

FORMULA SERIES

Industrial UV nanosecond laser



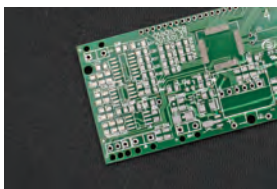
Features & Benefits:

FORMULA-355 laser adopts a compact all-in-one design, which effectively simplifies the design of the customer's equipment, making the installation and integration easier and more convenient. The design that organically combines the laser's electrical control part and the optical part greatly reduces the risk of possible failure caused by excessive external wiring connections and improves the overall stability of the user's equipment. Water-cooling, stable mechanical structure, and sufficient anti-stress design make it a perfect combination of performance and stability and a good candidate for various challenging applications.

FORMULA series is an upgraded version of the original AWAVE laser with excellent performance. In addition to maintaining the original excellent beam quality ($M2 < 1.1$), it also expanded the laser's operating frequency range from 30-150kHz to 20-300kHz, and optimizes the laser power at high frequency. Thus, the laser can be used in more applications and improves the processing efficiency for customers. It adopts Inno Laser's world-leading intra-cavity harmonic generation technology. Its electrical-to-optical conversion efficiency is also industrial-leading. Thus, it is a solid-state UV laser with the lowest energy consumption.

The power ranges from 15w, 20w, 25w, up to 40 watts, which can meet most requirements on the power from customers for nanosecond UV lasers. The FORMULA series lasers can be operated with TTL level signals and PWM pulse width modulation signals. The PWF function allows customers to adjust the output power of the laser in the internal control mode through software.

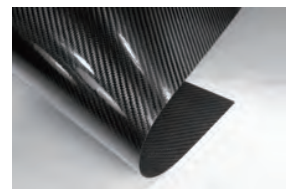
The compact all-in-one design, excellent beam quality, wide repetition rate, flexible control mode, and comprehensive power coverage make it a perfect choice for the application of precision micro-machining, on-fly marking, FPC/PCB cutting, etc.



FPC/PCB cutting&drilling



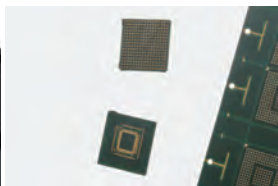
Fly marking



Carbon fiber cutting

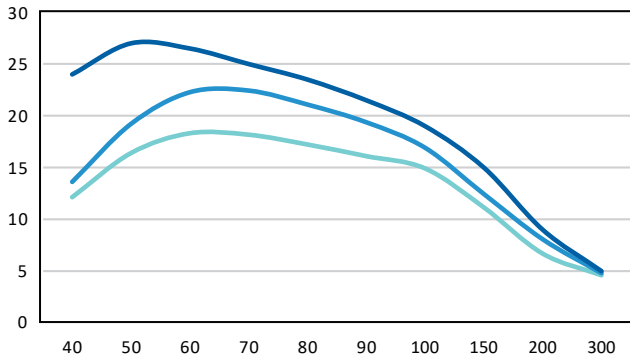


Mobilephone module/Fingerprint module cutting

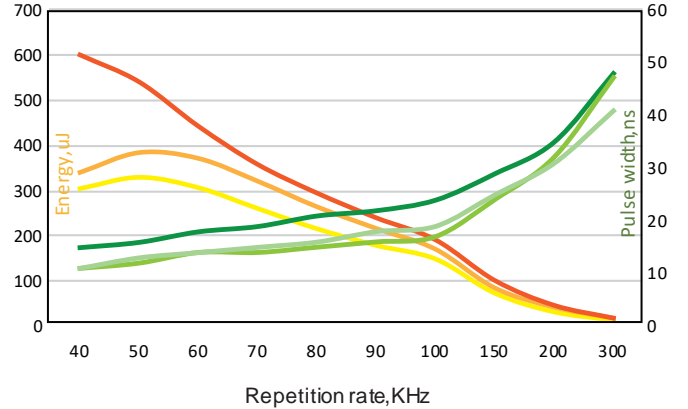


Battery electrode welding

Typical Performance FORMULA-355-15W/20W/25W
Power vs Repetition Rate



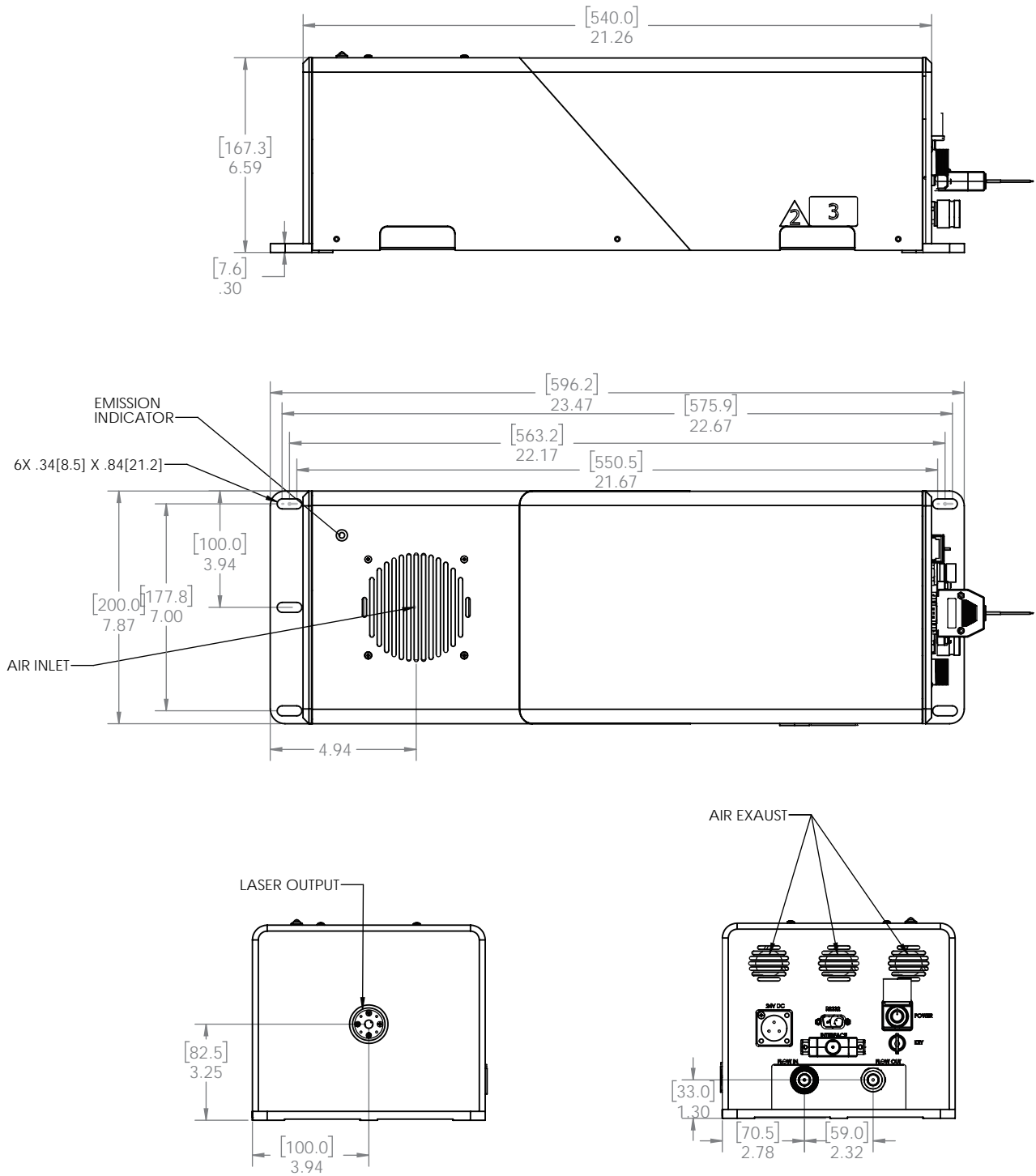
Typical Performance FORMULA-355-15W/20W/25W
Energy and Pulse width vs Repetition Rate



FORMULA 355			
Specification	15W - 50K	20W - 60K	25W - 50K
Wavelength (nm)	355		
Average Power (Watts)	>15W@50KHz	>20W@60KHz	>25W@50KHz
Energy (μJ)	>300	>400	>500
Specified Repetition Rate(kHz)	50	60	50
Repetition Rate (kHz)	40-300		
Pulse Width (ns)	<15	<15	<20
Beam Quality (M ²)	<1.2		
Beam Roundness (%)	>90		
Beam Diameter (mm)	-0.55	-0.47	-0.55
Beam Divergence (mRad)	< 2		
Point Stability (μrad/°C)	< 20		
Polarization Ratio	100:1 Linear,Horizontal		
Pulse-to-Pulse Stability (% RMS)	< 3		
Average Power Stability(% over12 hours)	< 3		
Cold Start Warm-Up (mins.)	< 40		
Standby Warm-Up (mins.)	< 10		
Operational Temperature Range (°C)	5-40°C		
Operation Humidity Range (%)	20 to 80,non-condensing		
Storage Temperature Range (°C)	- 20 to 50		
Storage Humidity Range (%)	20 to 80,non-condensing		
Input Voltage (VDC)/Rated Power(W)	24/450	24/600	
Communication	RS232		
Cooling	Water		
Weight (kg)	20		

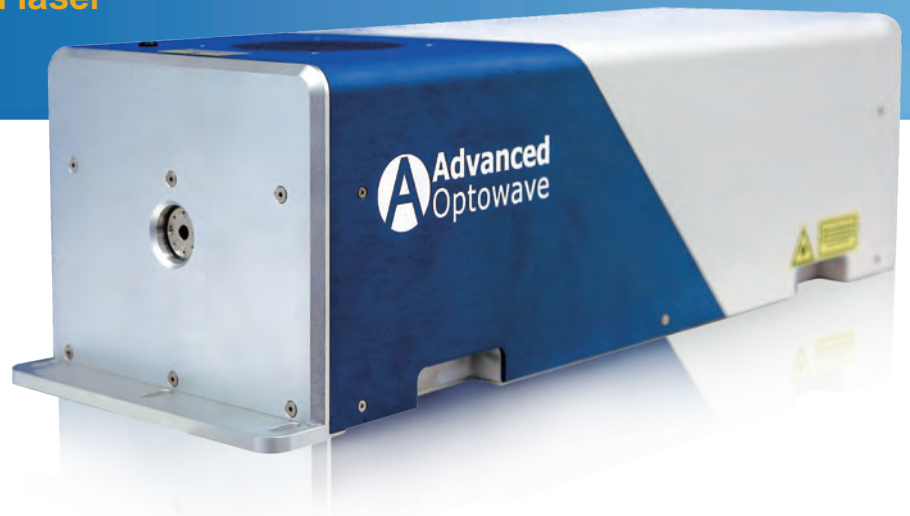
FORMULA SERIES

FORMULA -355 Laser Dimensions



FORMULA (i) SERIES

Industrial UV nanosecond laser



Features & Benefits:

FORMULA(i)-355, the intelligent upgrade of the FORMULA series, not only perfectly inherits the original excellent performance and stability, but also makes the operation smarter and more convenient.

Power auto-optimization enables the laser to use intelligent algorithms to achieve one-key intelligent optimization of laser power through intelligent adjustment of crystal temperature and laser intra-cavity light path.

The crystal intelligent indexing, by clicking the "Change point" button, the laser can change the crystal position and recover the output power.

Real-time power feedback, in the "Power (W)" interface of GUI software, the laser power can be automatically displayed.

Long-term power consistency (power change <2%), making it more widely applied to various industrial processing, and a perfect combination of high performance, high reliability, and low cost.



FPC/PCB cutting&drilling



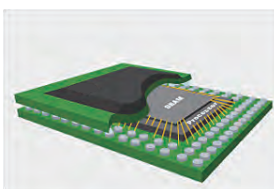
Fly marking



Carbon fiber cutting



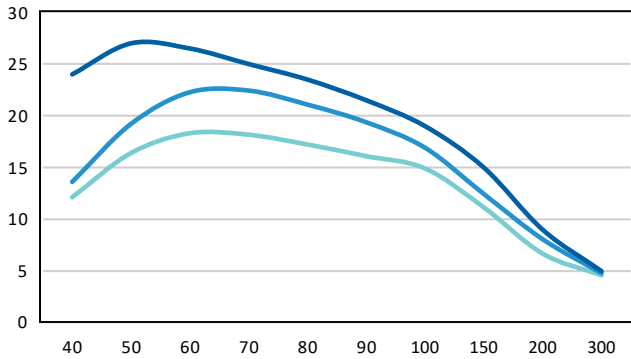
Mobilephone module/SIP cutting



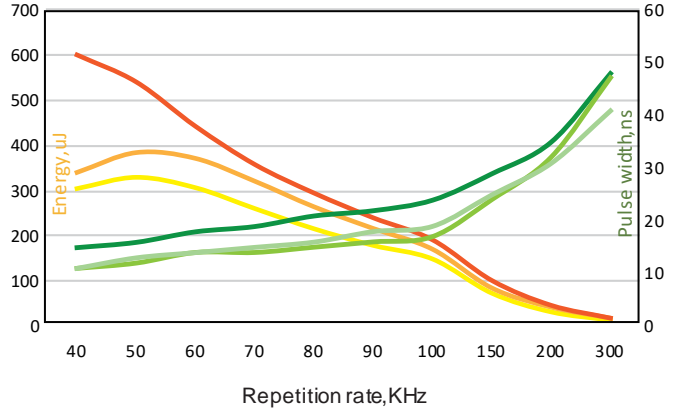
PI cutting



Typical Performance FORMULA(i)-355-15W/20W/25W
 Power vs Repetition Rate



Typical Performance FORMULA(i)-355-15W/20W/25W
 Energy and Pulse width vs Repetition Rate



FORMULA 355			
Specification	15W - 50K	20W - 60K	25W - 50K
Wavelength (nm)	355		
Average Power (Watts)	>15W@50KHz	>20W@60KHz	>25W@50KHz
Energy (μJ)	>300	>400	>500
Specified Repetition Rate(kHz)	50	60	50
Repetition Rate (kHz)	40-300		
Pulse Width (ns)	<15	<15	<20
Beam Quality (M ²)	<1.2		
Beam Roundness (%)	>90		
Beam Diameter (mm)	-0.55	-0.47	-0.55
Beam Divergence (mRad)	< 2		
Point Stability (μrad/°C)	< 20		
Polarization Ratio	100:1 Linear,Horizontal		
Pulse-to-Pulse Stability (% RMS)	< 3		
Average Power Stability(% over12 hours)	< 3		
Cold Start Warm-Up (mins.)	< 40		
Standby Warm-Up (mins.)	< 10		
Operational Temperature Range (°C)	5-40°C		
Operation Humidity Range (%)	20 to 80,non-condensing		
Storage Temperature Range (°C)	- 20 to 50		
Storage Humidity Range (%)	20 to 80,non-condensing		
Input Voltage (VDC)/Rated Power(W)	24/450	24/600	
Communication	RS232		
Cooling	Water		
Weight (kg)	20		

FORMULA(i) SERIES

FORMULA(i) Laser Dimensions

