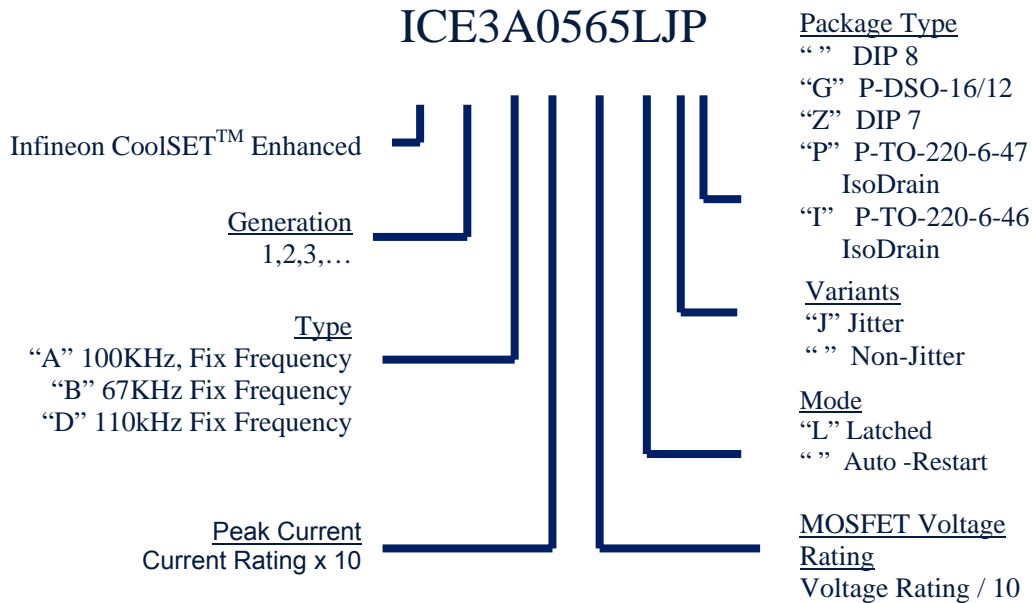




# CoolSET™ Selection Guide

## CoolSET F3 Nomenclature








## CoolSET™ F3

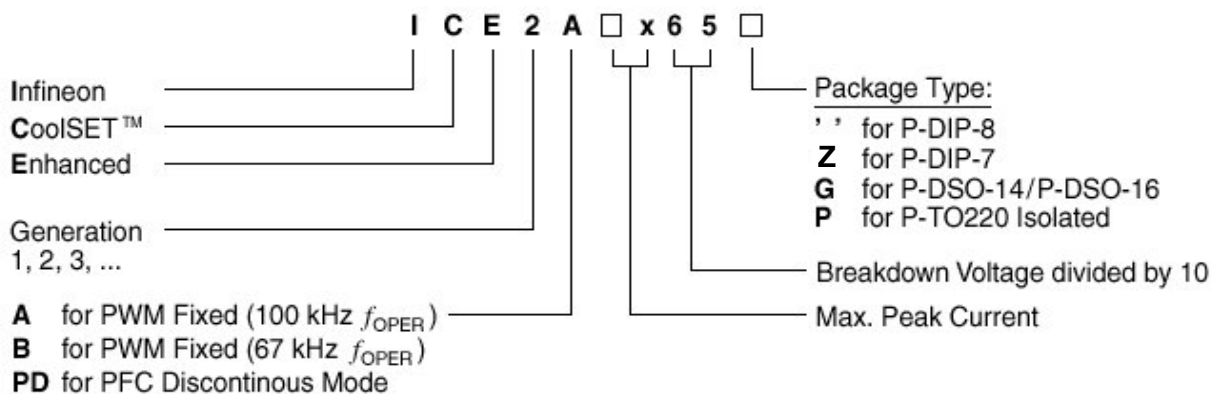
Third generation offline SMPS current mode controller with integrated CoolMOS™ power transistor.

### Function description and features of CoolSET™ F3

- 650V avalanche rugged CoolMOS™ with built in switchable Startup Cell
- Active Burst Mode for lowest Standby Power @ light load
- Fast load jump response in Active Burst Mode
- 67/100 kHz fixed switching frequency
- Auto Restart Mode for Overtemperature Detection, Overvoltage Detection, Overload and Open Loop, and VCC Undervoltage
- Blanking Window for short duration high current
- User defined Soft Start
- Minimum of external components required
- Max Duty Cycle 72%
- Overall tolerance of Current Limiting <math>< \pm 5\%</math>
- Internal Leading Edge Blanking
- Soft switching for low EMI
- Isolated drain package for TO220/I2PAK
- Increased creepage distance for TO220/I2PAK
- Wide power class selection of products for various applications

$V_{DS}$ [V]	$f_{oper}$ [kHz]	Type	$R_{ds\_on}$ [ $\Omega$ ]	$P_{out(max)}$ [W] Narrow Range	$P_{out(max)}$ [W] Wide Range	Package	Application		
650	100	ICE3A0365	6.45	22	10	 P-DIP-8-6	Adapter/Charger, Aux. Supply		
		ICE3A0565	4.70	25	12				
		ICE3A1065	2.95	32	16				
		ICE3A1565	1.70	42	20				
		ICE3A2065	0.92	57	28				
		ICE3A2565	0.65	68	33				
	67	67	ICE3B0365	6.45	22		10		
			ICE3B0565	4.70	25		12		
			ICE3B1065	2.95	32		16		
			ICE3B1565	1.70	42		20		
			ICE3B2065	0.92	57		28		
			ICE3B2565	0.65	68		33		
650	100	ICE3A3065P	3.00	125	60	 P-TO-220-6-47	Adaptors for LCD TV, LCD Monitor, Notebooks		
		ICE3A4065P	2.10	150	72				
		ICE3A4565P	1.55	170	83				
		ICE3A6065P	0.95	220	105				
		ICE3A6565P	0.79	240	120				
		ICE3A3065I	3.00	125	60			 P-TO-220-6-46	
		ICE3A4065I	2.10	150	72				
		ICE3A4565I	1.55	170	83				
		ICE3A6065I	0.95	220	105				
		ICE3A6565I	0.79	240	120				
	67	67	ICE3B3065P	3.00	125	60		 P-TO-220-6-47	
			ICE3B4065P	2.10	150	72			
			ICE3B4565P	1.55	170	83			
			ICE3B6065P	0.95	220	105			
			ICE3B6565P	0.79	240	120			
			ICE3B3065I	3.00	125	60			 P-TO-220-6-46
			ICE3B4065I	2.10	150	72			
			ICE3B4565I	1.55	170	83			
			ICE3B6065I	0.95	220	105			
			ICE3B6565I	0.79	240	120			

## CoolSET - New Type Numbering System



Example 1: **ICE2B165**

2. Generation, 67 kHz Operation Frequency, 1 A Peak Current, 650 V Breakdown Voltage, P-DIP-8 Package

Example 2: **ICE2A0565 Z**

2. Generation, 100 kHz Operation Frequency, 0.5 A Peak Current, 650 V Breakdown Voltage, P-DIP-7 Package

## CoolSET™ F2

Second generation off-line SMPS current mode controller with integrated CoolMOS power transistor as well as enhanced Protection Features and Lowest Standby

### Functional Description / Features for all ICE2Axxx and ICE2Bxxx devices

- Lowest on-resistance for record efficiency levels
- 650V or 800V avalanche rugged CoolMOS Power MOSFET is integrated optionally
- Lowest standby power consumption <300mW @ no load condition to comply with international standby requirements
- Enhanced Integrated Protection Features for minimum external components
- Overload and Open Loop Protection
- Overvoltage Protection during Auto Restart
- Input Undervoltage Lockout
- Thermal Shut Down with Auto Restart
- User defined Soft Start
- Adjustable Peak Current Limitation via External Resistor
- Overall Tolerance of Current Limiting  $\leq \pm 5\%$
- Internal Leading Edge Blanking
- Soft Switching / Improved Modulated Gate Drive for Lower EMI
- 67kHz or 100kHz Switching Frequency
- Max Duty Cycle 72%
- Input Voltages AC 85V...270V

## P-DIP-8-6, A-type controller

f <sub>OPER</sub> [kHz]	V <sub>in</sub> [V <sub>AC</sub> ]	V <sub>DS</sub> [V]	Type	R <sub>DS(on)</sub>	P <sub>OUT(max.)</sub> <sup>1)</sup>	Application
100	85-270	650	ICE2A0565	6.0	15	Adapter/Charger, Aux. Supply
			ICE2A165	3.0	21	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A265	1.0	34	DVD, STB, Adapter/Charger, Aux. Supply
		800	ICE2A365	0.5	47	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A180	3.0	21	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A280	0.8	37	DVD, STB, Adapter/Charger, Aux. Supply
100	180-270	650	ICE2A0565	6.0	25	Adapter/Charger, Aux. Supply
			ICE2A165	3.0	39	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A265	1.0	53	DVD, STB, Adapter/Charger, Aux. Supply
		800	ICE2A365	0.5	60	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A180	3.0	39	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A280	0.8	55	DVD, STB, Adapter/Charger, Aux. Supply

## P-DIP-8-6, B-type controller

f <sub>OPER</sub> [kHz]	V <sub>in</sub> [V <sub>AC</sub> ]	V <sub>DS</sub> [V]	Type	R <sub>DS(on)</sub>	P <sub>OUT(max.)</sub> <sup>1)</sup>	Application
67	85-270	650	ICE2B165	3.0	21	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2B265	1.0	34	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2B365	0.5	47	DVD, STB, Adapter/Charger, Aux. Supply
67	180-270	650	ICE2B165	3.0	39	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2B265	1.0	53	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2B365	0.5	60	DVD, STB, Adapter/Charger, Aux. Supply

## P-DIP-7-1

f <sub>OPER</sub> [kHz]	V <sub>in</sub> [V <sub>AC</sub> ]	V <sub>DS</sub> [V]	Type	R <sub>DS(on)</sub>	P <sub>OUT(max.)</sub> <sup>1)</sup>	Application
100	85-270	650	ICE2A0565Z	6.0	13	Adapter/Charger, Aux. Supply
		800	ICE2A180Z	3.0	19	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A280Z	0.8	33	DVD, STB, Adapter/Charger, Aux. Supply
100	180-270	650	ICE2A0565Z	6.0	22	Adapter/Charger, Aux. Supply
		800	ICE2A180Z	3.0	35	DVD, STB, Adapter/Charger, Aux. Supply
			ICE2A280Z	0.8	50	DVD, STB, Adapter/Charger, Aux. Supply

<sup>1)</sup> R<sub>th</sub>=56k/W (~6cm<sup>2</sup> copper area), T<sub>a</sub>=50°C, T<sub>j</sub>=125°C

## P-TO220-6-3 Isolated

f <sub>OPER</sub> [kHz]	V <sub>in</sub> [V <sub>AC</sub> ]	V <sub>DS</sub> [V]	Type	R <sub>DS(on)</sub>	P <sub>OUT(max.)</sub> <sup>2)</sup>	Application
100	85-270	650	ICE2A765P	0.5	180	DVD, STB, NB, LCD- Monitor, Adapter/Charger, Aux. Supply
	180-270	650	ICE2A765P	0.5	280	DVD, STB, NB, LCD- Monitor, Adapter/Charger, Aux. Supply
67	85-270	650	ICE2B765P	0.5	180	DVD, STB, NB, LCD- Monitor, Adapter/Charger, Aux. Supply
	180-270	650	ICE2B765P	0.5	280	DVD, STB, NB, LCD- Monitor, Adapter/Charger, Aux. Supply

<sup>2)</sup> R<sub>th</sub>=2,7k/W, T<sub>a</sub>=50°C, T<sub>j</sub>=125°C

## CoolSET™ F1

Integrated pulse width modulation (PWM) Control IC + sense CoolMOS Power MOSFET in multi-chip technology

### Functional Description / Features for all TDA1683x

- Lowest on-resistance for record efficiency levels. Silicon instead of heatsink - elimination (or minimization) of heatsink to shrink board weight and size resulting from reduced heat dissipation
- 650V avalanche rugged Sense CoolMOS Power MOSFET is integrated
- Low Start Up Current
- Current mode control
- Input Undervoltage Lockout
- Max. Duty Cycle Limitation
- Thermal Shutdown
- 100kHz Switching Frequency
- Modulated Gate Drive for lower EMI
- Only 4 Active Pins
- Input Voltages AC 85V...270V

### P-DIP-8-6

f <sub>OPER</sub> [kHz]	V <sub>in</sub> [V <sub>AC</sub> ]	V <sub>DS</sub> [V]	Type	R <sub>DS(on)</sub>	P <sub>OUT(max.)</sub>	Application
100	85-270	650	TDA16831	3.5	10	Adapter/Charger, Aux. Supply
			TDA16832 <sup>3)</sup>	3.5	20	-
			TDA16833	1.0	30	DVD, STB, Adapter/Charger, Aux. Supply
			TDA16834 <sup>3)</sup>	0.5	40	-
100	180-270	650	TDA16831	3.5	10	DVD, STB, Adapter/Charger, Aux. Supply
			TDA16832 <sup>3)</sup>	3.5	20	-
			TDA16833	1.0	40	DVD, STB, Adapter/Charger, Aux. Supply
			TDA16834 <sup>3)</sup>	0.5	40	-

### P-DSO-14

f <sub>OPER</sub> [kHz]	V <sub>in</sub> [V <sub>AC</sub> ]	V <sub>DS</sub> [V]	Type	R <sub>DS(on)</sub>	P <sub>OUT(max.)</sub>	Application
100	85-270	650	TDA16831G	3.5	10	Adapter/Charger, Aux. Supply
			TDA16832G <sup>3)</sup>	3.5	20	-
			TDA16833G	1.0	20	DVD, STB, Adapter/Charger, Aux. Supply
100	180-270	650	TDA16831G	3.5	10	DVD, STB, Adapter/Charger, Aux. Supply
			TDA16832G <sup>3)</sup>	3.5	20	-
			TDA16833G	1.0	90	DVD, STB, Adapter/Charger, Aux. Supply

<sup>3)</sup> discontinued

## Functional Description / Features for TDA16822

Off-line SMPS current mode controller with integrated CoolMOS power transistor as well as enhanced Protection Features

- Lowest on-resistance for record efficiency levels. Silicon instead of heatsink - elimination (or minimization) of
- 650V avalanche rugged CoolMOS Power MOSFET is integrated
- Integrated Protection Features for minimum external components
- Input Undervoltage Lockout
- Overload and Open Loop Protection by hiccup mode
- Overvoltage Protection during hiccup mode
- Latched thermal shut down when  $T_j = 140^\circ\text{C}$  of PWM controller
- Current Overshoot Minimization dependent on  $di/dt$
- Adjustable Peak Current Limitation via external sense resistor
- Overall Tolerance of Current Limiting  $< \pm 5\%$
- Low Start Up Current
- Improved Current Mode Control for low load conditions
- Max duty cycle 72%
- 100kHz Switching Frequency
- Modulated Gate Drive for lower EMI
- Only 4 Active Pins
- Input Voltages AC 85V...270V

### P-DIP-8-6

$f_{\text{OPER}}$ [kHz]	$V_{\text{in}}$ [V <sub>AC</sub> ]	$V_{\text{DS}}$ [V]	Type	$R_{\text{DS(on)}}$	$P_{\text{OUT(max.)}}$ <sup>1)</sup>	Application
100	85-270	650	TDA16822	3.0	21	Adapter/Charger, Aux. Supply
	180-270	650	TDA16822	3.0	21	Adapter/Charger, Aux. Supply

<sup>1)</sup>  $R_{\text{th}}=56\text{k/W}$  (~6cm<sup>2</sup> copper area),  $T_a=50^\circ\text{C}$ ,  $T_j=125^\circ\text{C}$

## CoolSET™ P1

Integrated power factor correction (PFC) Control IC (Discontinuous Mode) + CoolMOS Power MOSFET in multi-chip technology. IC for sinusoidal line-current consumption.

## Functional Description / Features for ICE1PD265G

- Lowest on-resistance for record efficiency levels. Silicon instead of heatsink - elimination (or minimization) of heatsink to shrink board weight and size resulting from reduced heat dissipation
- 650V avalanche rugged CoolMOS Power MOSFET is integrated
- Unique Multiplier Characteristic for improved THD
- All Integrated Protection Features are with automatic re-start
- Open Loop Protection
- Overvoltage Protection
- Input Undervoltage Lockout
- Zero Current Detector for Discontinuous Operation
- Internal Start Up Timer
- Totem Pole Output with Active Shut Down
- Internal Leading Edge Blanking LEB
- Amplifier minimizes distortion interferences caused by MOSFET switching
- Soft Start
- Modulated Gate Drive for lower EMI
- Input Voltages AC 85V...270V

## P-DSO16-9

$f_{\text{OPER}}$ [kHz]	$V_{\text{in}}$ [V <sub>AC</sub> ]	$V_{\text{DS}}$ [V]	Type	$R_{\text{DS(on)}}$	$P_{\text{OUT(max.)}}$ <sup>4)</sup>	Application
resonant	85-270	650	ICE1PD265G	1.1	45	Lamp Ballast, PFC correction
	180-270	650	ICE1PD265G	1.1	100	Lamp Ballast, PFC correction

<sup>4)</sup>  $R_{\text{th}} \sim 1\text{cm}^2$  copper area,  $T_{\text{a}}=50^\circ\text{C}$ ,  $T_{\text{j}}=125^\circ\text{C}$

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