



A53 fx A B C D E F G H I J K L M N O P Q R S

Switching Speed Calculation for the DS2715 Switch-Mode Battery Charger

3 See Tab 2 for speed results = User or device specific parameter required

4 See Tab 3 for reference schematic = Recommended value, may adjust as necessary

5 = Calculated value

Parameter	Value	Notes
Vin	12	Charge source voltage
Vdiode	0.35	Charge source protection diode drop
Qsw drop	0.133	Vds(on) or Vce(sat) for the switching transistor at the Icharge operating point
Qcc drop	0	Not applicable to the DS2715
Rparasitic	0.2	Other significant parasitic resistances in the Icharge path such as battery holders, connectors, fuses, etc.
Vcatch	0.35	Catch diode voltage drop
Rsense	0.1	Icharge sense resistor
L	4.70E-05	Switch-mode inductor
Battery Cells	3	Number of cells in charge circuit
Vbatt min	3	Minimum battery voltage for cell stack (1.0V per cell is minimum for fast-charge)
Vbatt nom	4.35	Nominal battery voltage for cell stack (1.45V per cell is normal for bulk of fast-charge)
Vbatt max	4.95	Maximum battery voltage for cell stack (1.65V per cell is maximum for fast-charge)
Vbatt precharge	3	Nominal battery voltage for cell stack during precharge (1.0V per cell is maximum)
Vbatt toff	4.65	Nominal battery voltage for cell stack during toff (1.55V per cell is a nominal value for bulk of toff)
Vfc	0.121	Fast-charge voltage reference for sense resistor; see device data sheet; DS2715 = 121mV is default
Vhys-fc	0.028	Hysteresis for fast-charge voltage reference; see device data sheet; DS2715 = 28mV is default
Vto	0.033	Topoff voltage reference across sense resistor; see device data sheet, or use 0.25 * Vfc if not specified; DS2715 = 33mV is default
Vhys-to	0.008	Hysteresis for toff voltage reference across sense resistor; see device data sheet, or use .25 * Vhys-fc if not specified; DS2715 = 8mV is default
Vhys-fc/2	0.014	Half of the fast-charge hysteresis value
Vhys-to/2	0.004	Half of the toff hysteresis value
Vsense-fc	0.107	DC voltage regulated across sense resistor in fast-charge is the voltage reference minus half of the hysteresis
Vsense-to	0.029	DC voltage regulated across sense resistor in toff is the voltage reference minus half of the hysteresis
tpdly	2.00E-07	Internal Vsense comparator time delay; 200ns is a typical value
tsw on	2.00E-07	Switching transistor turn-on time delay from control signal request (if applicable; more likely necessary in bipolar circuits; often much less than tsw_off)
tsw off	2.00E-07	Switching transistor turn-off time delay from control signal request (if applicable; more likely necessary in bipolar circuits where 2us or more is possible)