



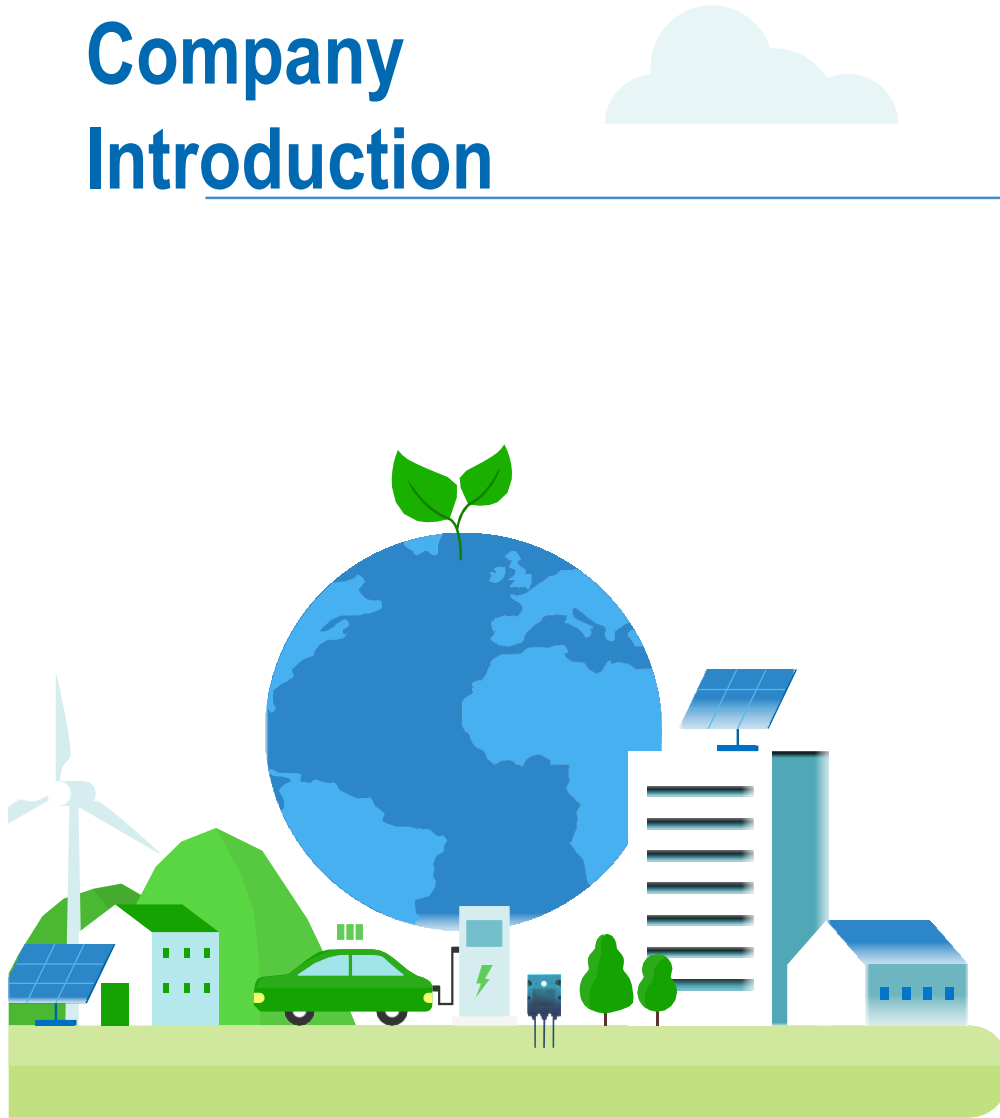
Power Semiconductor

SELECTION GUIDE

IGBT / DIODE / SiC



Company Introduction



TRinno Technology is committed to creating technologies for a better life and a brighter future in a safe, environmentally friendly and sustainable way.

From Silicon technology to WBG technology, our device solutions make requirements easier in a variety of business sectors from home appliance, industrial motor drive, renewable energy, automotive and emerging applications.

We will continue to provide unparalleled solutions for success and prosperity of our customers through the ceaseless innovation and inspiration in power device technology.

Ordering Information

■ Discrete

| | | | | | | | |
|---|---|----|----|---|----|----|----|
| T | G | AN | 40 | N | 60 | F2 | DS |
| A | B | C | D | E | F | G | H |

A TRinno Technology Product Line-up

T : Consumer & Industrial / **AT** : Automotive

B Product Family

G : IGBT / D : DIODE / DC : SiC DIODE / MC : SiC MOSFET

C Package Type

AN / AF / L : TO-3PN / TO-3PF / TO-264
 H / HP : TO-247 / TO-247 PLUS
 P / PF : TO-220 / TO-220F
 B / D / U : D2-PAK / D-PAK / I-PAK

D Current Rating / On-resistance(Rds(on),max.)

IGBT & DIODE : Current Rating (A)
 SiC MOSFET : Typical on-resistance (mΩ)

E Channel Polarity / Diode Speed

IGBT : N (N-type), P (P-type), S (Reverse conducting IGBT)
 DIODE : A (Low Vf), B (Standard), C (Low Qrr)

F Voltage Rating

Absolute voltage rating divided by '10'

G Generation / Technology

IGBT : N (Non Punch Through), F (Fieldstop), P (Punch Through) F2 / F3 / Fx (Fieldstop : 2nd / 3rd / ...Generation)

H Option

IGBT : C (SiC Diode), D (Anti-parallel Diode), L (Low Vce,sat), R (Short Circuit Rated), S (Fast Switching), W (for Welder)
 DIODE : DN (Common Cathode), DP (Common Anode)

■ Bare Die (Wafer)

| | | | | | | | |
|---|---|----|---|-----|---|---|----|
| T | G | 25 | N | 120 | F | R | WT |
| A | B | C | D | E | F | G | H |

A TRinno Technology Product Line-up

T : Consumer & Industrial / **AT** : Automotive

B Wafer Family

G : IGBT / D : DIODE

C Current Rating

D Channel Polarity / Diode Speed

IGBT / MOSFET : N (N-type), P (P-type), S (Reverse conducting IGBT), R (On-resistance)
 DIODE : A (Low Vf), B (Standard), C (Low Qrr), U (Ultra Fast)

E Voltage Rating (divided by '10')

F Generation / Technology

IGBT : F (Fieldstop), Fx (Fieldstop Generation)

G IGBT Option

IGBT : R (Short Circuit Rated), S (Fast Switching)

H Offering type

WT : Wafer biz.

IGBT Discrete

| V_{CES} [V] | Part Number | I_c @25°C [A] | I_c @100°C [A] | $V_{CE(SAT),max}$ @25°C [V] | $V_{CE(SAT),typ}$ @25°C [V] | $E_{OFF,typ}$ @25°C [mJ] | Anti-Parallel Diode | Package | Feature/Status |
|---------------|-----------------|--------------------|---------------------|--------------------------------|--------------------------------|-----------------------------|------------------------|-------------|--------------------------------|
| 1600 | TGAN30S160FD* | 60 | 30 | 2.65 | 2.25 | 1.02 | Yes | TO-3PN | Reverse Conducting IGBT |
| | TGAN20N135FD | 40 | 20 | 2.20 | 1.80 | 0.51 | Yes | TO-3PN | |
| 1350 | TGAN20N135FDL2 | 40 | 20 | 2.20 | 1.80 | 0.51 | Yes | TO-3PN | |
| | TGAN20N135F3D | 40 | 20 | 2.40 | 1.90 | 0.63 | Yes | TO-3PN | |
| | TGAN30N135FD1 | 60 | 30 | 2.25 | 1.90 | 0.75 | Yes | TO-3PN | |
| | TGH40N135FD | 80 | 40 | 2.20 | 1.70 | 1.81 | Yes | TO-247 | |
| | TGH40N135FDS | 80 | 40 | 2.45 | 1.95 | 0.97 | Yes | TO-247 | Fast Speed Switching |
| | TGAN25N120ND | 50 | 25 | 2.50 | 1.90 | 0.87 | Yes | TO-3PN | |
| | TGAN40N120F2DW | 80 | 40 | 2.40 | 2.00 | 0.57 | Yes | TO-3PN | |
| 1200 | TGH40N120F3D* | 80 | 40 | 2.35 | 1.85 | 0.54 | Yes | TO-247 | |
| | ATGH40N120F2DR* | 80 | 40 | 2.30 | 1.80 | 1.83 | Yes | TO-247 | AEC-Q101 / Short Circuit Rated |
| | TGH40N120F2DR* | 80 | 40 | 2.30 | 1.80 | 1.83 | Yes | TO-247 | Short Circuit Rated |
| | TGHP75N120FDR | 150 | 75 | 2.20 | 1.70 | 3.76 | Yes | TO-247 PLUS | Short Circuit Rated |
| | TGHP75N120F2D | 150 | 75 | 2.20 | 1.70 | 1.80 | Yes | TO-247 PLUS | |
| 1100 | TGAN40N110FD | 80 | 40 | 2.50 | 2.00 | 0.68 | Yes | TO-3PN | |

* Under Development

IGBT Discrete

| V_{CES} [V] | Part Number | I_c @25°C [A] | I_c @100°C [A] | $V_{CE(SAT),max}$ @25°C [V] | $V_{CE(SAT),typ}$ @25°C [V] | $E_{OFF,typ}$ @25°C [mJ] | Anti-Parallel Diode | Package | Feature/Status |
|---------------|----------------|--------------------|---------------------|--------------------------------|--------------------------------|-----------------------------|------------------------|---------|--------------------------------|
| 650 | TGAN40N65F2DS | 80 | 40 | 2.25 | 1.85 | 0.17 | Yes | TO-3PN | Fast Speed Switching |
| | TGAN60N65F2DS | 120 | 60 | 2.25 | 1.85 | 0.54 | Yes | TO-3PN | Fast Speed Switching |
| | TGAN60N65F2D2S | 120 | 60 | 2.45 | 2.10 | 0.44 | Yes | TO-3PN | |
| | TGAN80N65F2DS | 160 | 80 | 2.25 | 1.85 | 1.11 | Yes | TO-3PN | Fast Speed Switching |
| | TGAF40N65F2D* | 80 | 40 | 2.25 | 1.85 | 0.17 | Yes | TO-3PN | Fast Speed Switching |
| | TGAF60N65F2D* | 120 | 60 | 2.25 | 1.85 | 0.54 | Yes | TO-3PN | Fast Speed Switching |
| | TGH40N65F2DS | 80 | 40 | 2.25 | 1.85 | 0.17 | Yes | TO-247 | Fast Speed Switching |
| | ATGH40N65F2DR* | 80 | 40 | 2.30 | 1.80 | 0.46 | Yes | TO-247 | AEC-Q101 / Short Circuit Rated |
| | TGH40N65F2DR* | 80 | 40 | 2.30 | 1.80 | 0.46 | Yes | TO-247 | Short Circuit Rated |
| | TGH60N65F2DS | 120 | 60 | 2.25 | 1.85 | 0.54 | Yes | TO-247 | Fast Speed Switching |
| | ATGH60N65F2DR* | 120 | 60 | 2.30 | 1.80 | 0.79 | Yes | TO-247 | AEC-Q101 / Short Circuit Rated |
| | TGH60N65F2DR* | 120 | 60 | 2.30 | 1.80 | 0.79 | Yes | TO-247 | Short Circuit Rated |
| | TGH80N65F2DS | 160 | 80 | 2.25 | 1.85 | 1.11 | Yes | TO-247 | Fast Speed Switching |
| | TGH80N65F2D2 | 160 | 80 | 2.25 | 1.75 | 1.15 | Yes | TO-247 | |
| | ATGH80N65F2DR* | 160 | 80 | 2.30 | 1.80 | 1.55 | Yes | TO-247 | AEC-Q101 / Short Circuit Rated |
| | TGH80N65F2DR* | 160 | 80 | 2.30 | 1.80 | 1.55 | Yes | TO-247 | Short Circuit Rated |

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IGBT Discrete

| V _{CES} [V] | Part Number | I _c @25°C [A] | I _c @100°C [A] | V _{CE(SAT),max} @25°C [V] | V _{CE(SAT),typ} @25°C [V] | E _{OFF,typ} @25°C [mJ] | Anti-Parallel Diode | Package | Feature/Status |
|----------------------|---------------|-----------------------------|------------------------------|---------------------------------------|---------------------------------------|------------------------------------|------------------------|---------|----------------------|
| 600 | TGAN40N60F2DS | 80 | 40 | 2.40 | 2.00 | 0.14 | Yes | TO-3PN | Fast Speed Switching |
| | TGAN60N60F2DS | 120 | 60 | 2.20 | 1.75 | 0.54 | Yes | TO-3PN | Fast Speed Switching |
| | TGAN80N60F2DS | 160 | 80 | 2.20 | 1.75 | 1.09 | Yes | TO-3PN | Fast Speed Switching |
| | TGAF40N60F2D | 80 | 40 | 2.20 | 1.70 | 0.20 | Yes | TO-3PF | |
| | TGAF50N60F2DM | 100 | 50 | 2.25 | 1.75 | 0.33 | Yes | TO-3PF | |
| | TGH40N60F2D | 80 | 40 | 2.20 | 1.70 | 0.20 | Yes | TO-247 | |
| 330 | TGAN90N33PD* | 90 | 60 | - | 1.20 | - | Yes | TO-3PN | |

* Under Development

DIODE Discrete

| V_{RRM} [V] | Part Number | $I_{F(AV)}$ [A] | I_{FSM} [A] | $V_{F(max)}$ @25°C [V] | $V_{F(typ)}$ @25°C [V] | $Q_{rr(typ)}$ @25°C [nC] | Package | Feature/Status |
|---------------|-------------|-----------------|---------------|------------------------|------------------------|--------------------------|---------|---------------------|
| 650 | TDAF30A65 | 30 | 300 | 1.85 | 1.35 | 600 | TO-3PF | |
| | TDAF30B65 | 30 | 300 | 2.20 | 1.70 | 188 | TO-3PF | |
| | TDAN30A65 | 30 | 300 | 1.85 | 1.35 | 600 | TO-3PN | |
| | TDAN30B65 | 30 | 300 | 2.20 | 1.70 | 188 | TO-3PN | |
| | TDAN60A65DN | 30 | 300 | 1.85 | 1.35 | 600 | TO-3PN | Common Cathode Type |
| | TDAN60B65DN | 30 | 300 | 2.05 | 1.55 | 188 | TO-3PN | Common Cathode Type |
| | TDH60A65DN | 30 | 300 | 1.85 | 1.35 | 600 | TO-247 | Common Cathode Type |

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IGBT Bare Die

| V_{CES} [V] | Part Number | I_c @100°C [A] | $V_{CE(SAT),max}$ @25°C [V] | $V_{CE(SAT),typ}$ @25°C [V] | $E_{OFF,typ}$ @25°C [mJ] | $V_{ge(TH),typ}$ @25°C [V] | Package | Feature/Status |
|---------------|----------------|---------------------|--------------------------------|--------------------------------|-----------------------------|-------------------------------|---------|----------------------|
| 1350 | TG20N135FWT | 20 | 2.20 | 1.80 | 0.51 | 6.0 | Wafer | |
| | TG30N135FWT | 30 | 2.25 | 1.90 | 1.18 | 6.0 | Wafer | |
| | TG40N135FWT | 40 | 2.20 | 1.70 | 1.81 | 6.0 | Wafer | |
| | TG40N135F2SWT | 40 | 2.45 | 1.95 | 0.91 | 6.0 | Wafer | Fast Speed Switching |
| | TG40N135F2RWT* | 40 | 2.30 | 1.80 | 2.00 | 6.0 | Wafer | Short Circuit Rated |
| 1200 | TG40N120FWWT | 40 | 2.40 | 2.00 | 0.57 | 6.0 | Wafer | |
| | TG75N120F2NWT | 75 | 2.20 | 1.70 | 3.78 | 6.2 | Wafer | Short Circuit Rated |
| 1100 | TG40N110FWT | 40 | 2.50 | 2.00 | 0.68 | 5.5 | Wafer | |
| 650 | TG40N65F2SWT | 40 | 2.25 | 1.85 | 0.17 | 6.0 | Wafer | Fast Speed Switching |
| | TG40N65F2RWT* | 40 | 2.10 | 1.60 | 0.55 | 6.0 | Wafer | Short Circuit Rated |
| | TG60N65F2SWT | 60 | 2.25 | 1.85 | 0.54 | 6.0 | Wafer | Fast Speed Switching |
| | TG60N65F2RWT* | 60 | 2.10 | 1.60 | 0.97 | 6.0 | Wafer | Short Circuit Rated |
| | TG80N65F2SWT | 80 | 2.25 | 1.85 | 1.11 | 6.0 | Wafer | Fast Speed Switching |
| | TG80N65F2RWT* | 80 | 2.05 | 1.55 | 1.76 | 6.0 | Wafer | Short Circuit Rated |

* Under Development

IGBT Bare Die

| V_{CES} [V] | Part Number | I_c @100°C [A] | $V_{CE(SAT),max}$ @25°C [V] | $V_{CE(SAT),typ}$ @25°C [V] | $E_{OFF,typ}$ @25°C [mJ] | $V_{ge(TH),typ}$ @25°C [V] | Package | Feature/Status |
|---------------|--------------|---------------------|--------------------------------|--------------------------------|-----------------------------|-------------------------------|---------|----------------------|
| 600 | TG40N60F2SWT | 40 | 2.40 | 2.00 | 0.12 | 6.0 | Wafer | Fast Speed Switching |
| | TG60N60F2SWT | 60 | 2.20 | 1.75 | 0.54 | 6.0 | Wafer | Fast Speed Switching |
| | TG80N60F2SWT | 80 | 2.20 | 1.75 | 1.09 | 6.0 | Wafer | Fast Speed Switching |

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DIODE Bare Die

| V_{CES} [V] | Part Number | $I_{F(AV)}$ [A] | $V_{F(max)}$ @25°C [V] | $V_{F(typ)}$ @25°C [V] | Package | Feature/Status |
|---------------|-------------|-----------------|------------------------|------------------------|---------|----------------|
| 1350 | TD15A135WT | 15 | 2.25 | 1.75 | Wafer | |
| | TD40B135WT | 40 | 2.85 | 2.35 | Wafer | |
| | TD30B120WT | 30 | 2.55 | 1.90 | Wafer | |
| 1200 | TD50B120WT | 50 | 2.33 | 1.82 | Wafer | |
| | TD75B120WT | 75 | 2.33 | 1.82 | Wafer | |
| | TD100B120WT | 100 | 2.33 | 1.82 | Wafer | |
| | TD150B120WT | 150 | 2.33 | 1.82 | Wafer | |
| | TD10B65WT | 10 | 1.85 | 1.35 | Wafer | |
| 650 | TD20A65WT | 20 | 1.85 | 1.35 | Wafer | |
| | TD20B65WT | 20 | 2.05 | 1.55 | Wafer | |
| | TD20C65WT | 20 | 2.45 | 1.95 | Wafer | |
| | TD30A65WT | 30 | 1.85 | 1.35 | Wafer | |
| | TD30B65WT | 30 | 2.05 | 1.55 | Wafer | |
| | TD30C65WT | 30 | 2.45 | 1.95 | Wafer | |
| | | | | | | |









* Under Development

SiC MOSFET

| V_{DSS} [V] | Part Number | I_D @25°C [A] | $R_{DS(on),typ}$ @25°C [mΩ] | $V_{GS(th),typ}$ [V] | Polarity | Package | Feature/Status |
|---------------|--------------|--------------------|--------------------------------|-------------------------|----------|---------|----------------|
| 1200 | TMCH350R120* | 10.0 | 350 | 3.0 | N | TO-247 | |
| | TMCH160R120* | 22.0 | 160 | 3.0 | N | TO-247 | |
| | TMCH080R120* | 30.0 | 80 | 3.0 | N | TO-247 | |
| | TMCH052R120* | 50.0 | 52 | 3.0 | N | TO-247 | |

* Under Development

Package Information

| Discrete | |  |  |  |  |  |  |  |  |
|----------------|----------|---|---|---|--|---|---|---|---|
| Type | | D-PAK / I-PAK | TO-220 | TO-220F | TO-3PN | TO-3PF | TO-247 | TO-247 PLUS | TO-264 |
| Dimension (mm) | W | 6.5 | 10.1 | 10.1 | 15.6 | 15.5 | 15.9 | 15.9 | 20.0 |
| | L (Body) | 10.0 / 16.4 (7.2) | 28.9 (15.4) | 28.6 (15.9) | 39.9 (19.9) | 43.8 (24.5) | 41.0 (21.0) | 41.0 (21.0) | 46.0 (26.0) |
| | T | 2.3 | 4.5 | 4.7 | 4.8 | 5.5 | 5.0 | 5.0 | 5.0 |

Certification



ISO 14001 Certification



IATF 16949 Certification



Advanced Tech. Center



Inno-Biz Certification



Small Giant Company



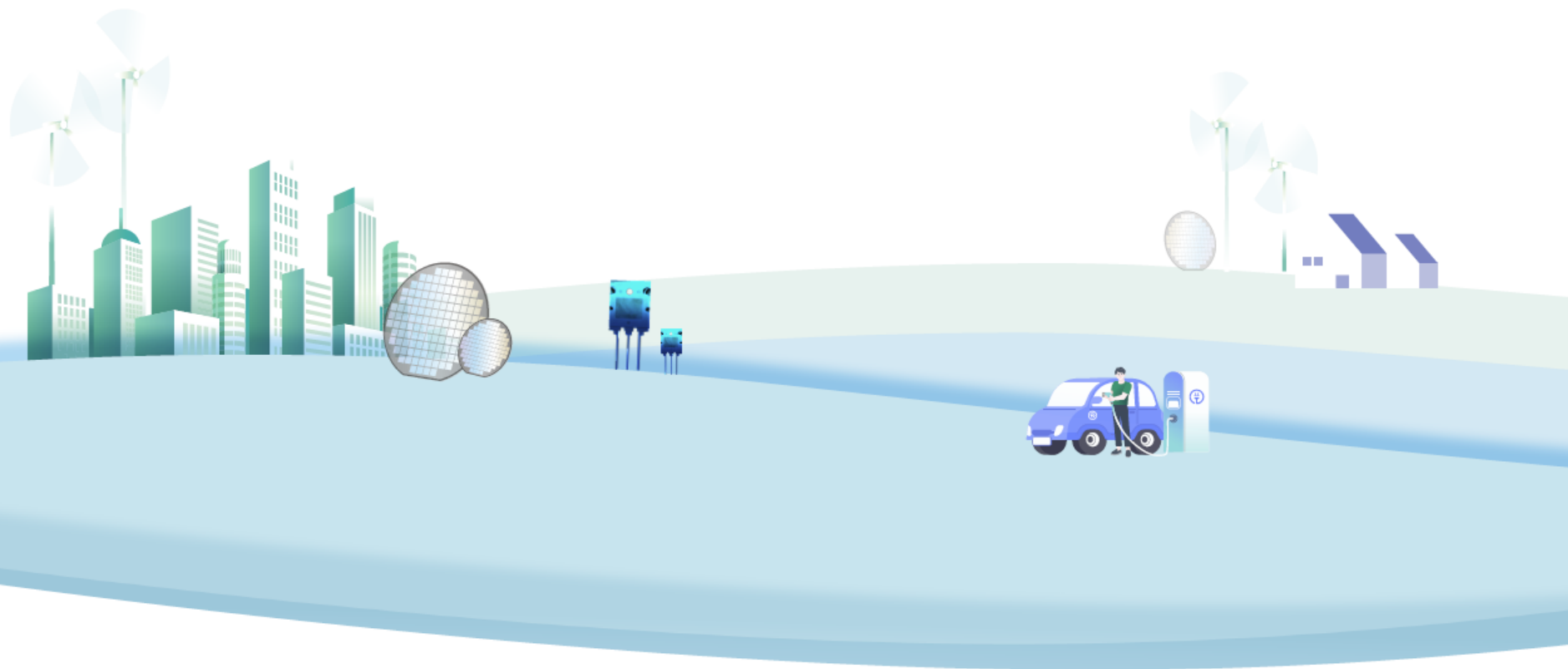
Company Reserch Lab.



Parts Specialized Company



Venture Company



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