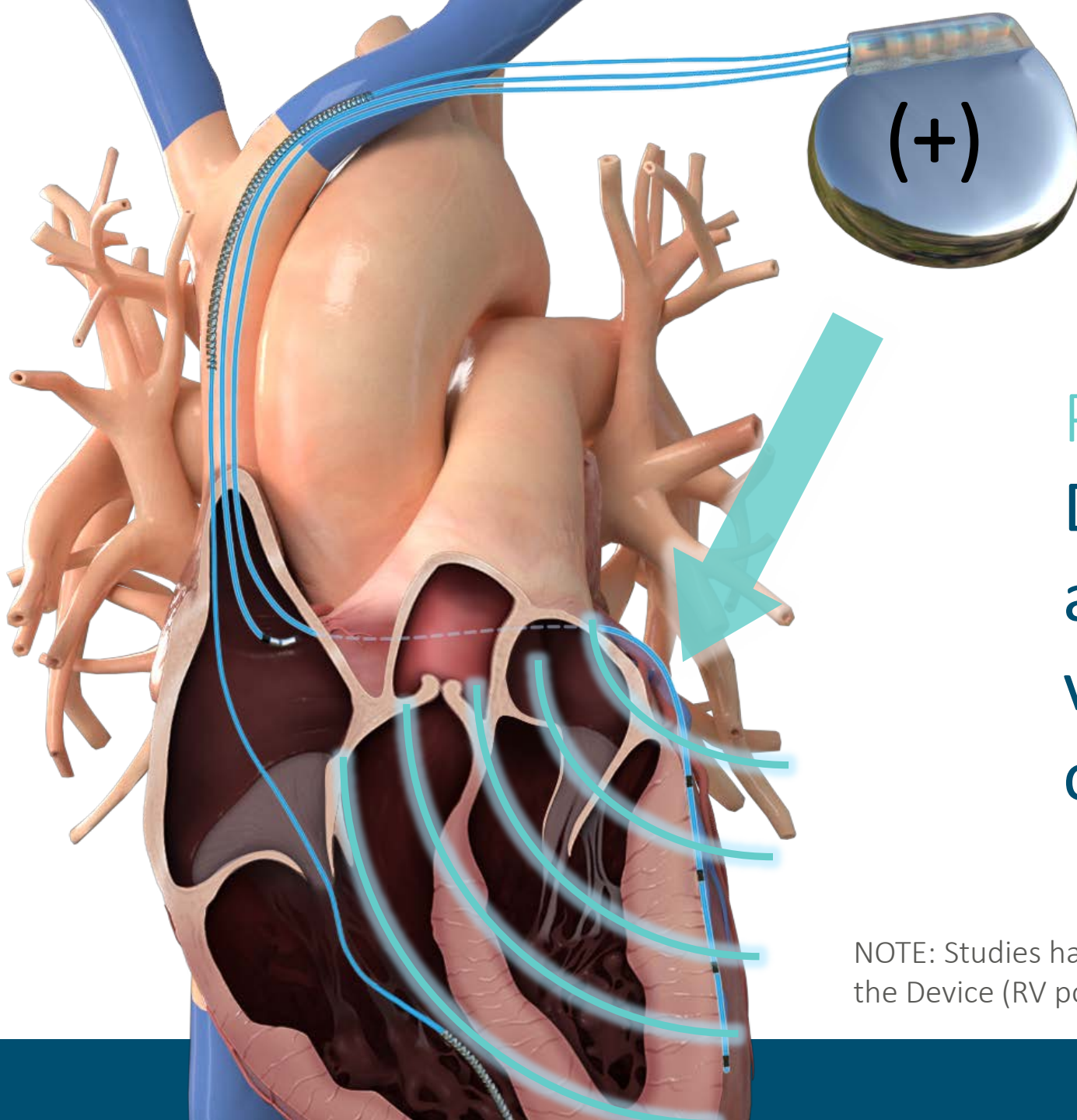
Understanding the BIPHASIC SHOCK WAVEFORM





PHASE 1
typically delivered
from RV coil to ICD

NOTE: Studies have shown that shocking from the RV coil to the Device (RV positive) for Phase 1 is more effective.



PHASE 2

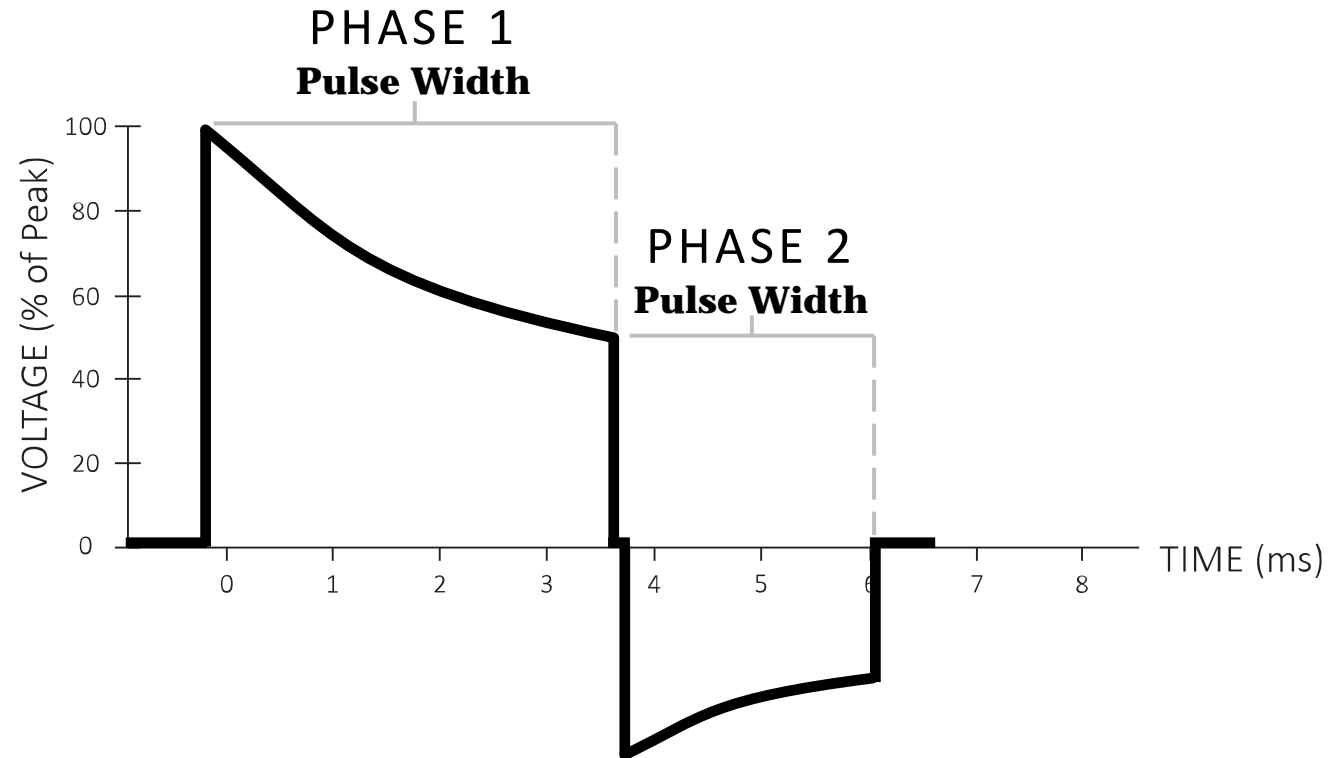
Device flips polarity and delivers the voltage in the opposite direction.

NOTE: Studies have shown that shocking from the RV coil to the Device (RV positive) for Phase 1 is more effective.

What is

PULSE WIDTH?

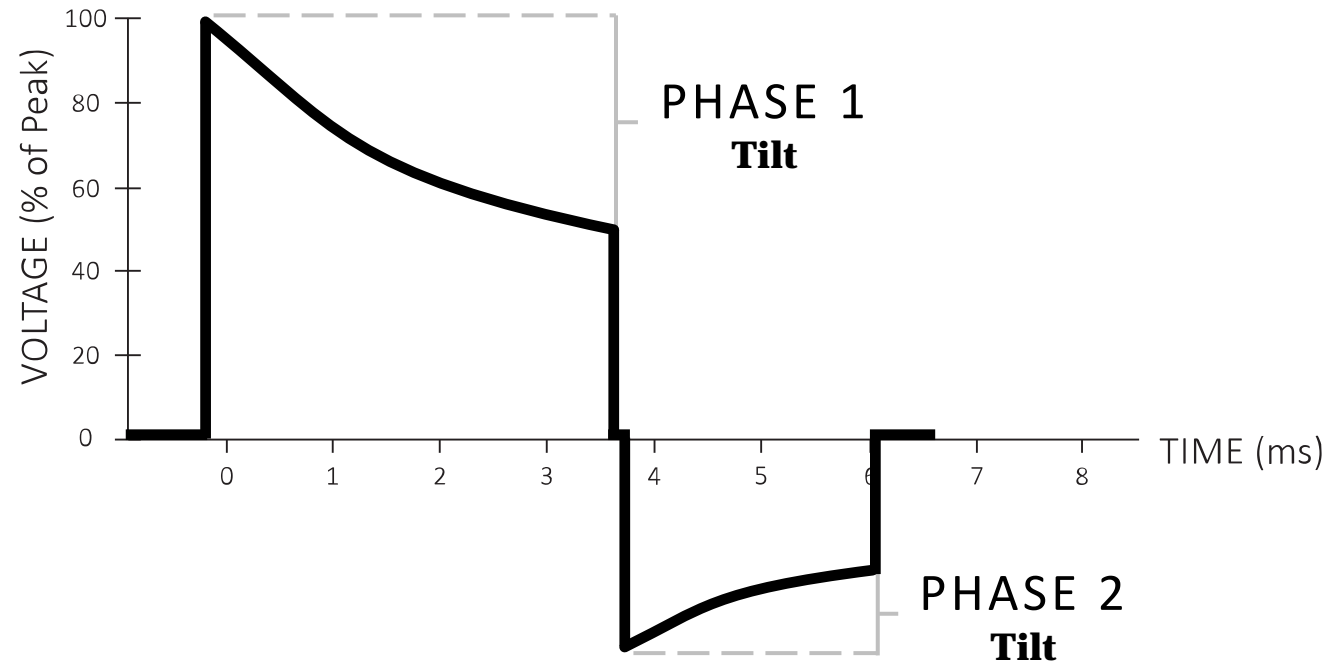
PULSE WIDTH is the **AMOUNT OF TIME**
it takes to deliver each phase



In a fixed pulse width system, duration of each phase of the shock waveform is controlled by a programmed amount of time.

What is
TILT?

TILT is the **PERCENT DROP IN VOLTAGE** from the beginning to the end of each phase.



In a fixed tilt system, the pulse width changes as the impedance changes.

A biphasic shock can be programmed one of two ways.

①

Deliver a
certain output
(TILT)

or

②

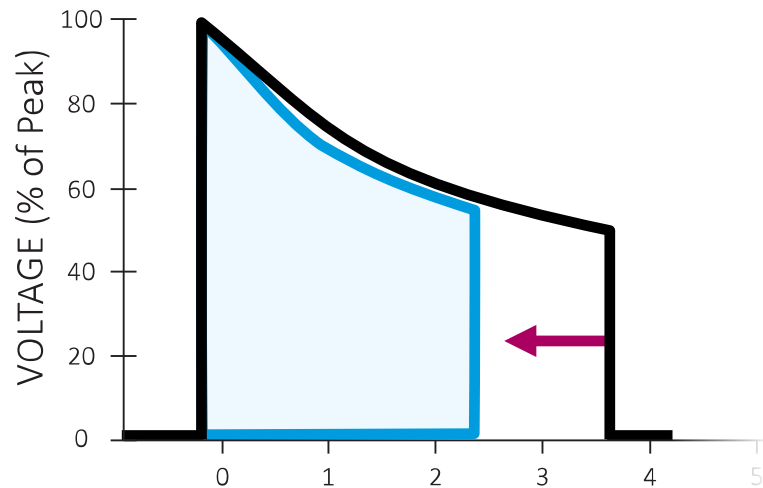
Apply voltage for a
certain amount of time
(PULSE WIDTH)

It can't do both.

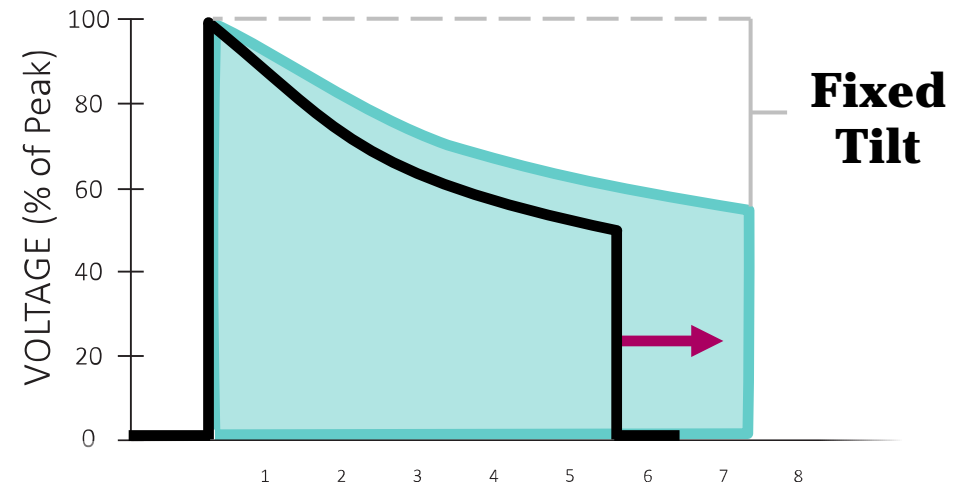
Why does it matter?

Why does timing matter?

TOO EARLY could mean there was insufficient time to convert the rhythm.

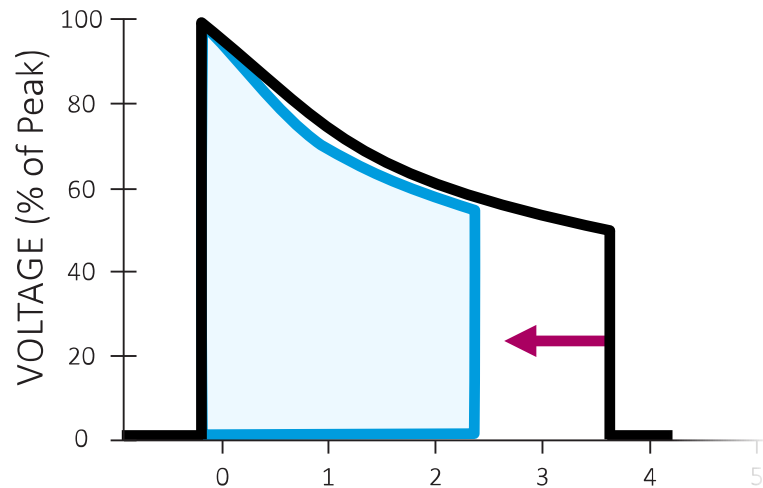


TOO LATE can reinitiate VF.

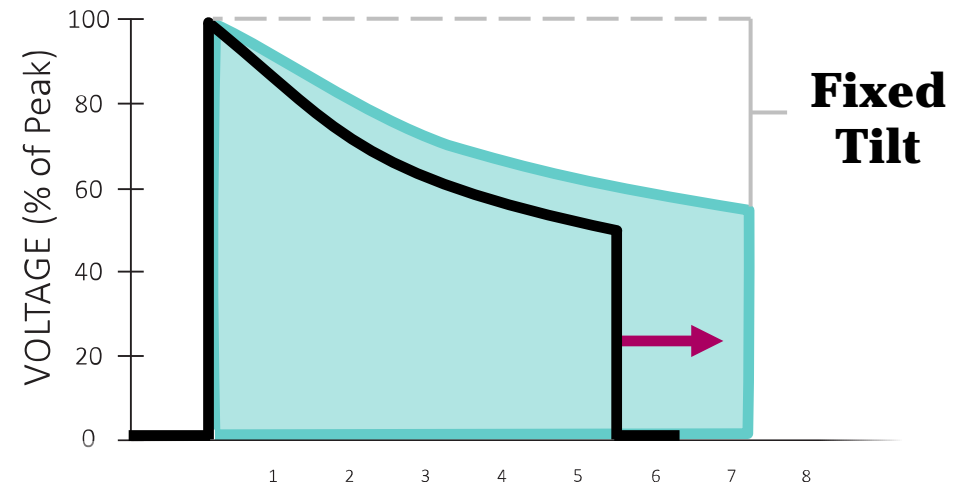


The challenge with fixed tilt systems is that the **SHOCK DURATION (timing) VARIES WITH IMPEDANCE**

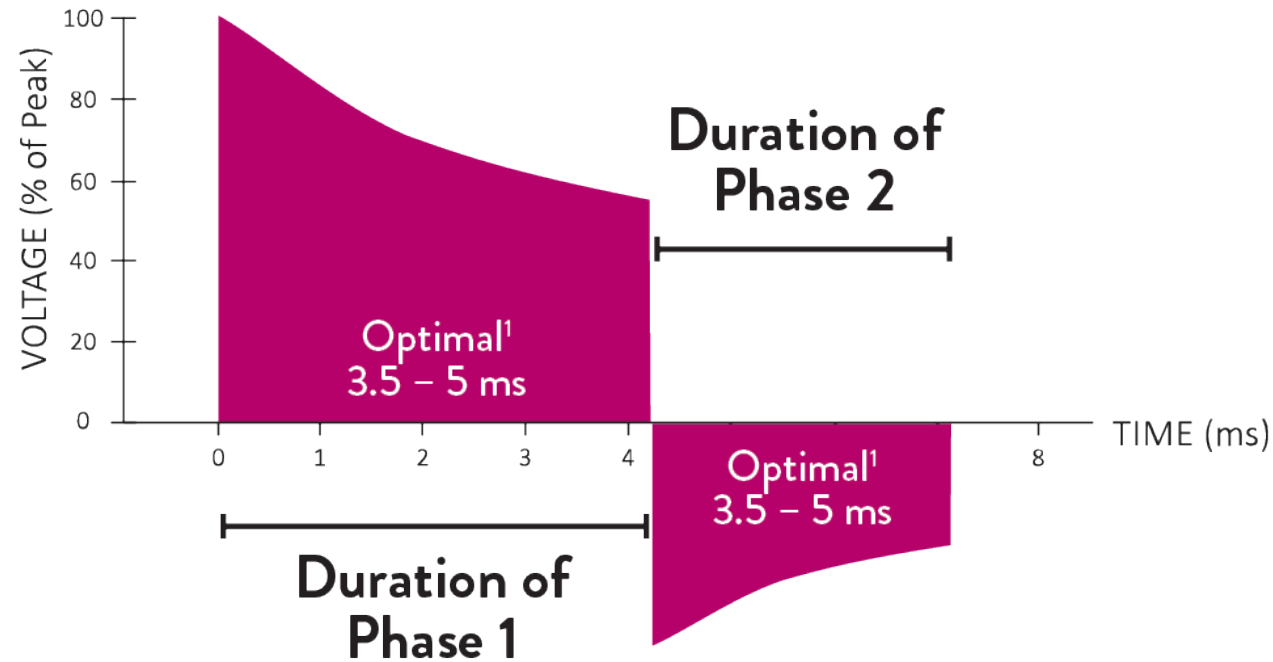
LOWER IMPEDANCE shifts the shock waveform **TO THE LEFT** resulting in a **SHORTER DURATION** which could mean insufficient time to convert the rhythm.



HIGHER IMPEDANCE shifts the shock waveform **TO THE RIGHT** resulting in a **LONGER DURATION** which could reinitiate VF.



Fixed Pulse Width allows **control over shock duration** regardless of the high voltage impedance

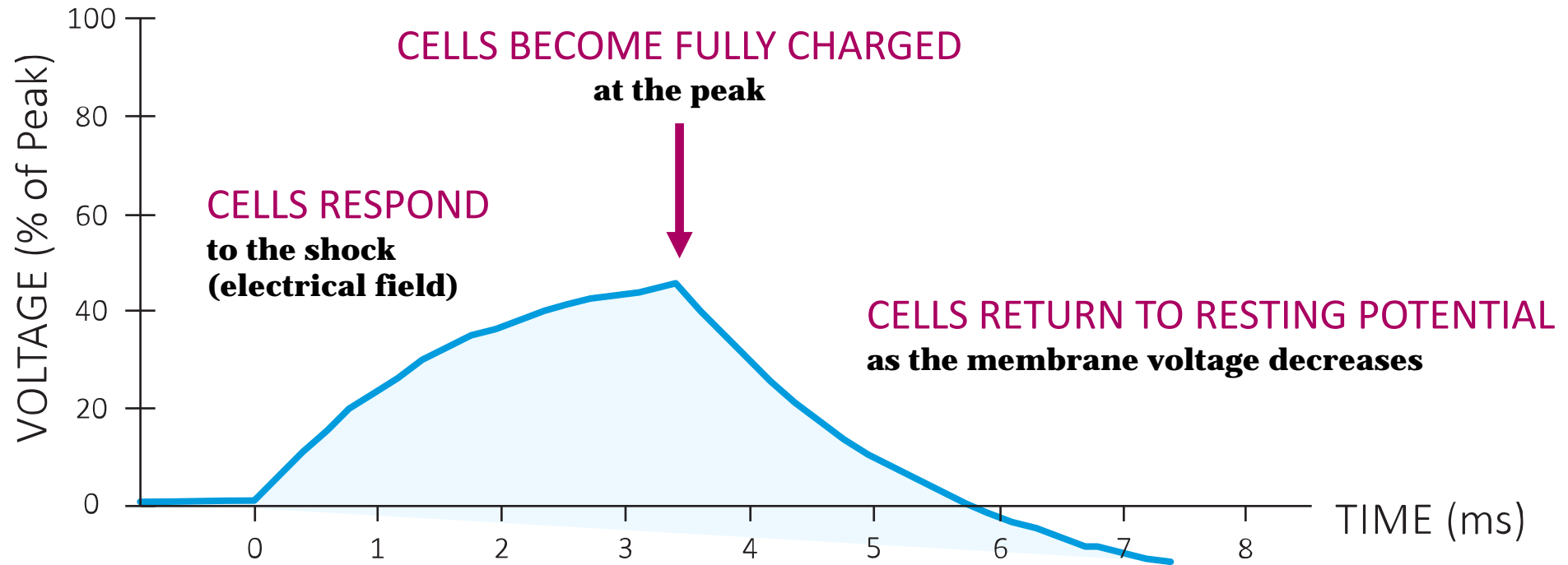


1. Kroll MW, Schwab JO, Fundam Clin Pharmacol 2010;24(5):561-573

WHEN and **HOW** you
deliver energy matters.

WHEN?

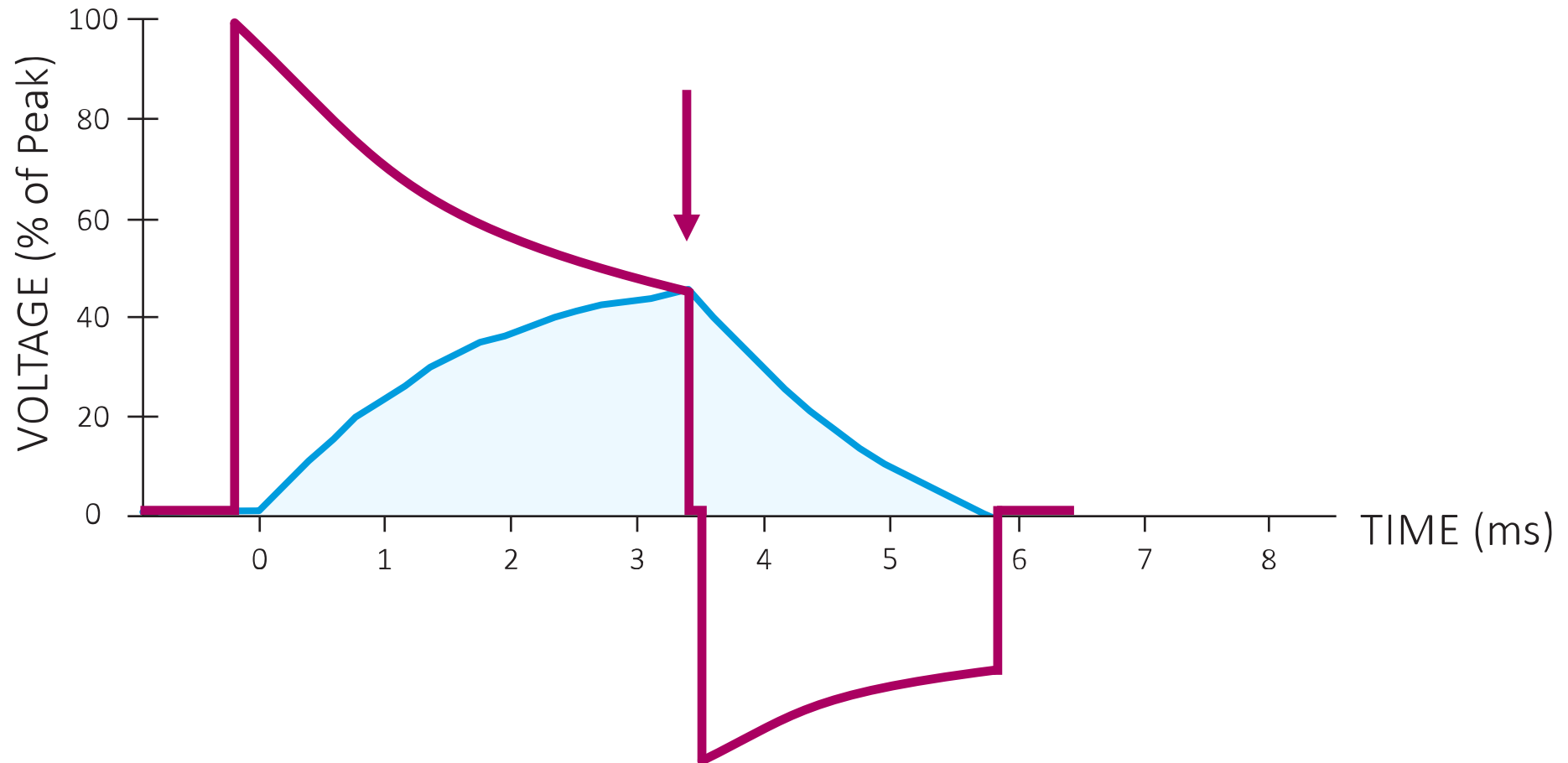
How fast is electricity moving through the patient's myocardium?



*Kroll MW. A Model of the Single Capacitor Biphasic Defibrillation Waveform. PACE, 1994. Swerdlow CD, et al. Charge-Burping Theory Correctly Predicts Optimal Ratios of Biphasic Duration for Biphasic Defibrillation Waveforms. Circ 1996.

WHEN?

The goal is to end the first phase of the shock **AT THE PEAK** of the Patient Response Curve.



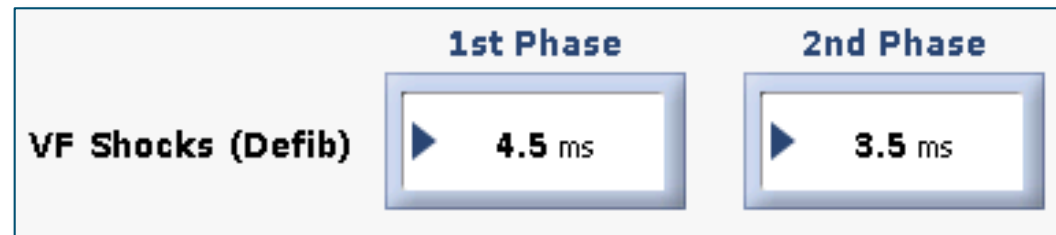
HOW?

DeFT Response™ technology allows **FIXED PULSE WIDTH PROGRAMMABILITY**, or the ability to control the length of each phase.

Non-invasively adjust the shock waveform



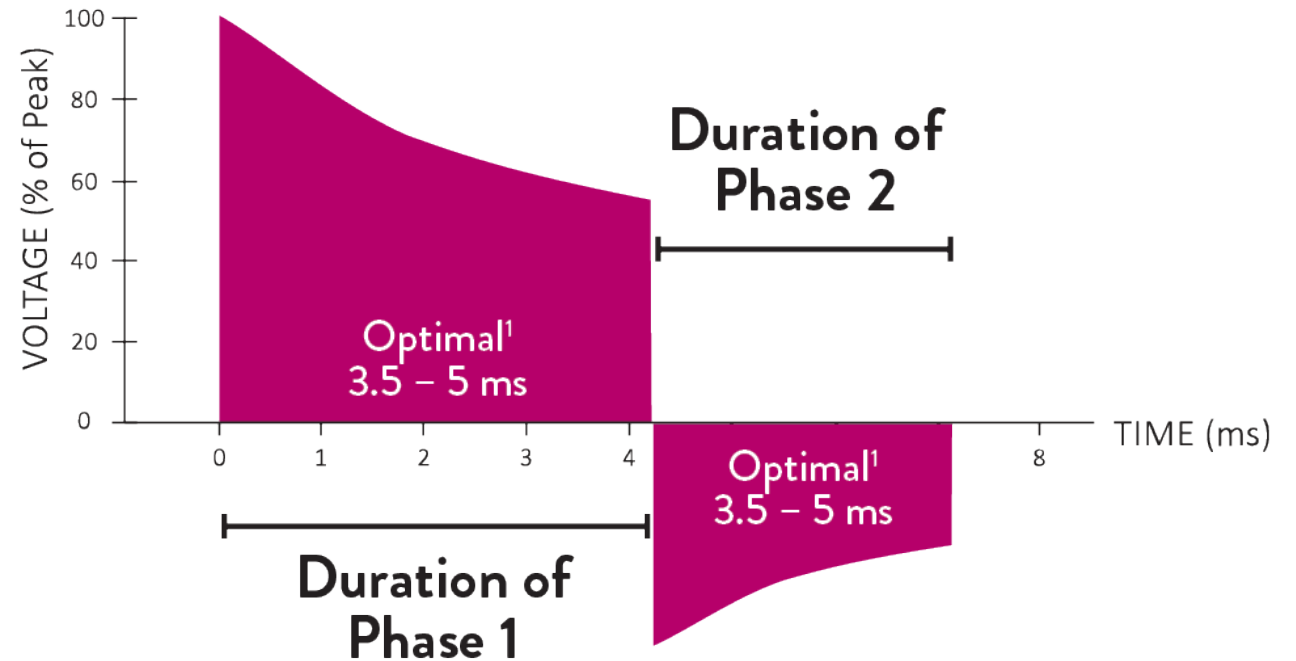
Program the optimal 3.5 –5 millisecond duration



*Kroll M, Swerdlow C. Optimizing defibrillation waveforms for ICD. J Interv Card Electrophysiol 2007; 18:247–263.

PULSE WIDTH (shock duration) matters!

While selectable tilt is useful, **programmability of the shock duration (pulse width) is a more powerful method** for precisely matching the biphasic waveform to a patient's tissue response time.



1. Kroll MW, Schwab JO, Fundam Clin Pharmacol 2010;24(5):561-573

Timing is everything.

It's not just about power, **it's about knowing when to turn the power off.**



DeFT Response™ Technology

Allows **FIXED PULSE WIDTH PROGRAMMABILITY**, or the ability to control the length of each phase of a shock waveform.

Non-invasive programming options to rapidly optimize therapy performance to each patient's unique needs, **exclusively from Abbott.**



Abbott

