USB VBUS I$_{SOURCE}$ Load Switch with Current Limit Control

Features

- 2.5V to 5.5V Supply Voltage Range at IN
- 29V Abs. Max. Rating at OUT
  - ±80V Surge Protection (IEC61000-4-5)
  - ±8kV ESD Contact Discharge (IEC61000-4-2)
  - ±15kV ESD Air Gap Discharge (IEC61000-4-2)
- 30mΩ typ. On-Resistance from IN to OUT
- Adjustable Current Limit Protection (CLP)
  - 400mA to 3.7A via R$_{ISET}$
- Over-Current Protection (OCP)
- Short-Circuit Protection (SCP)
- "Ideal Diode" Reverse Current Protection (RCP)
- Over Temperature Protection (OTP)
- Soft-Start (SS) Limits Inrush Current
- Fast Turn ON supports USB Fast Role Swap (FRS)
  - Open-Drain $\overline{FLT}$ Flag
- Safety approvals
  - UL 2367, file no. E515099
- -40°C to 85°C Operating Temperature Range
- 16-bump WLCSP 1.98 x 1.98mm (0.5mm pitch)
- Pin-to-Pin with NX5P3290A & NX5P3363

Applications

- Notebooks, Ultra-Books, Desktop PCs
- Smartphones, Tablets, Gaming Consoles
- Set-Top Box, Networking, any USB I$_{SOURCE}$ Port
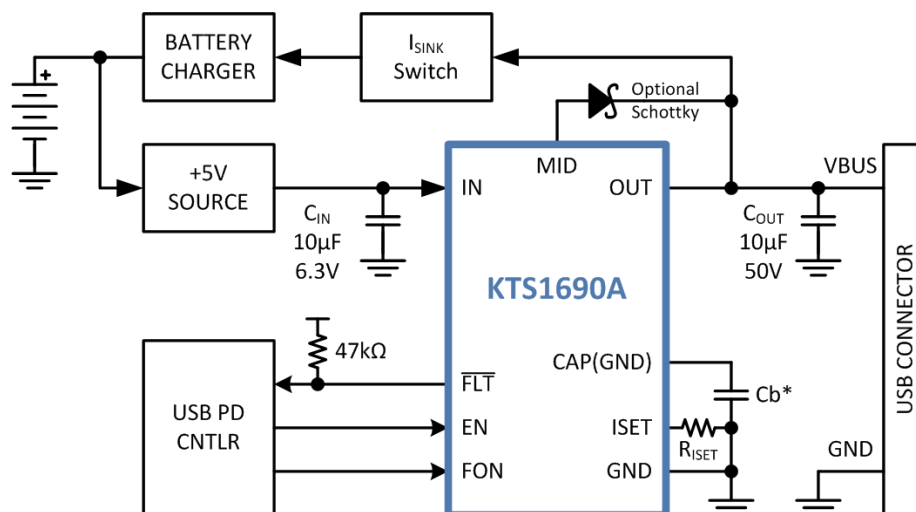
Brief Description

The KTS1690A is a low-resistance load switch with adjustable current limit, soft-start, fast turn ON mode, "ideal diode" reverse current protection, and integrated TVS. It is optimized to protect systems with USB type-C ports that source up to 15W at 5V and must withstand up to 29V on VBUS (OUT pin).

The KTS1690A uses an external resistor to set the current limit from 400mA to 3.7A.

Soft-start limits inrush current, while the FON logic input enables fast turn ON mode for USB fast role swap (FRS). Automatic "ideal diode" reverse current protection (RCP) isolates the system's 5V internal rail whenever VBUS (OUT pin) is driven to a higher voltage, as when charging. The integrated TVS provides IEC Standards ±8kV ESD contact, ±15kV ESD air gap, and ±80V surge ratings for robust system protection. A $\overline{FLT\backslash}$ flag indicates an over-current or over-temperature fault condition.

The KTS1690A is available in advanced, fully "green" compliant, 1.98 x 1.98mm, 16-bump Wafer-Level Chip-Scale Package (WLCSP).

Typical Application
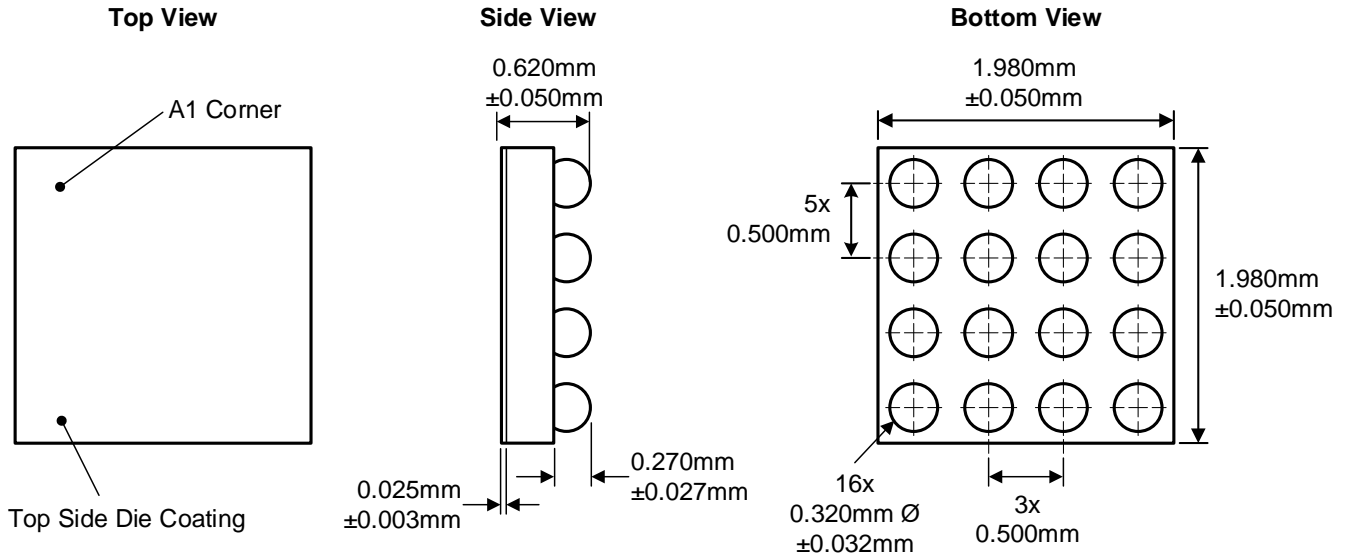

Cb* = optional 1nF, open, or short to GND

Ordering Information

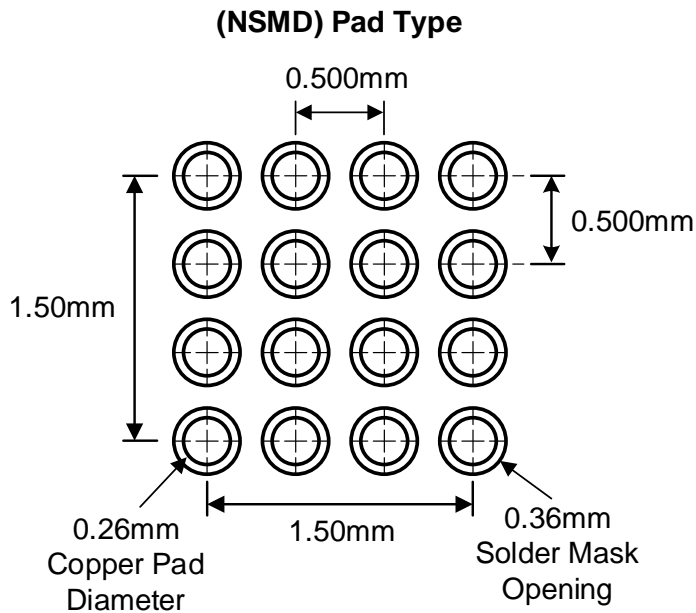| Part Number	Marking[1]	Operating Temperature	Package
KTS1690AEGAA-TA	NIXXYYZZZZ	-40°C to +85°C	WLCSP44-16

1. WW = Device ID, XX = Date Code, YY = Assembly Code and ZZZZ = Serial Number.

Packaging Information

WLCSP44-16 (1.980mm x 1.980mm x 0.620mm)

Top View

A1 Corner

Top Side Die Coating

Side View

0.620mm
±0.050mm

0.025mm
±0.003mm

0.270mm
±0.027mm

Bottom View

1.980mm
±0.050mm

5x
0.500mm

1.980mm
±0.050mm

16x
0.320mm Ø
±0.032mm

3x
0.500mm

Recommended Footprint

(NSMD) Pad Type

0.500mm

0.500mm

1.50mm

0.26mm
Copper Pad
Diameter

1.50mm

0.36mm
Solder Mask
Opening