



UNISONIC TECHNOLOGIES CO., LTD.

UTC Product Introduction

Integrated Device Manufacturer



Power & Analog **Integrated Circuit**
High-quality **Semiconductor Device**



Site	Capacity
Taiwan x 2 China x 6	1. Circuit design 2. Pattern layout 3. Process development
(XiaMen) Jaysun Semiconductor Manufacturing	6" CMOS/BiCMOS/DMOS 50k / month
(FuZhou) Fushun, Heshun Microelectronics	8",6" CMOS/Bipolar/BiCMOS 100k / month
(FuZhou) Fushun Semiconductor Manufacturing	Assembly / Final test 300M / month
Taiwan, China, Korea, Japan, Germany, Turkey, USA	

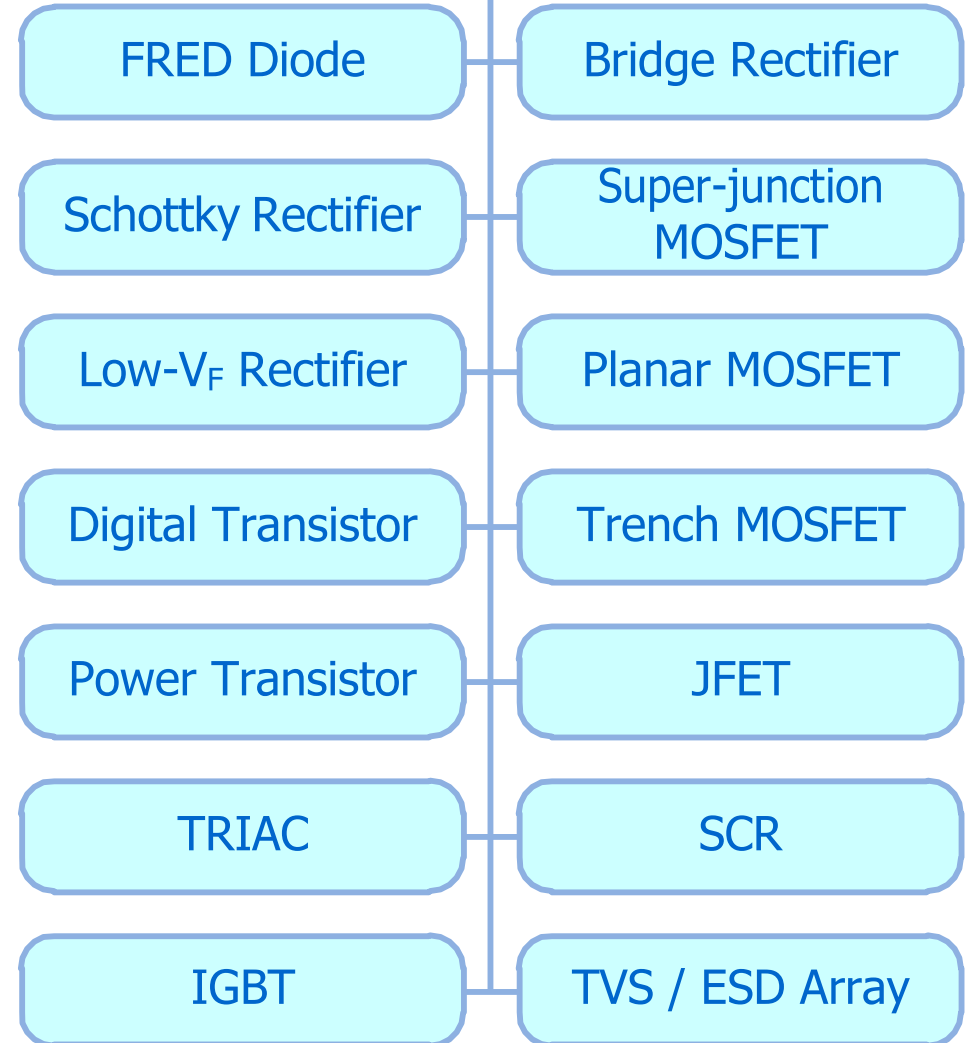


Product Tree

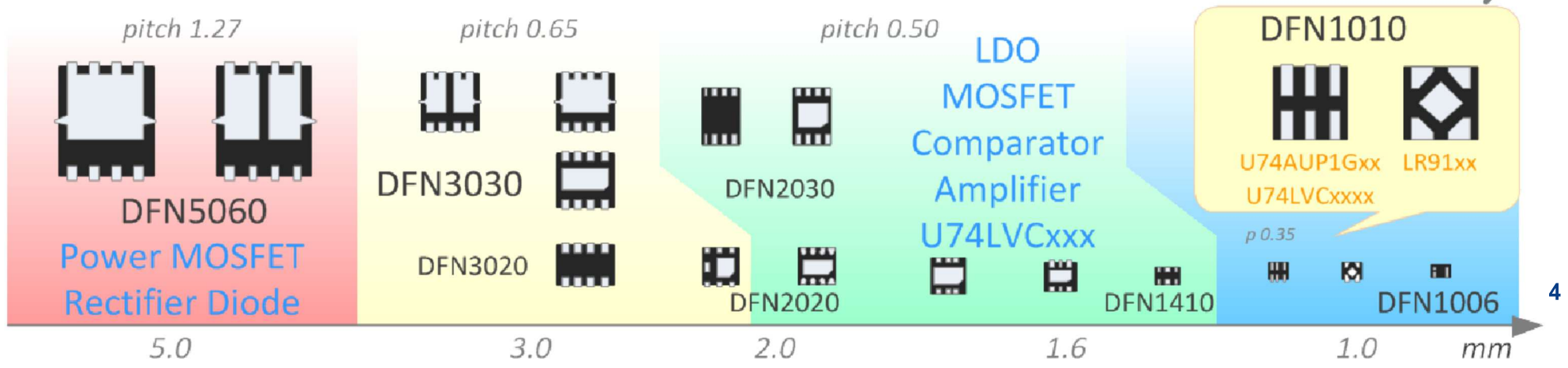
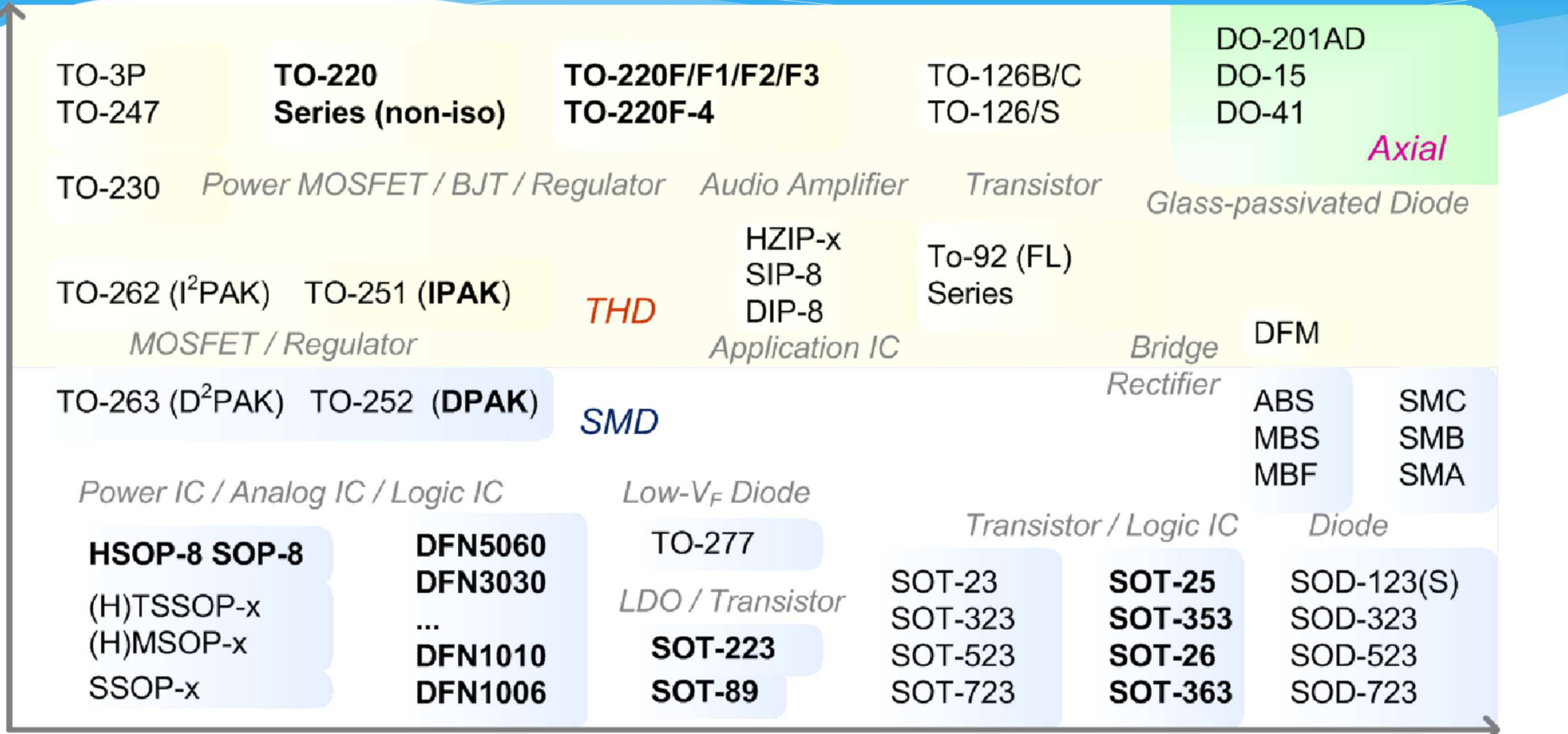
IC (Integrated Circuit)



Discrete Component



Package Portfolio



Lighting Solution IC

- Lighting solution IC
 - AC-DC isolated PSR solution
 - AC-DC non-isolated solution (buck topology)
 - AC-DC linear solution
 - DC-DC lighting solution
- 2nd-side control IC
 - Photo-coupler UPC816 / UPC817
 - Shunt-voltage reference TL431 series
 - CC/CV control IC: TL431 + amplifiers
- Discrete Component
 - MOSFET
 - Diode
 - Thyristor (SCR/TRIAC)

UTC Lighting Solution

Topology	Application	Part Number	Feature
AC-DC Isolated PSR	60W Lighting	UPSL101 UCL5811	High PF, high Efficiency
AC-DC Non-isolated Buck	10~30W Indoor Lighting	UPSL304 USL3533 UL98, UL82 UL51 UL52	High-PF, Ind. ballast comp. Wide-range buck with built-in MOSFET
AC-DC Linear Solution	<25W Indoor Lighting	UL66 UL68 UL67 UL69 UL23	High-PF, bulk-cap-free Single string CC output Dimmer compatible Switching-controlled
DC Boost	20~70W DC Lighting Flashlight	L5107 ULC6001 L5030	6V~45V driving Battery-driven lighting
DC Buck	Flashlight	L3010 L3012	MOSFET built-in
Ripple Removing	Illumination	ULD5131	Adapt. 100/120Hz removing
Display Driver	Sign Board	UL316	LED control with keyscan

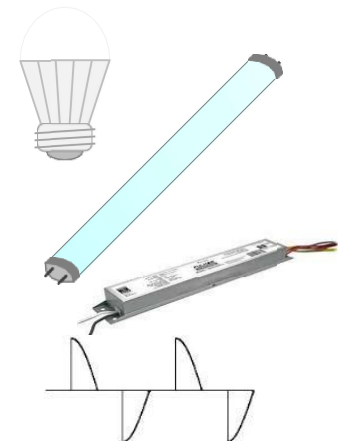
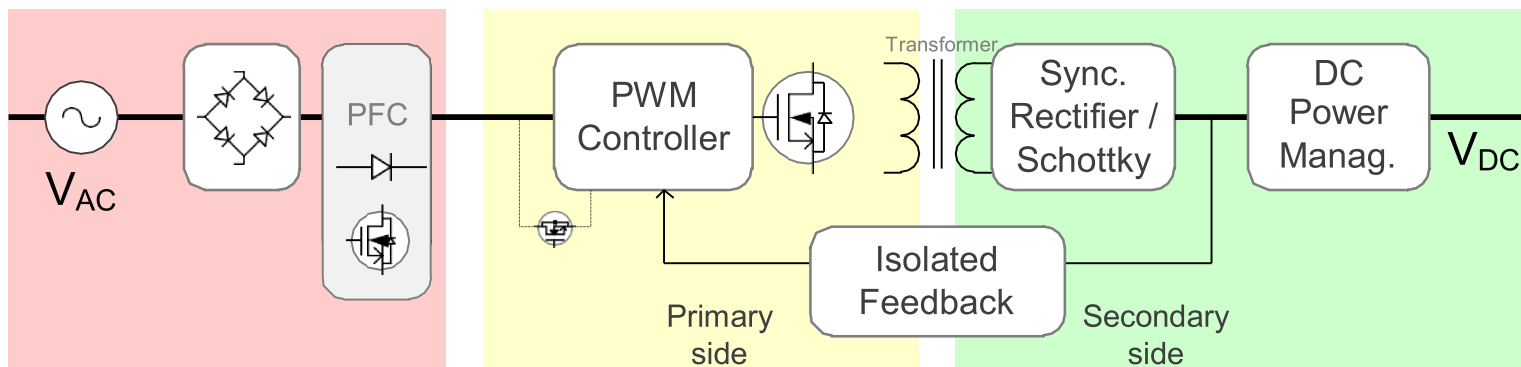
AC-DC Isolated Solution

Solution IC

Fly-back PWM Controller IC	— Low-cost PSR — MOSFET Built-in
Non-isolated Buck	Low-cost AC-DC
Volt. Reference	TL431
Photo-coupler	UPC817 UPC816
DC Power manage.	LDO, DC converter
Supporting IC	USB port, DDR, reset IC

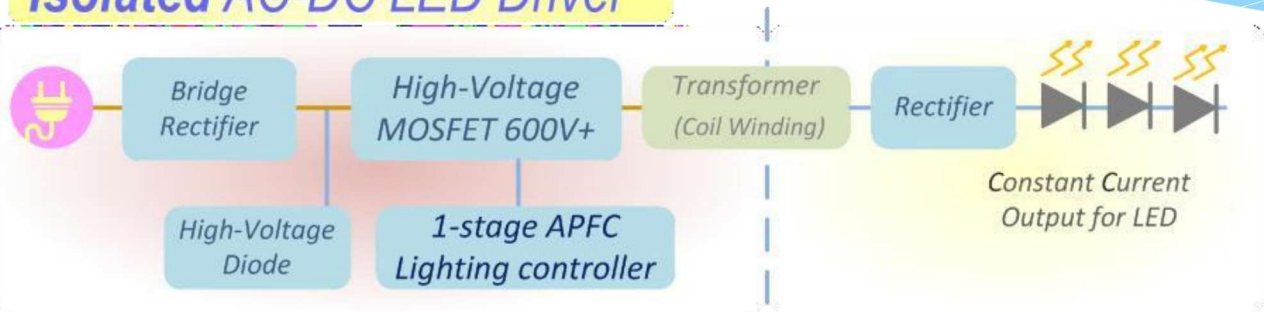
Discrete Component

TVS	P6KE/SMDJ... (up to 3kW)
High-V diode	FRED 600V~1200V Bridge rectifier
Enhance / Depl. MOSFET	Super-Junc. 500V (for PFC) 600V~1000V (for AC-DC)
Rectifier diode	MBR/MGBR/TGBR 40~200V, 300V
Sync. MOSFET	60V~100V <20mΩ



AC-DC Isolated Solution

Isolated AC-DC LED Driver

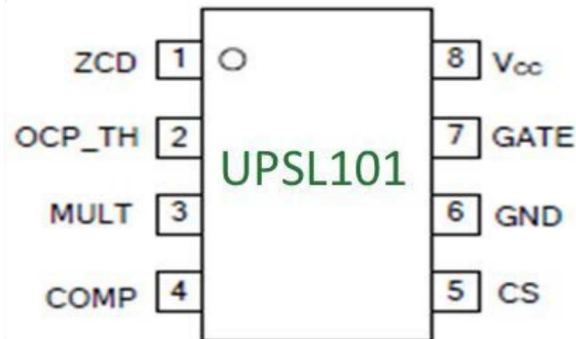


UPSL101

Isolated PSR fly-back

Single stage active PFC up to 50W

Input OVP, UVLO, load SCP, OCP, OTP, auto-recovery

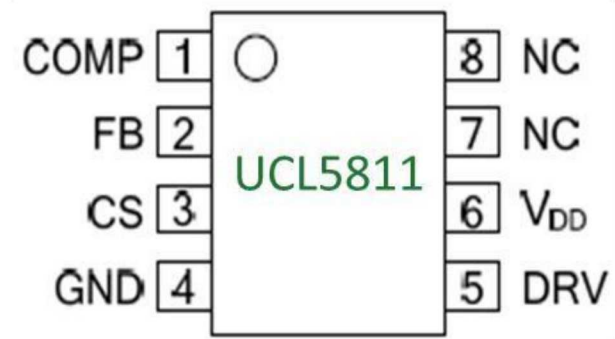


UCL5811

Isolated PSR fly-back

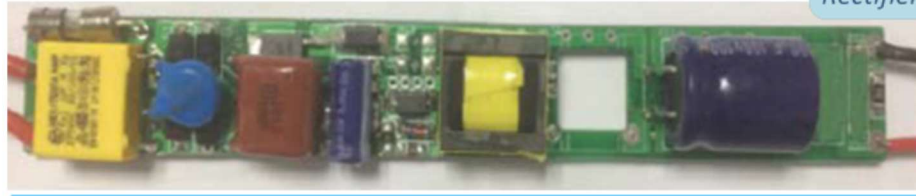
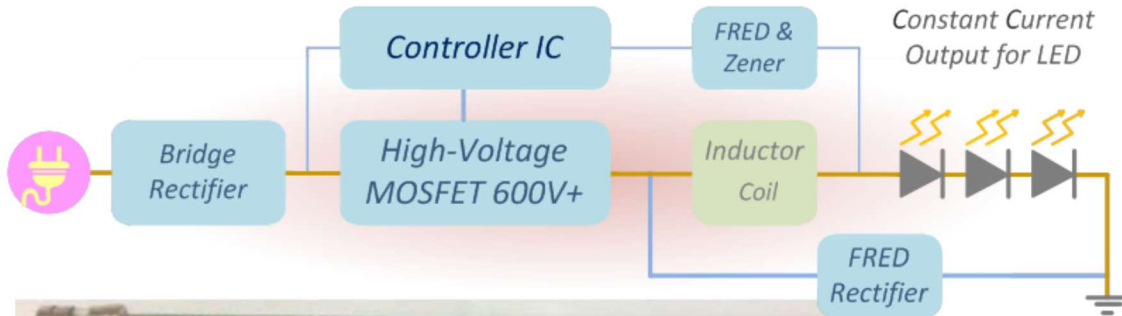
High PF with QR (quasi-resonant) mode

Input OVP, UVLO, load SCP, OCP, OTP, auto-recovery



AC-DC Non-isolated Solution

Non-isolated AC-DC LED Driver

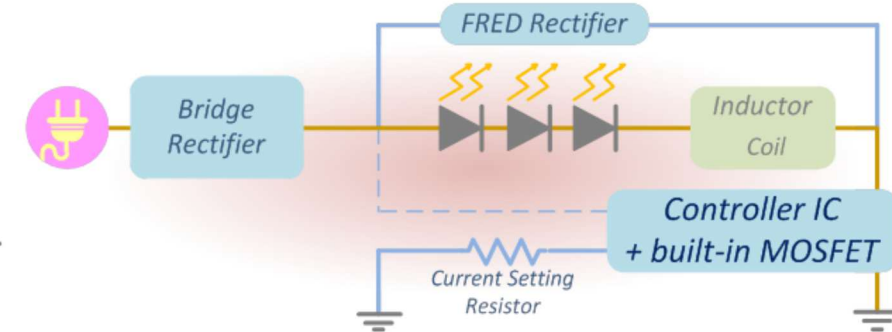
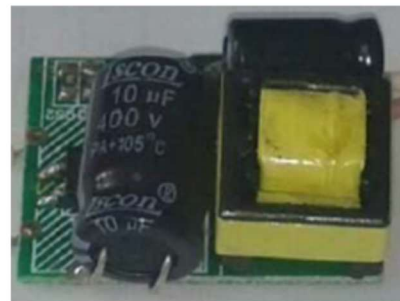
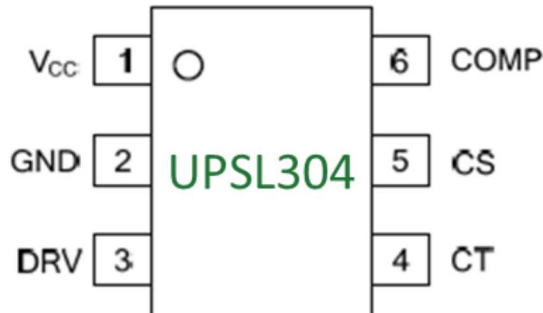


UPSL304

Buck LED driver with PFC control

Input OVP, UVLO, load O/S, OLP, recovery

Inductance ballast compatible

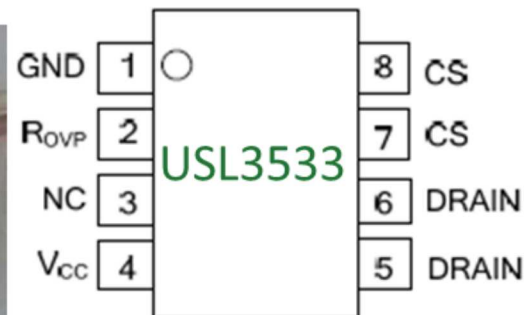
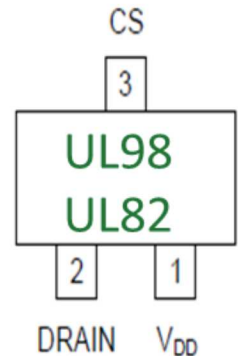


USL3533 / UL98 / UL82

Low BoM-count with built-in MOSFET

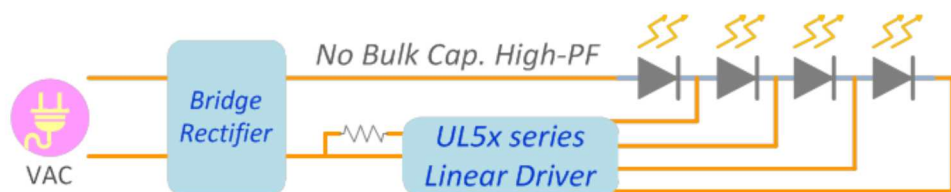
Critical-conduction mode

Wide input range



AC-DC Linear Solution

Linear AC-DC LED Driver



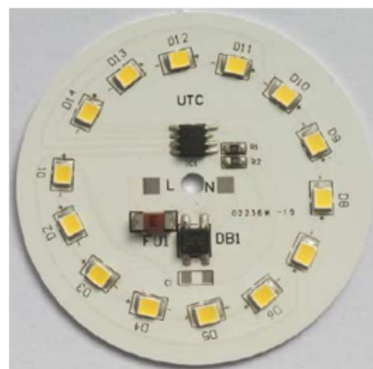
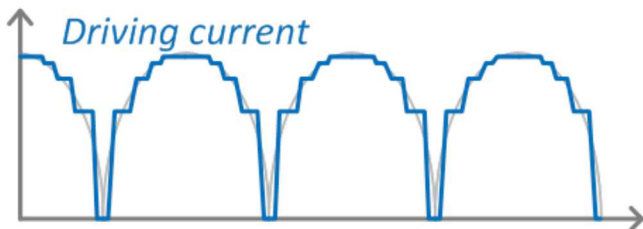
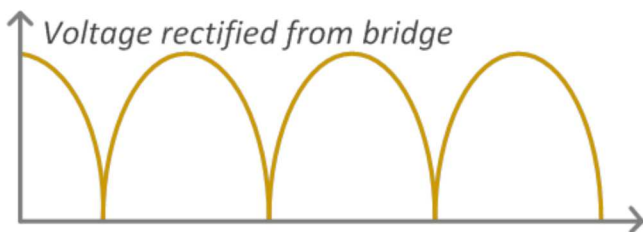
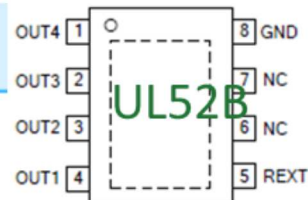
UL51x: 100 V_{AC}

UL52x: 230 V_{AC}

No-need for transformer and electrolytic cap.

Integrated current switch and start-up circuit

High PF, low EMI



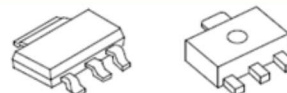
UL66x, UL68x:

Single-string linear driver

Extremely low BoM count

Constant current driving

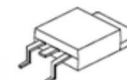
Temperature compensation



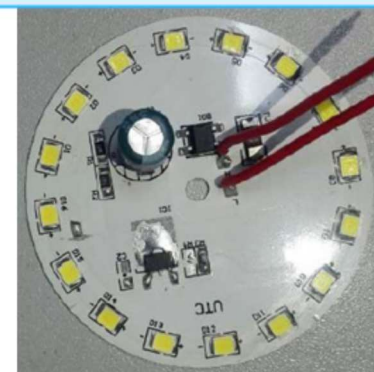
UL68D

SOT-223

SOT-89



TO-252



AC-DC Linear Solution



UL67x, UL69x: (Single-string linear driver)

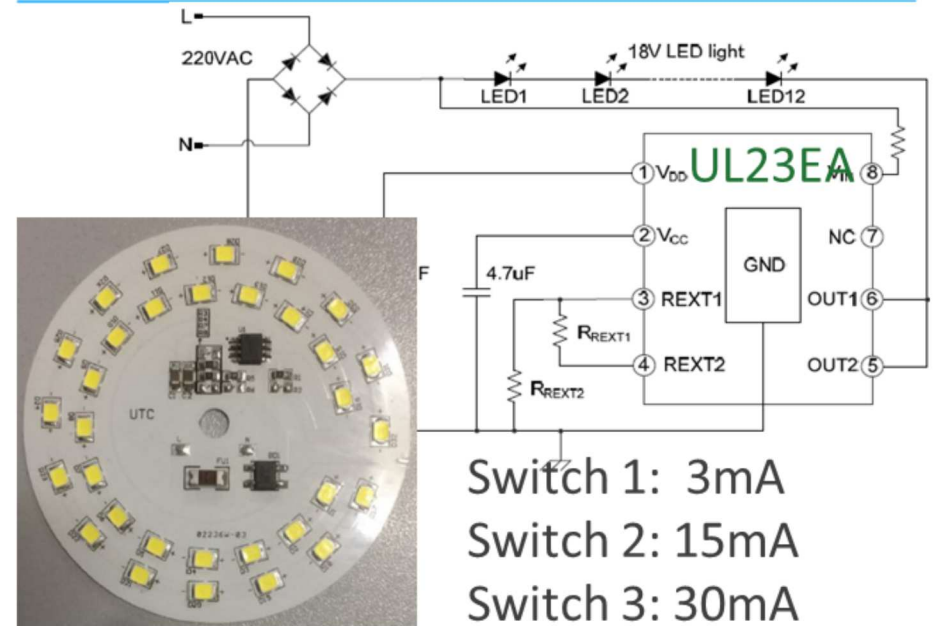
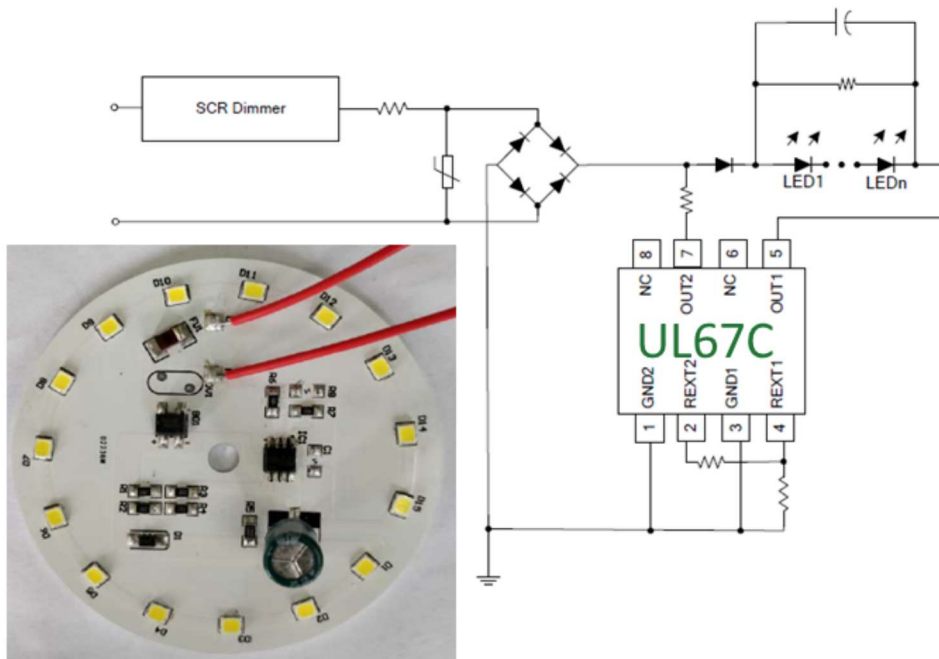
Dimmer compatible

Parallel configuration available (UL69x)

UL23EA, UL23EB: (Single-string linear)

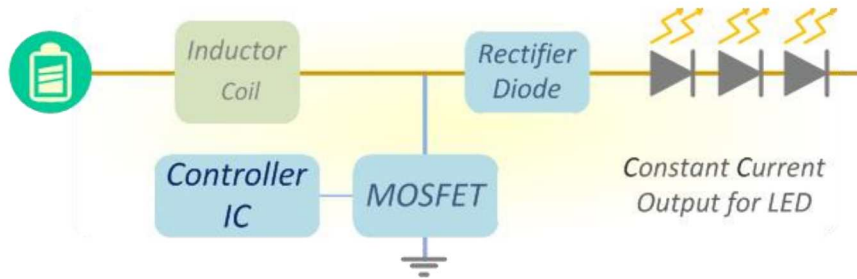
Switch-controlled brightness

Design options of high-PF or non-stroboscopic



DC-DC Lighting Solution

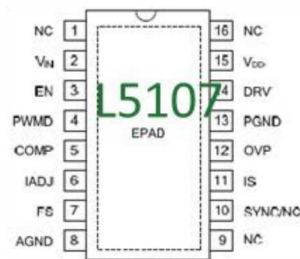
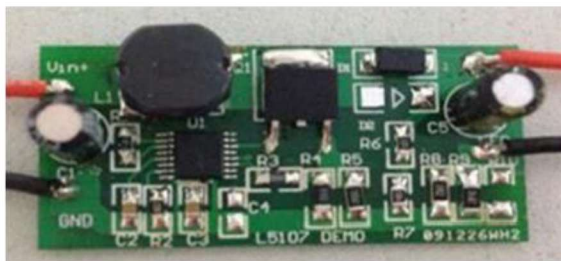
DC-DC Boost / Step-up



L5107

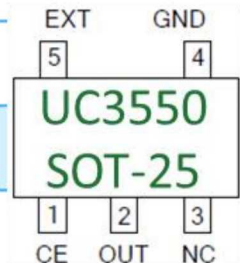
Boost controller of 6V~45V 70W

MR16, low-voltage industrial / emergency / indicator lighting

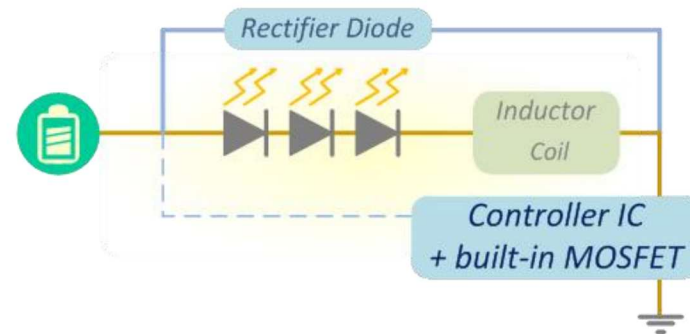


UC3550 / L5030

Battery-powered flashlight



DC-DC Buck / Step-down

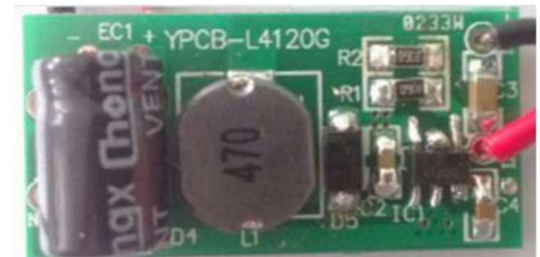
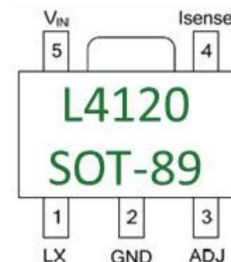


L3010 L3012 L4120

Buck converter of 18W (L3012 36V 1A)

Buck converter of 12W (L4120 40V 1.2A)

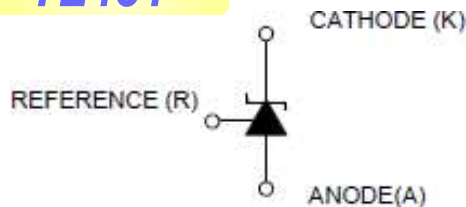
MR16, low-voltage lighting, flashlight



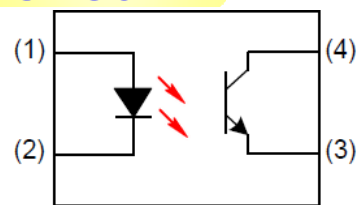
2nd-side Component for High Power Lighting

- * Photo-coupler (UPC816/UPC817)
- * Shunt Voltage Reference (TL431 series 0.8/1.25/2.495/2.5V)
- * CC/CV circuit ($V_{REF} + \text{op amp}$)

TL431



UPC817



CC / CV Control IC

Ref. Voltage	Part Number
0.8 V	TL432D
1.233~1.25 V	TL432, TL432C, LM4041, M385
2.495~2.5 V	TL431, LL431, TL431L

Part No.	Configuration	V_{REF}
UM601A UM609	Vref x 1 OP x 2	1.24 V 2.5 V
UM602/A UM603/A	Vref x 1 OP x 2 Comp x 2	2.5V
UM604A	Vref x 1 OP x 4	2.5 V
UM605A/B UM606/D UM607B/D	Vref x 1 OP x 2	2.5 / 1.25 1.21 / 1.24
UM608	Vref x 1 OP x 2 for CC/CV Comp x 2 for Charge Status	2.5 V

TL431: high precision **0.5%**

LL431, ULVH431: **low** $I_{K(MIN)}$ ($< 100\mu A$)

Various options of packages and pin-assignment

Discrete Component

➤ **Transistor**

➤ **MOSFET**

- Trench MOSFET (~200V)
- Planar MOSFET (~1200V)
- Super-junction MOSFET (500~950V, 0.2~75A)

➤ IGBT (600V/1200V)

➤ JFET

➤ Bipolar junction transistor

➤ Darlington transistor

➤ Digital transistor

➤ **Diode**

➤ FRED (~1200V, ~80A)

➤ Schottky diode (~200V, ~40A)

➤ MGBR/TGBR (Low- V_F , ~300V, ~60A)

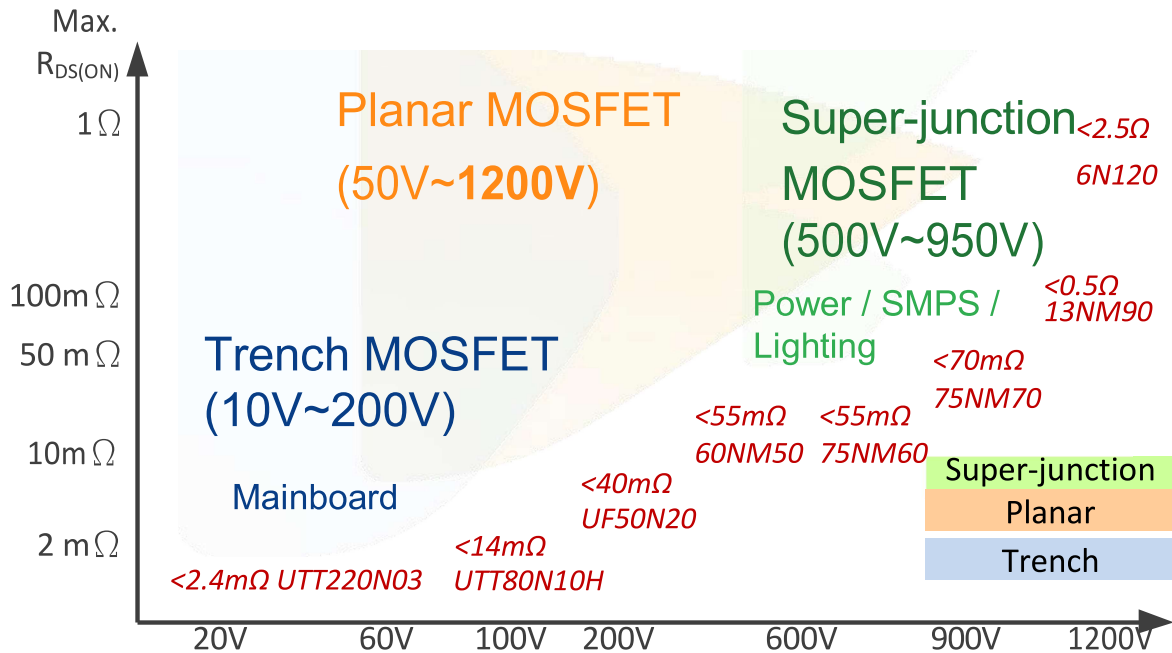
➤ TVS diode / array

➤ **Thyristor**

➤ SCR (200~800V, ~20A)

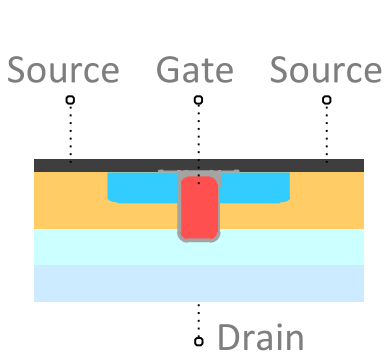
➤ TRIAC (400~800V, ~40A)

UTC Power MOSFET

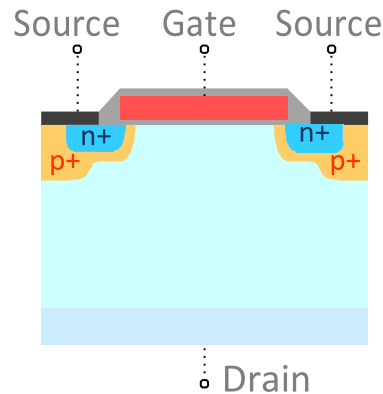


Application

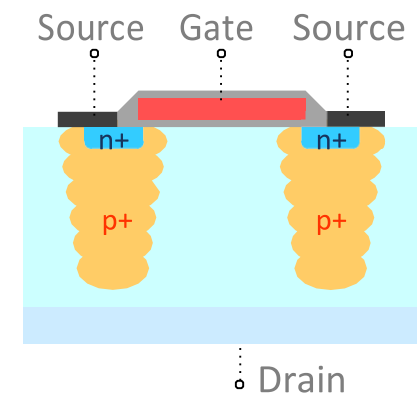
- Low-voltage Trench MOSFET
 - Mainboard application
- 100~400V Planar MOSFET
 - Motor / Industrial application
- High-voltage Super-junction / Planar MOSFET
 - AC-DC power / lighting
 - Up to **1200V**
 - Low $R_{DS(ON)} < 55m\Omega$ (75A) at 600V



Trench MOSFET
(Low R_{ch})

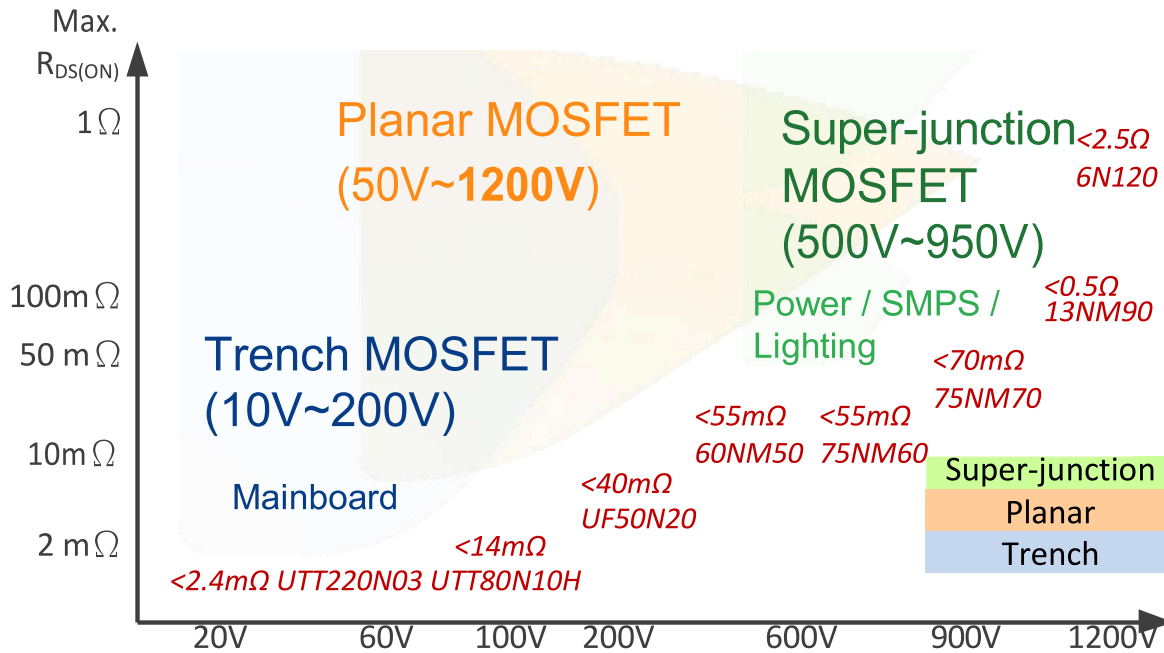


Planar MOSFET
(up to 1000V, high EAS)



Super-junction MOSFET
(Low R_{epi})

UTC Planar MOSFET



Planar Power MOSFET

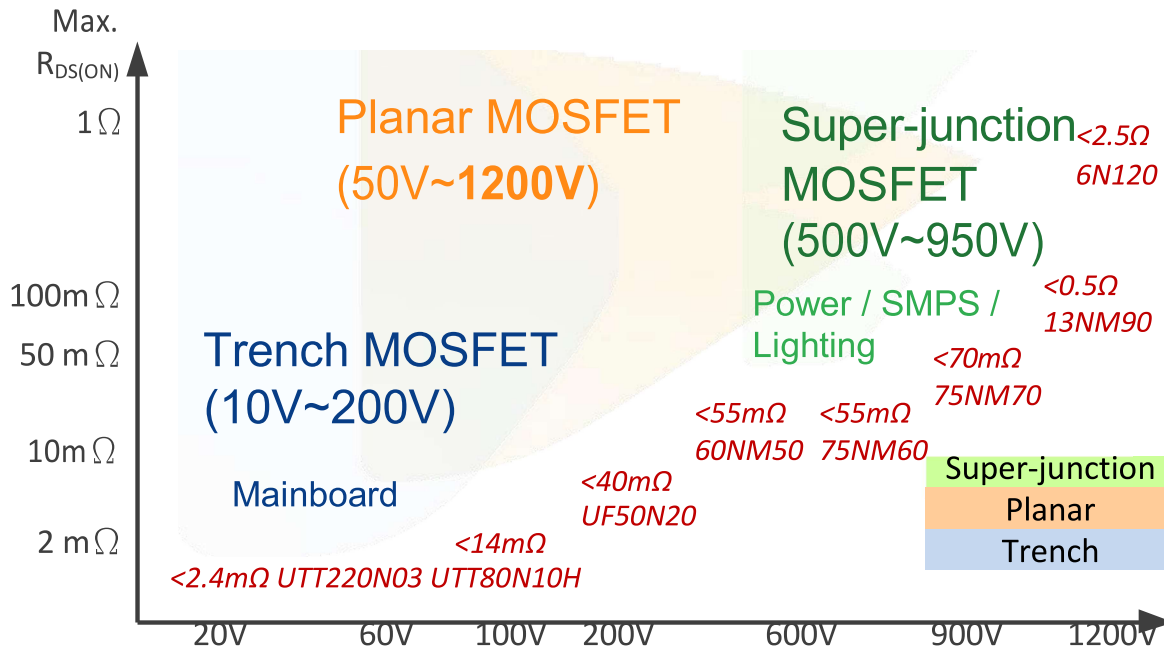
V_{DSS} : up to 1200 V I_D : up to 110 A

Part No.	Type	V_{DSS}	$I_D (=X)$
UF5305	P-ch	-55V	-31A
UF5210	P-ch	-100V	-40A
UF9640	P-ch	-200V	-11A
7P30	P-ch	-300V	-6A
4P50	P-ch	-500V	-4A
UF3205	N-ch	55V	110A
UF8010	N-ch	100V	80A
UF50N20	N-ch	200V	50A
12N30	N-ch	300V	12A
XN40	N-ch	400V	up to 25A
XN50	N-ch	500V	up to 26A
XN60	N-ch	600V	up to 22A
XN70	N-ch	700V	up to 25A
XN80	N-ch	800V	up to 12A
XN90	N-ch	900V	up to 12A
XN100	N-ch	1000V	up to 9A
XN100	N-ch	1200V	up to 6A

Broad Product Coverage, Wide Application



Super-junction MOSFET

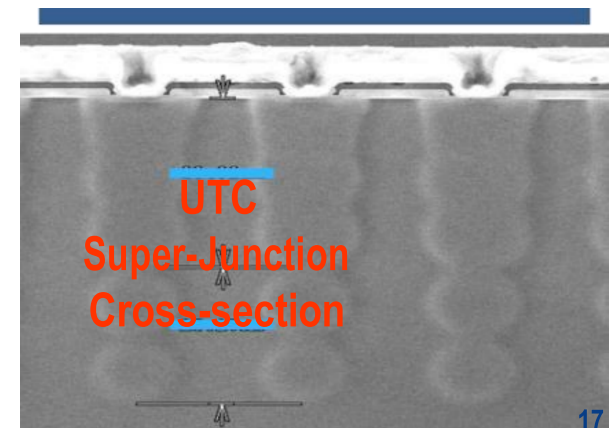


High efficiency with low $R_{DS(ON)}$,
low Q_G & fast switching

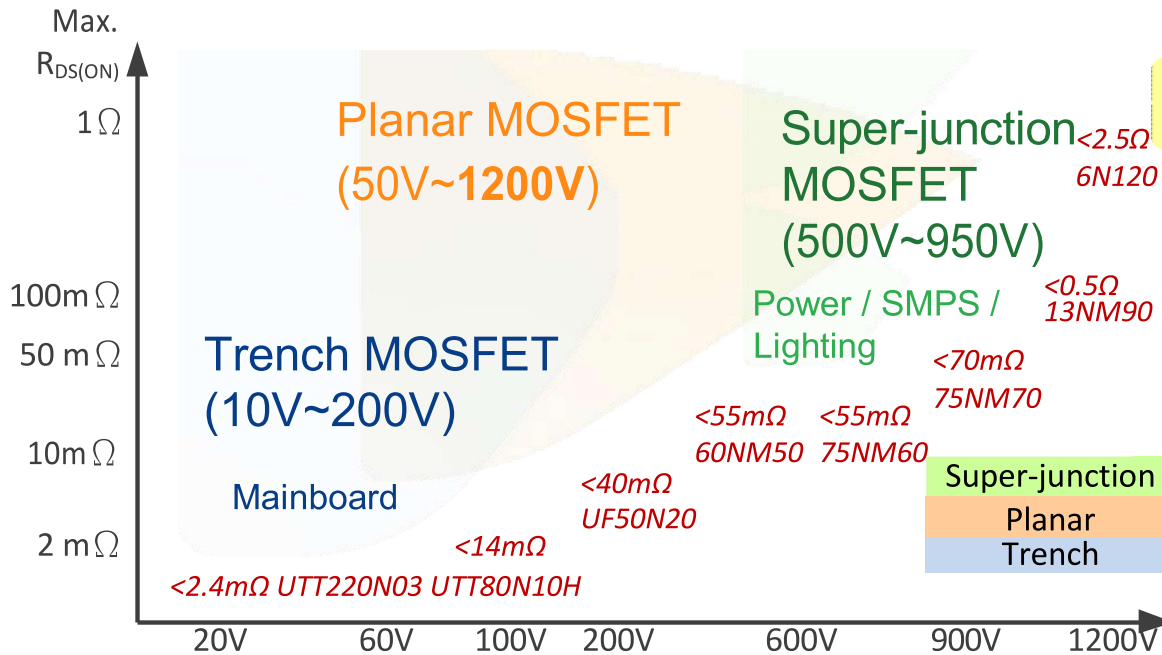
Comparison	7N65	7NM65
RDS (ON) max.	1.2 Ω	0.9 Ω
Gate Charge	29 nC	21 nC
Die size	100%	35%

Part No.	V_{DSS}	$I_D (=X)$	$R_{DS(ON), MAX}$
XNM50	500V	0.4A~60A	55m Ω
XNM60	600V	0.2A~75A	55m Ω
XNM65	650V	0.2A~60A	65m Ω
XNM70	700V	0.2A~75A	70m Ω
XNM80	800V	2A~13A	0.35 Ω
XNM90	900V	2A~13A	0.50 Ω
XNM95	950V	6A~9A	1.20 Ω

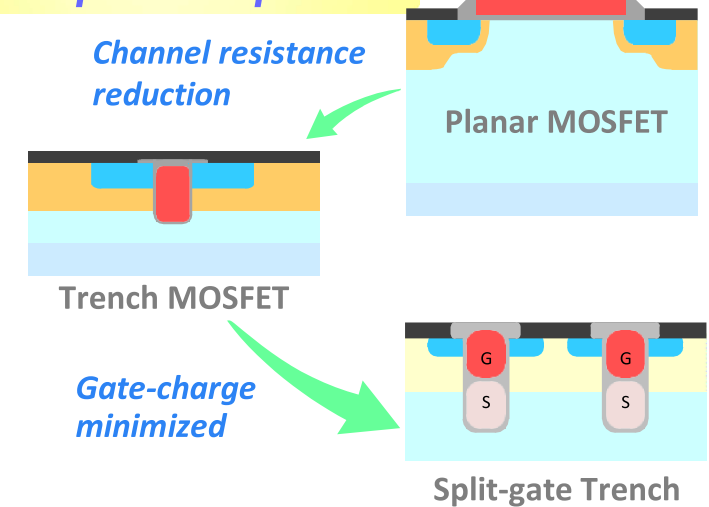
Low $R_{DS(ON)}$
Fast Switching
Small Package



Low-voltage MOSFET



Develop and Improve



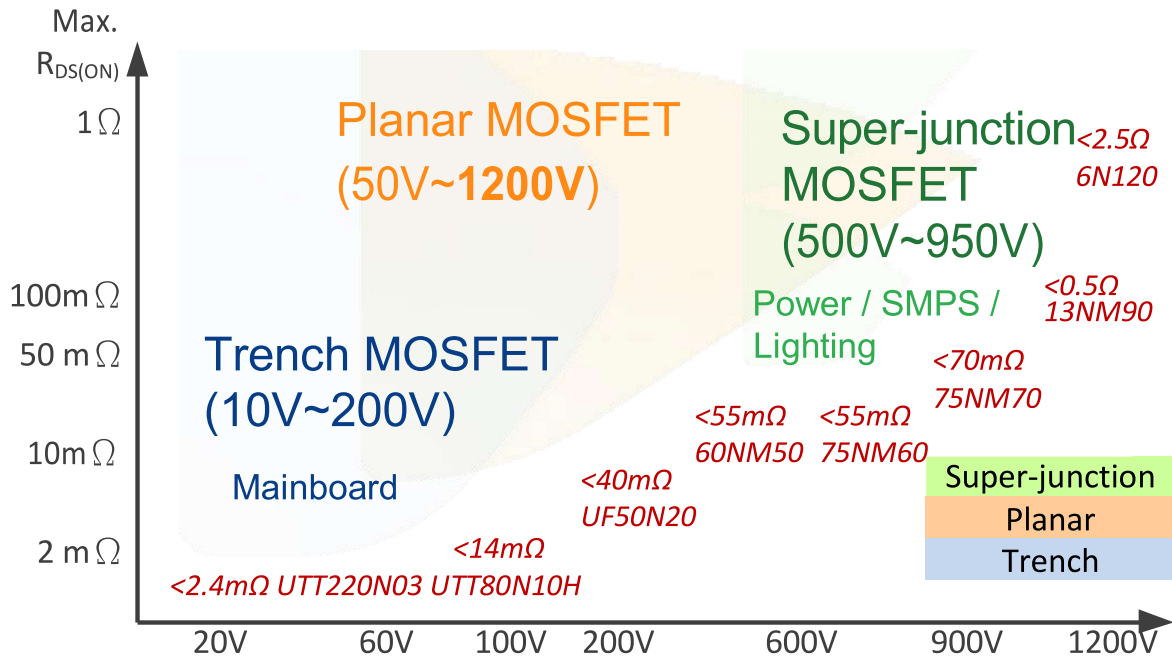
Package miniaturization

Part Number	V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω)		Package
	(V)		(A)	TYP.	
UTT130N06M	60	80	-	5.9	DFN5060
UTT60N10M	100	60	15	16	DFN5060
USG80N10*	100	86	6.4	7.7	DFN5060

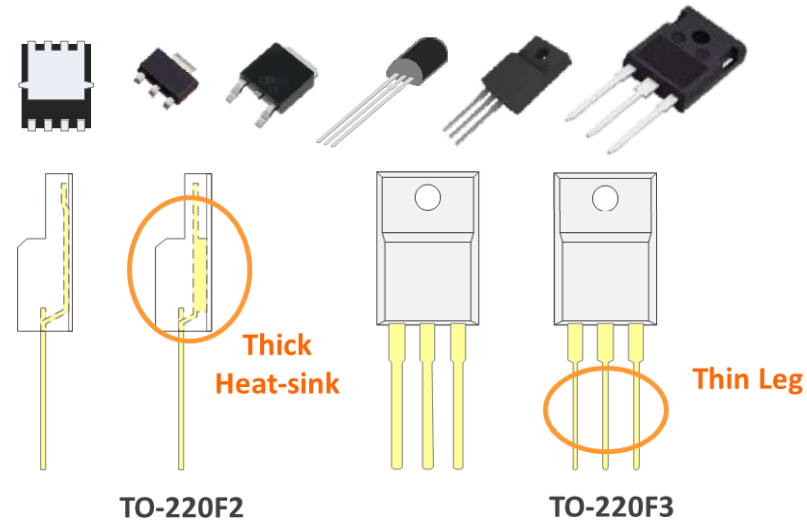
Combo solutions available

Config.	V_{DSS}	Package
N-ch x2	20V ~ 600V	SOT-26 SOT-363 TSSOP SOP DIP DFN3030 DFN5060
P-ch x2	-20V ~ -50V	SOT-363 SOP-8
N-ch + P-ch	$\pm 20V \sim \pm 100V$	SOT-26 TO-252-4 SOP-8 DIP-8 DFN3030 DFN5060
Nx2 + Px2	$\pm 30V \sim \pm 100V$	SOP-8

MOSFET Variants



Various Package Options



MOSFET with Fast Recovery Diode

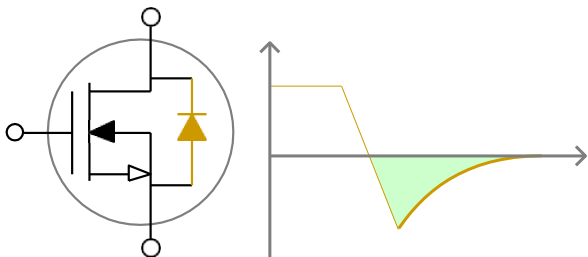
Planar / Super-junction

Part No.	V_{DSS}	I_D
2N65-F	650V	2A
75NM60-F	600V	75A
60NM65-F	650V	60A
11NM70-	700V	11A

Signal Switching MOSFET

Part No.	V_{DSS}	$V_{GS(TH)}$
UT3P01Z	-30V	-0.4~-1.4V
BSS84ZT	-50V	-0.8~-2V
BSS139Z	50V	0.5~1.5V
2N7002K	60V	1~2.5V
BSS123	100V	1.6~2.6V
BSS127	600V	1.4~2.6V
(Depletion Type)		
UF601Q	600V	-1.4~-2.7V

Innovation & investment



Cross-Reference

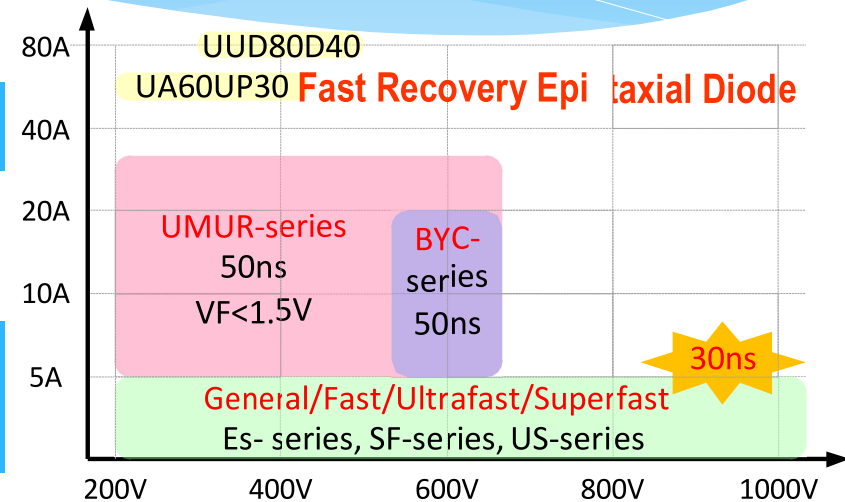
➤ MOSFET

Product Category	UTC Example	Competitor	Competitor PN
Super-junction MOSFET (500~950V)	xNM60 xNM65 xNM80 xNM90	Infineon ST Toshiba	STD7NM64N IPI90R500C3
Planar MOSFET (up to 1200V)	12P10 UF9640 4P50 UF3205 UF630 UF830 15N20 xN40 xN60 xN65 xN80 xN100	Vishay IR (Infineon) Fairchild (On-semi)	IRF9640 IRF3205 IRFP22N60K FQP10N80C
Low Voltage Trench MOSFET (10 ~ 200V)	UT4101 UT3419 UM6K1N UTT50N06	On-semi AoS Rohm Toshiba	NTR4101P AO3419
Signal Switching MOSFET	BSS84ZT BSS139Z 2N7002K BSS127	NXP Diodes Rohm	BSS84 2N7002K
Combo MOSFET (N-ch x 2, P-ch x2, N+P)	UD9926 QS8M11 UD4606 1NNPP10	Fairchild (On-semi) Rohm AoS Diodes	FDS9926A ZXMHC10A07N8

Rectifier Diode

➤ Rectifier

Category	Spec. Coverage
Bridge Rectifier	1000V, DFM, ABS, MBS, MBF package
FRED rectifier	1200V (UHRP15120), 80A (UUD80D40) Ultrafast / Superfast grade available
Low- V_F Schottky rectifier	Schottky (SB / MBR series): 200V, 40A MGBR / TGBR: 300V, 60A



➤ High-efficiency Schottky

	Schottky SB / MBR	MGBR	TGBR
V_F	Low	Very Low	Very Low
I_{RM}	High	Low	Low
V_{RM}	Medium (~200V)	High (~300V)	Medium (~200V)
T_j	Low	Very High (~ 200°C)	High (~ 175°C)

Diodes SBR Vishay TMBS

P2P cross-reference example

UTC PN.	Competitors
ES1J	ES1J (Diodes)
BYC20	BYC20 (NXP)
BAV99	BAV99 (Diodes)
MBR20100C	MBR20100C (Vishay)

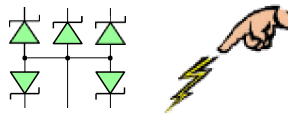
TVS Diode & Array

➤ Surge Protection Diode



TVS Series	Power Rating (10/1000μs)	Package
P6KExxx	600W	DO-15
SMDJxxx	3000W	SMC
SMCJxxx	1500W	SMC
SMBJxxx	600W	SMB
SMAJxxx	400W	SMA

➤ ESD Protection Array

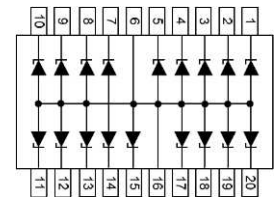


Part Number	power rating (8/20μs)	Package
SMA5V	50W	SOD-523
SOT05C	140W	SOT-23
UESDA6V1W5	150W	SOT-353
USMS05	350W	SOT-26
UZ5C056	150W	SOT-26

➤ High-speed-signal ESD Protection

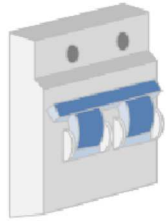
Application	Part Number
USB 2.0 Charger, USB OTG	USB4S012
Firewire , DVI and Ethernet	SRV05-4
DVI, Ethernet and USB2.0	UPRTR5V0U4D
DVI, Ethernet and USB2.0	PUSB220
HDMI LVDS SATA Ethernet	TVS4S009
1284 port for printer	URCZ1284-xx

P2P cross-reference example

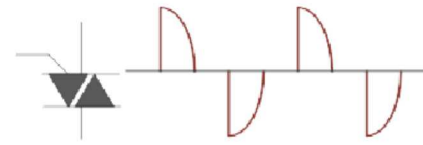
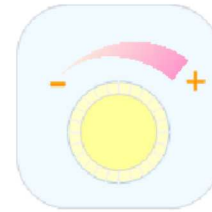
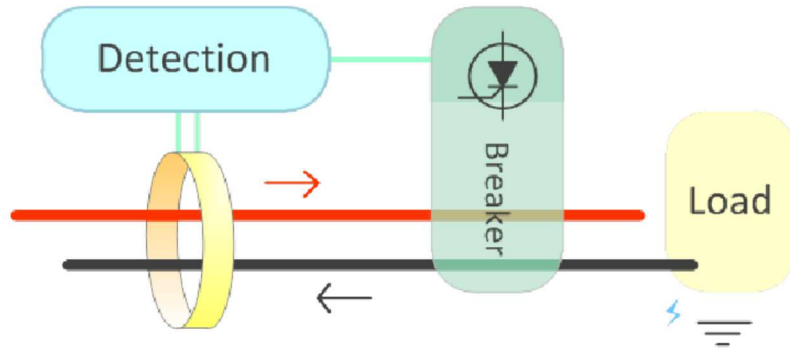


UTC PN.	Competitors
UZ18C6V8 18-common-cathode TVS array	BZA100 (NXP)

Thyristor



AC Source



Power Control
Dimming

SCR ($V_{DRM}=200V\sim 800V$, $I_{T(RMS)}=0.47A\sim 12A$)

Part Number	V_{DRM}	$I_{T(RMS)}$	I_{GTMAX}	Package
CR03AM-12	600	0.47	0.1	TO-92
X0202/A	600 800	1.25	0.2	SOT-223 TO-92
ML1225 / XL1225 PCR406	300 400	0.8	0.2	SOT-23 TO-92
MCR100	200~600	0.8	0.2	SOT-89 SOT-23 TO-92
US112	400~600	12	0.2~15	TO-251 TO-252 TO-220

TRIAC (3-Q/4-Q)

($V_{DRM}=400V\sim 800V$, $I_{T(RMS)}=0.6A\sim 16A$)

Part Number	V_{DRM}	$I_{T(RMS)}$	$I_{MAX,GT}$	Package
MAC97A	400~600	0.6	5	TO-92 SOT-223
UT131	500~800	1.0	3	TO-92 SOT-223
UT136	500~800	6.0	10~50	TO-220 TO-220F TO-252
BTA312 BTB312	600~800	12.0	5~50	TO-220 TO-220F
UCR316CM	600	16.0	20~30	TO-220 TO-220F

Cross-Reference

➤ Discrete Components

Product Category	UTC Example	Competitor	Competitor PN
High Power BJT / Darlington	2SC5200 2SA1943 (230V 15A) 2SC4467 2SA1694 (120V 8A) UN2488 UP1620 (10A hFE 5k~30k)	ST Toshiba Sxxxxx	2SC5200 2SC4467 MN2488
Digital Transistor	DTA114E DTB123Y DTC143X DTD113Z	Rohm NXP	DTA114E
FRED Rectifier up to 1200V ultrafast / superfast	UFR75120 (1200V 75A super-fast) BYC20 ES1J FR107G UFR8060C	Fairchild NXP Diodes	RHRG75120 BYC20 ES1J
Schottky Diode / Low- V_F Rectifier	SR26 RB751V40 MBR20150C TGBR40U100C MGBR40V300C	Vishay Diodes	TMBS series SBR series
Surge Protection	P6KE SMDJxxxx SMAJxxxx	ST Littlefuse	P6KE SMDJ
ESD Protection (for I/O port)	TVS4S009 PUSB220 SRV05-4 UZ18C6V8 SOT05C USMS05	TI NXP On-semi	TPD4S009 BZA100
SCR (200~1000V)	BT151 US650 MCR100	NXP ST	BT151 TYN840
TRIAC (400~800V)	4Q: BTA12 UT136 3Q: BTA312A	NXP ST	BTA12 UT136

THANK YOU

IC (Integrated Circuit)



Discrete Component

