

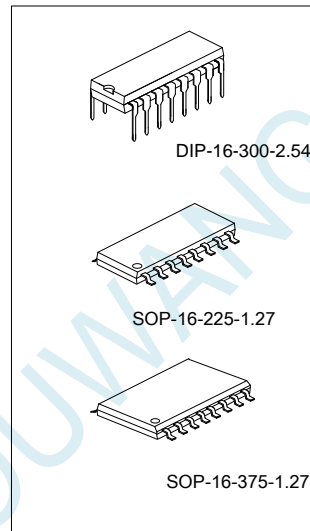
## VOLTAGE-MODE PWM CONTROLLER

### DESCRIPTION

The UTC3525 is a monolithic integrated circuit that included all of the control circuit necessary for a pulse width modulating regulator. There are a voltage reference, an error amplifier, a pulse width modulator, an oscillator, under-voltage lockout, soft start circuit, and output drivers in the chip.

### FEATURES

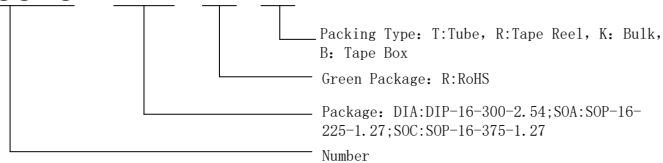
- \* 5.1V± 1% Reference
- \* Oscillator Sync Terminal
- \* Internal Soft Start
- \* Dead time Control
- \* Under-Voltage Lockout



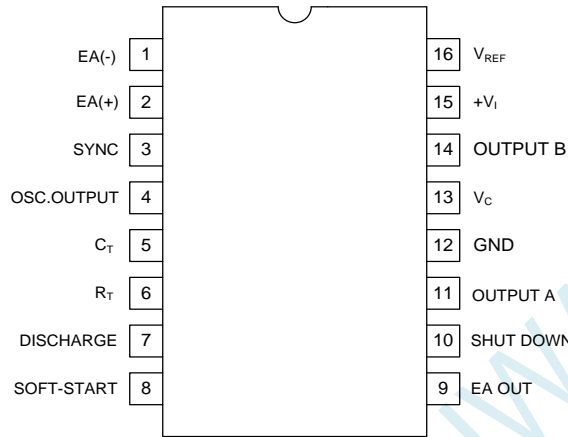
### ORDERING INFORMATION

| Ordering Number | Package         | Print Number | Free | Packing   |
|-----------------|-----------------|--------------|------|-----------|
| UTC3525-DIA-R-T | DIP-16-300-2.54 | UTC3525D     | RoHS | Tube      |
| UTC3525-SOA-R-T | SOP-16-225-1.27 | UTC3525E     | RoHS | Tube      |
| UTC3525-SOA-R-R | SOP-16-225-1.27 | UTC3525E     | RoHS | Tape Reel |
| UTC3525-SOC-R-T | SOP-16-375-1.27 | UTC3525M     | RoHS | Tube      |
| UTC3525-SOC-R-R | SOP-16-375-1.27 | UTC3525M     | RoHS | Tape Reel |

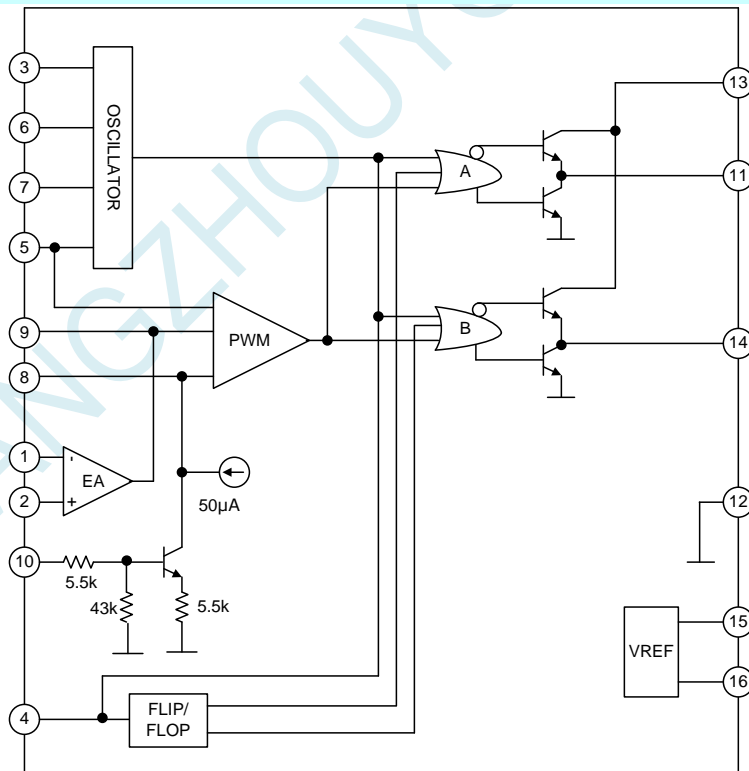
### UTC3525 - DIA - R - T



**PIN CONFIGURATIONS**



**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

| Characteristic                                 | Symbol         | Value      | Unit             |
|--|----------------|------------|------------------|
| Supply Voltage                                 | $V_{CC}$       | 40         | V                |
| Collector Supply Voltage                       | $V_C$          | 40         | V                |
| Output Current, Sink or Source                 | $I_O$          | 500        | mA               |
| Reference Output Current                       | $I_{REF}$      | 50         | mA               |
| Oscillator Charging Current                    | $I_{CHG(OSC)}$ | 5          | mA               |
| Power Dissipation ( $T_A = 25^\circ\text{C}$ ) | $P_D$          | 1000       | mW               |
| Junction Temperature                           | $T_J$          | -40 ~ +125 | $^\circ\text{C}$ |
| Operating Ambient Temperature                  | $T_{OPR}$      | 0 ~ +70    | $^\circ\text{C}$ |
| Storage Temperature                            | $T_{STG}$      | -65 ~ +150 | $^\circ\text{C}$ |
| Lead Temperature (Soldering, 10 sec)           | $T_{LEAD}$     | +260       | $^\circ\text{C}$ |

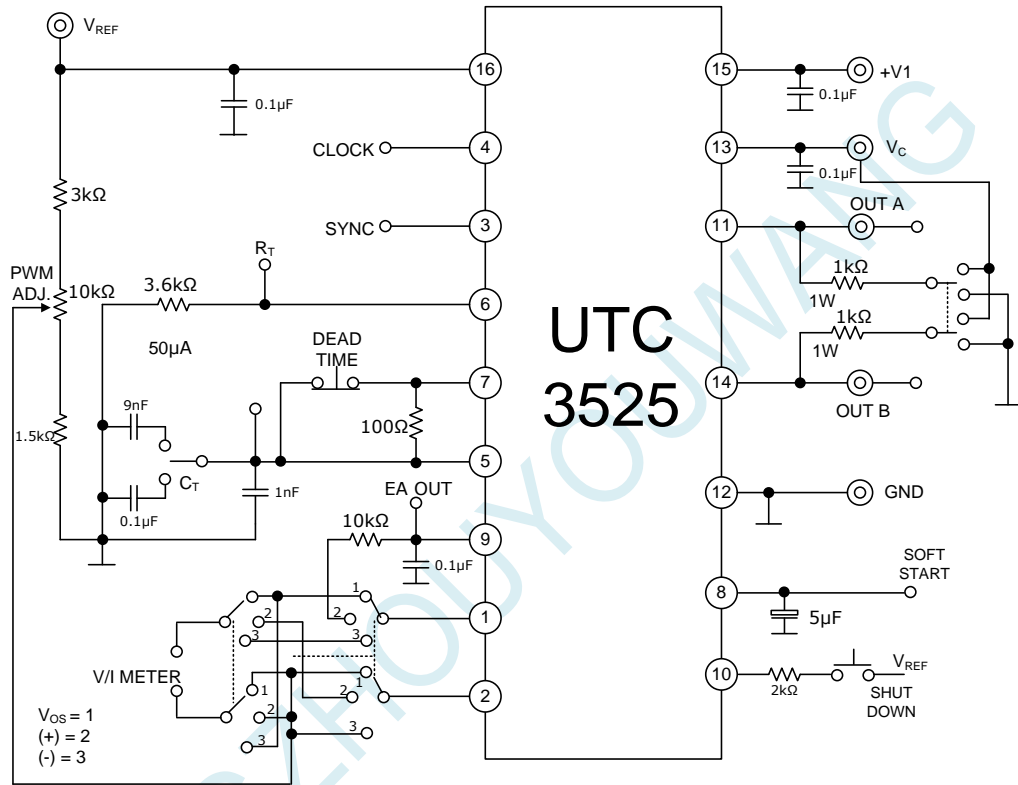
**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 20\text{V}$ , unless otherwise specified)

| Characteristic   | Symbol              | Test Conditions                                 | Min  | Typ.      | Max     | Unit          |
|--|---------------------|---|------|-----------|---------|---------------|
| <b>REFERENCE SECTION</b>   |                     |   |      |           |         |               |
| Reference Output Voltage   | $V_{REF}$           | $T_J = 25^\circ\text{C}$                        | 5.0  | 5.1       | 5.2     | V             |
| Line Regulation  | $\Delta V_{REF}$    | $V_{CC} = 8 \text{ to } 35\text{V}$             |      | 9         | 20      | mV            |
| Load Regulation  | $\Delta V_{REF}$    | $I_{REF} = 0 \text{ to } 20\text{mA}$           |      | 20        | 50      | mV            |
| Short Circuit Output Current                                       | $I_{SC}$            | $V_{REF} = 0, T_J = 25^\circ\text{C}$           |      | 80        | 100     | mA            |
| Total Output Variation (Note 1)                                    | $\Delta V_{REF}$    | Line, Load and Temperature                      | 4.95 |           | 5.25    | V             |
| Temperature Stability (Note 1)                                     | $ST_T$              |   |      | 20        | 50      | mV            |
| Long Term Stability (Note 1)                                       | ST                  | $T_J = 25^\circ\text{C}, 1 \text{ KHrs}$        |      | 20        | 50      | mV            |
| <b>OSCILLATOR SECTION</b>  |                     |   |      |           |         |               |
| Initial Accuracy (Note 1, 2)                                       | ACCUR               | $T_J = 25^\circ\text{C}$                        |      | $\pm 3$   | $\pm 6$ | %             |
| Frequency Change With Voltage                                      | $\Delta f / V_{CC}$ | $V_{CC} = 8 \text{ to } 35\text{V}$ (Note 1, 2) |      | $\pm 0.8$ | $\pm 2$ | %             |
| Maximum Frequency  | $f_{(MAX)}$         | $R_T = 2\text{K}\Omega, C_T = 470\text{pF}$     | 400  | 430       |         | KHz           |
| Minimum Frequency  | $f_{(MIN)}$         | $R_T = 200\text{K}\Omega, C_T = 0.1\mu\text{F}$ |      | 60        | 120     | Hz            |
| Clock Amplitude (Note 1, 2)  | $V_{(CLK)}$         |   | 3    | 4         |         | V             |
| Clock Width (Note 1, 2)  | $t_{W(CLK)}$        | $T_J = 25^\circ\text{C}$                        | 0.3  | 0.6       | 1       | $\mu\text{s}$ |
| Sync Threshold   | $V_{TH(SYNC)}$      |   | 1.2  | 2         | 2.8     | V             |
| Sync Input Current   | $I_{I(SYNC)}$       | Sync = 3.5V                                     |      | 1.3       | 2.5     | mA            |
| <b>ERROR AMPLIFIER SECTION (<math>V_{CM} = 5.1\text{V}</math>)</b> |                     |   |      |           |         |               |
| Input Offset Voltage   | $V_{IO}$            |   |      | 1.5       | 10      | mV            |
| Input Bias Current   | $I_{BAIS}$          |   |      | 1         | 10      | $\mu\text{A}$ |
| Input Offset Current   | $I_{IO}$            |   |      | 0.1       | 1       | $\mu\text{A}$ |
| Open Loop Voltage Gain   | $G_{VO}$            | $R_L \geq 10\text{M}\Omega$                     | 60   | 80        |         | dB            |
| Common Mode Rejection Ratio  | CMRR                | $V_{CM} = 1.5 \text{ to } 5.2\text{V}$          | 60   | 90        |         | dB            |
| Power Supply Rejection Ratio                                       | PSRR                | $V_{CC} = 8 \text{ to } 35\text{V}$             | 50   | 60        |         | dB            |

| Characteristic                   | Symbol       | Test Conditions               | Min | Typ. | Max | Unit    |
|----------------------------------|--------------|-------------------------------|-----|------|-----|---------|
| <b>PWM COMPARATOR SECTION</b>    |              |                               |     |      |     |         |
| Minimum Duty Cycle               | $D_{(MIN)}$  |                               |     |      | 0   | %       |
| Maximum Duty Cycle               | $D_{(MAX)}$  |                               | 45  | 49   |     | %       |
| Input Threshold Voltage (Note 2) | $V_{TH1}$    | Zero Duty Cycle               | 0.7 | 0.9  |     | V       |
| Input Threshold Voltage (Note 2) | $V_{TH2}$    | Max Duty Cycle                |     | 3.2  | 3.6 | V       |
| <b>SOFT-START SECTION</b>        |              |                               |     |      |     |         |
| Soft Start Current               | $I_{SOFT}$   | $V_{SD} = 0V, V_{SS} = 0V$    | 25  | 51   | 80  | $\mu A$ |
| Soft Start Low Level Voltage     | $V_{SL}$     | $V_{SD} = 2.5V$               |     | 0.3  | 0.9 | V       |
| Shutdown Threshold Voltage       | $V_{TH(SD)}$ |                               | 0.7 | 1.3  | 2.0 | V       |
| Shutdown Input Current           | $I_{N(SD)}$  | $V_{SD} = 2.5V$               |     | 0.3  | 1   | mA      |
| <b>OUTPUT SECTION</b>            |              |                               |     |      |     |         |
| Low Output Voltage I             | $V_{OL I}$   | $I_{SINK} = 20mA$             |     | 0.1  | 0.4 | V       |
| Low Output Voltage II            | $V_{OL II}$  | $I_{SINK} = 100mA$            |     | 0.5  | 2   | V       |
| High Output Voltage I            | $V_{CH I}$   | $I_{SOURCE} = 20mA$           | 18  | 19   |     | V       |
| High Output Voltage II           | $V_{CH II}$  | $I_{SOURCE} = 100mA$          | 17  | 18   |     | V       |
| Under Voltage Lockout            | $V_{UV}$     | $V_8$ and $V_9 = High$        | 6   | 7    | 8   | V       |
| Collector Leakage Current        | $I_{LKG}$    | $V_{CC} = 35V$                |     | 80   | 200 | $\mu A$ |
| Rise Time (Note 1)               | $t_R$        | $C_L = 1nF, T_J = 25^\circ C$ |     | 80   | 600 | nS      |
| Fall Time (Note 1)               | $t_F$        | $C_L = 1nF, T_J = 25^\circ C$ |     | 70   | 300 | nS      |
| <b>STANDBY CURRENT</b>           |              |                               |     |      |     |         |
| Supply Current                   | $I_{CC}$     | $V_{CC} = 35V$                |     | 12   | 20  | mA      |

Note:1.These parameters, although guaranteed over the recommended operating conditions, are not 100% tested in production  
 2.Tested at  $f_{osc}=40$  KHz ( $R_T=3.6K, C_T=0.01\mu F, R_D=0\Omega$ ).

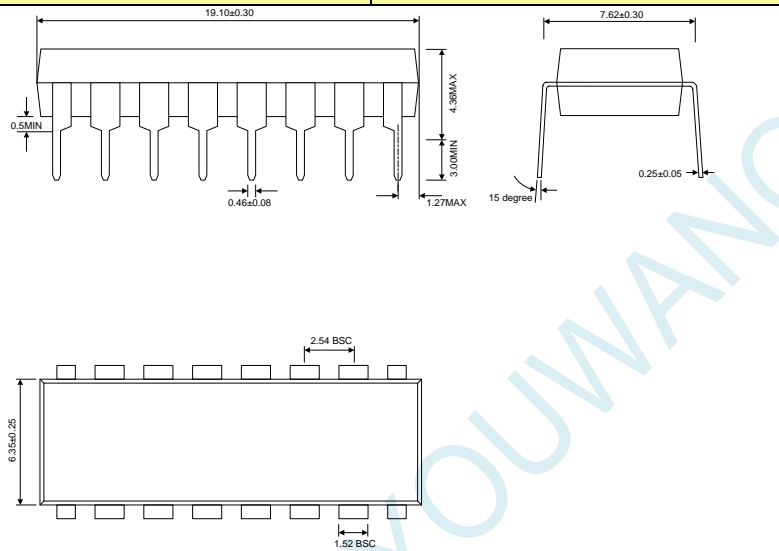
TEST CIRCUIT



PACKAGE OUTLINE

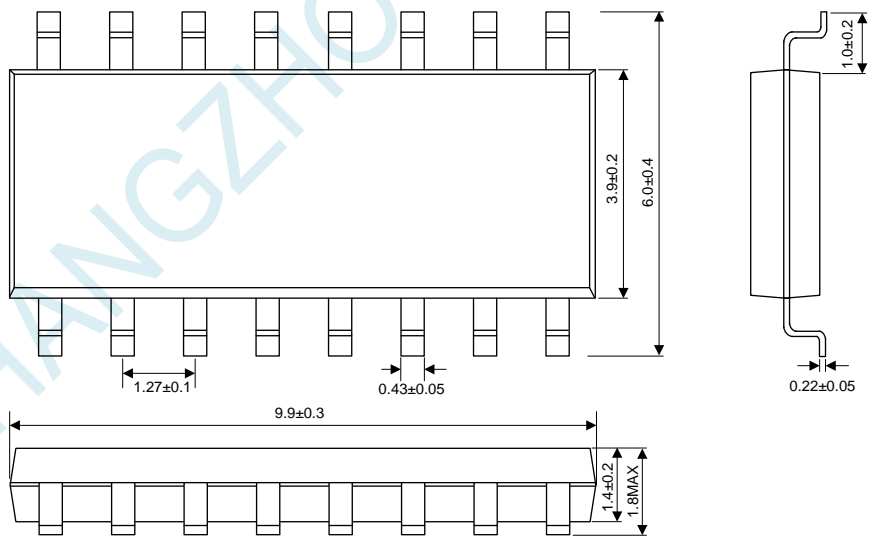
DIP-16-300-2.54

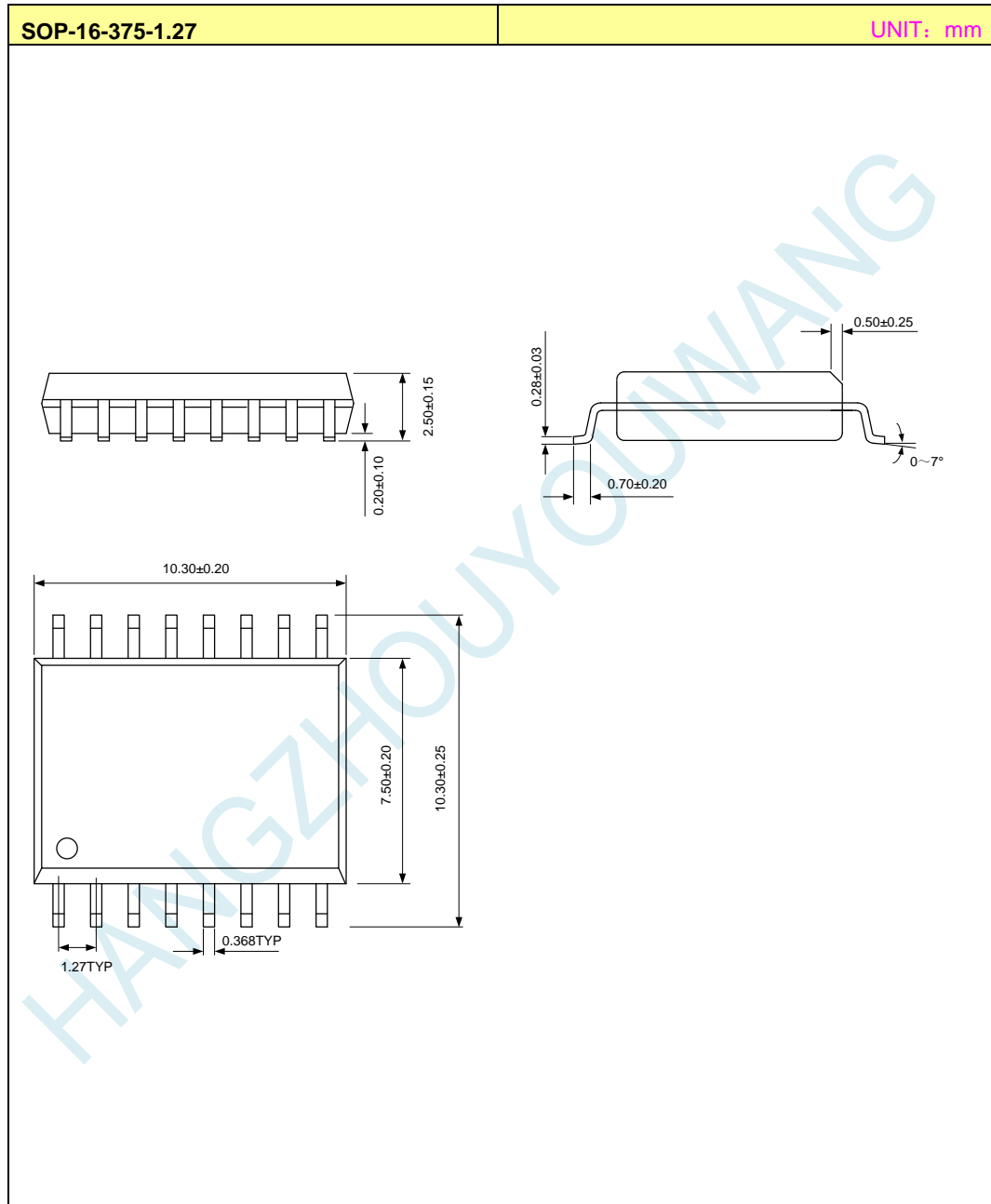
UNIT: mm



SOP-16-225-1.27

UNIT: mm





**ELECTROSTATIC DISCHARGE CAUTION**

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage handling to prevent electrostatic damage to the device.

**NOTICE**

HANGZHOU YOUWANG ELECTRONICS CO.LTD assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all HANGZHOU YOUWANG ELECTRONICS CO.LTD's products described or contained herein. HANGZHOU YOUWANG ELECTRONICS CO.LTD's products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.



Attach

Revision History

| Data       | REV | Description  | Page |
|------------|-----|--|------|
| 2014.11.17 | 1.0 | Original   |      |
| 2017.11.06 | 1.1 | Add "Electrostatic Discharge Caution" and "NOTICE" |      |
| 2019.06.11 | 1.2 | 添加SOP16-225封装及更改版面                                 |      |
| 2020.06.12 | 1.3 | 添加SOP16-375封装和订购信息                                 |      |
| 2021.03.02 | 1.4 | 添加结温温度，焊接温度300改为260，上升下降时间条件统一，外形尺寸图更改             |      |

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Switching Voltage Regulators](#) category:*

*Click to view products by [Youwang Electronics](#) manufacturer:*

Other Similar products are found below :

[FAN53610AUC33X](#) [FAN53611AUC123X](#) [EN6310QA](#) [160215](#) [R3](#) [KE177614](#) [FAN53611AUC12X](#) [MAX809TTR](#) [NCV891234MW50R2G](#)  
[AST1S31PUR](#) [NCP81103MNTXG](#) [NCP81203PMNTXG](#) [NCP81208MNTXG](#) [PCA9412AUKZ](#) [NCP81109GMNTXG](#) [NCP81109JMNTXG](#)  
[MP2161AGJ-Z](#) [NCP81241MNTXG](#) [MPQ4481GU-AEC1-P](#) [MP8756GD-P](#) [MPQ2171GJ-P](#) [MPQ2171GJ-AEC1-P](#) [MP2171GJ-P](#)  
[NCV1077CSTBT3G](#) [MP28160GC-Z](#) [MPM3509GQVE-AEC1-P](#) [XDPE132G5CG000XUMA1](#) [MP5461GC-P](#) [IR3888AMTRPBFAUMA1](#)  
[MPQ4409GQBE-AEC1-P](#) [S-19903DA-A8T1U7](#) [S-19903CA-A6T8U7](#) [S-19903CA-S8T1U7](#) [S-19902BA-A6T8U7](#) [S-19902CA-A6T8U7](#)  
[AP7361EA-SPR-13](#) [AP7361EA-33DR-13](#) [S-19902AA-A6T8U7](#) [S-19903AA-A6T8U7](#) [S-19902AA-S8T1U7](#) [S-19902BA-A8T1U7](#) [AU8310](#)  
[LMR36503R5RPER](#) [LMR36503RFRPER](#) [LMR54406DBVR](#) [XC9110C301MR-G](#) [XC9141A50CMR-G](#) [XCL206F083CR-G](#)  
[XCL210A111GR-G](#) [LTM4663EV#PBF](#)