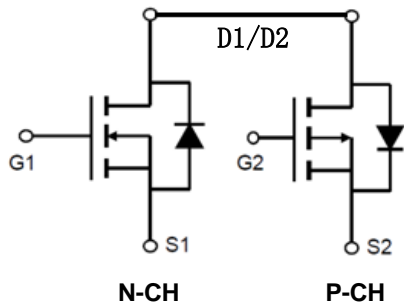
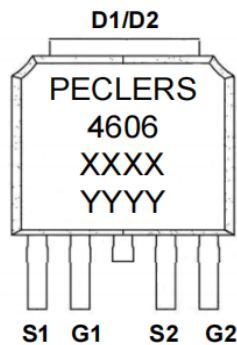


30V N And P-Channel Enhancement Mode MOSFET

Schematic diagram



Marking and pin assignment



Information

YYYY—Quality Code

Description

PECN4606G uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

General Features

◆ N-channel:

$V_{DS} = 30V$, $I_D = 12A$

$R_{DS(ON)} = 17m\Omega$ (typical) @ $V_{GS} = 10V$

$R_{DS(ON)} = 25m\Omega$ (typical) @ $V_{GS} = 4.5V$

◆ P-Channel:

$V_{DS} = -30V$, $I_D = -12A$

$R_{DS(ON)} = 28m\Omega$ (typical) @ $V_{GS} = -10V$

$R_{DS(ON)} = 36m\Omega$ (typical) @ $V_{GS} = -4.5V$

- ◆ Excellent gate charge x $R_{DS(ON)}$ product(FOM)
- ◆ Very low on-resistance $R_{DS(ON)}$
- ◆ 150 °C operating temperature
- ◆ Pb-free lead plating
- ◆ 100% UIS tested

Application

- ◆ DC/DC Converter
- ◆ Ideal for high-frequency switching and synchronous rectification

Ordering Information

| Part Number | Storage Temperature | Package | Devices Per Reel |
|-------------|---------------------|----------|------------------|
| PECN4606G-G | -55°C to +150°C | TO252-4L | 2500 |

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter | Symbol | Limit | | Unit |
|--------------------------------------|----------|---------|---------|------|
| | | N | P | |
| Drain-source voltage | V_{DS} | 30 | -30 | V |
| Gate-source voltage | V_{GS} | ±20 | ±20 | V |
| Operating junction Temperature range | T_j | -55—150 | -55—150 | °C |
| Drain Current-Continuous | I_D | 12 | -12 | A |

| | | | | | |
|--|-------------------------|------------------|---------|------|------------------|
| (Silicon Limited) | $T_A=70^\circ\text{C}$ | | 9 | -9 | |
| Pulsed Drain Current (Package Limited) | | I_{DM} | 50 | -50 | A |
| Avalanche Current ^C | | I_{AS}, I_{AR} | 22 | -27 | A |
| Avalanche energy $L=0.1\text{mH}^C$ | | E_{AS}, E_{AR} | 24 | 36 | mJ |
| Power Dissipation ^B | $T_A=25^\circ\text{C}$ | P_D | 15.6 | 31 | W |
| | $T_A=100^\circ\text{C}$ | | 6.2 | 12.5 | |
| Junction and Storage Temperature Range | | T_J, T_{STG} | -55—150 | | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | | Symbol | Device | Typ | Max | Unit |
|--|-------------------|-----------------|--------|-----|-----|--------------------|
| Maximum Junction-to-Ambient ^A | $\leq 10\text{s}$ | $R_{\theta JA}$ | n-ch | 20 | 28 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient ^A | Steady-State | | n-ch | 45 | 60 | |
| Maximum Junction-to-Lead ^B | Steady-State | $R_{\theta JC}$ | n-ch | 6 | 8 | |
| Maximum Junction-to-Ambient ^A | $\leq 10\text{s}$ | $R_{\theta JA}$ | p-ch | 15 | 20 | |
| Maximum Junction-to-Ambient ^A | Steady-State | | p-ch | 35 | 45 | |
| Maximum Junction-to-Lead ^B | Steady-State | $R_{\theta JC}$ | p-ch | 3 | 4 | |

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

B: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

N-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------------------|---------------------|--|-----|------|------|------|
| OFF Characteristics | | | | | | |
| Drain-source breakdown voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 30 | - | - | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =30V, V _{GS} =0V | - | - | 1 | μA |
| Gate-body leakage | I _{GSS} | V _{DS} =0V, V _{GS} =±20V | - | - | ±100 | nA |
| ON Characteristics | | | | | | |
| Gate threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.7 | 2.5 | V |
| Drain-source on-state resistance | R _{DS(ON)} | V _{GS} =10V, I _D =10A | - | 17 | 28 | mΩ |
| | | V _{GS} =4.5V, I _D =10A | - | 25 | 40 | |
| Forward transconductance | gfs | V _{DS} =5V, I _D =10A | - | 15 | - | S |
| Dynamic Characteristics | | | | | | |
| Input capacitance | C _{ISS} | V _{DS} =15V, V _{GS} =0V f=1.0MHz | - | 544 | - | pF |
| Output capacitance | C _{OSS} | | - | 66 | - | |
| Reverse transfer capacitance | C _{RSS} | | - | 50 | - | |
| Gate resistance | R _g | V _{GS} =0V, V _{DS} =0V, f=1.0MHz | - | 2.8 | - | Ω |
| Switching Characteristics | | | | | | |
| Turn-on delay time | t _{D(ON)} | V _{DS} =15V V _{GS} =10V R _L =1.8Ω R _{GEN} =3Ω | - | 4 | - | ns |
| Rise time | t _r | | - | 3 | - | |
| Turn-off delay time | t _{D(OFF)} | | - | 15 | - | |
| Fall time | t _f | | - | 2 | - | |
| Total gate charge | Q _g | V _{DS} =15V, I _D =10A V _{GS} =10V | - | 11.3 | - | nC |
| Gate-source charge | Q _{gs} | | - | 2.7 | - | |
| Gate-drain charge | Q _{gd} | | - | 1.5 | - | |

Typical Performance Characteristics

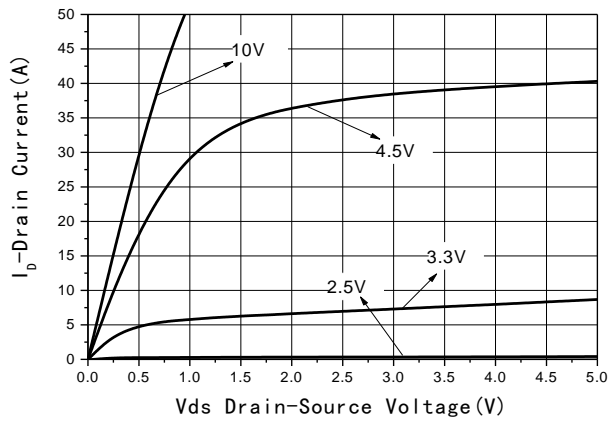


Fig1 Output Characteristics

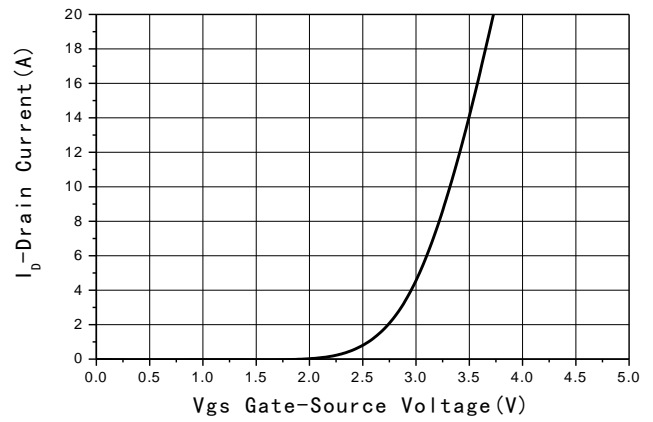


Fig2 Transfer Characteristics

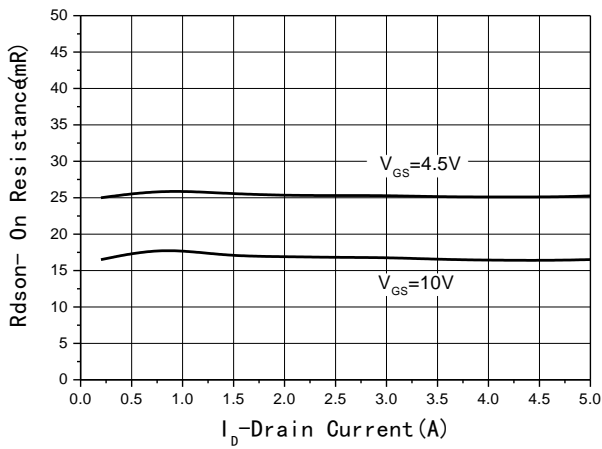


Fig3 Rds(on)-Drain current

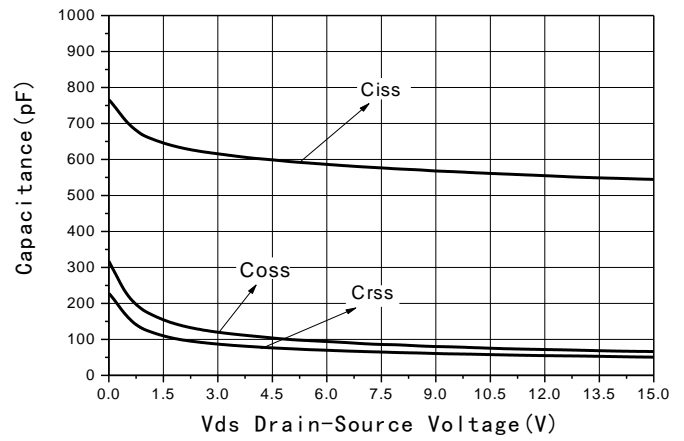


Fig4 Capacitance vs Vds

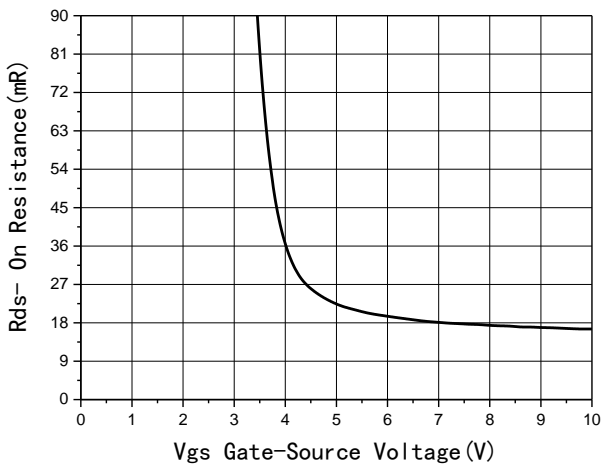


Fig5 Rds(on)-Gate Drain voltage

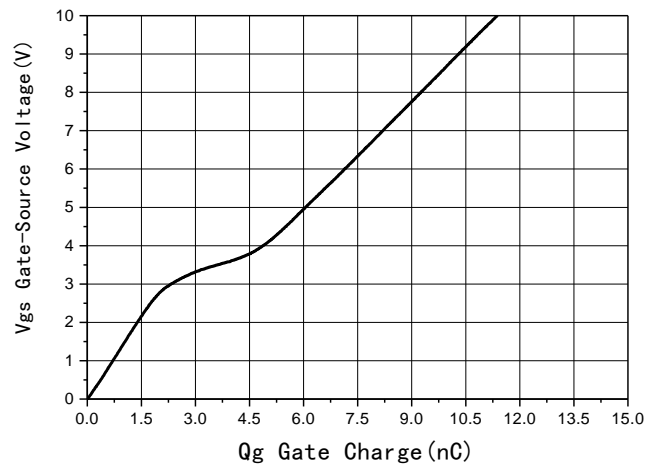


Fig6 Gate Charge

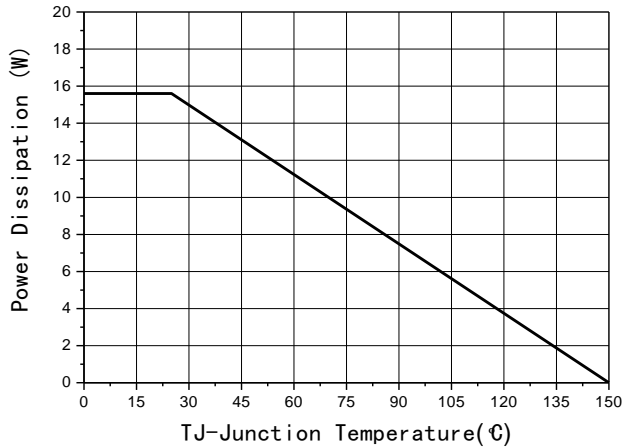


Fig7 Power De-rating

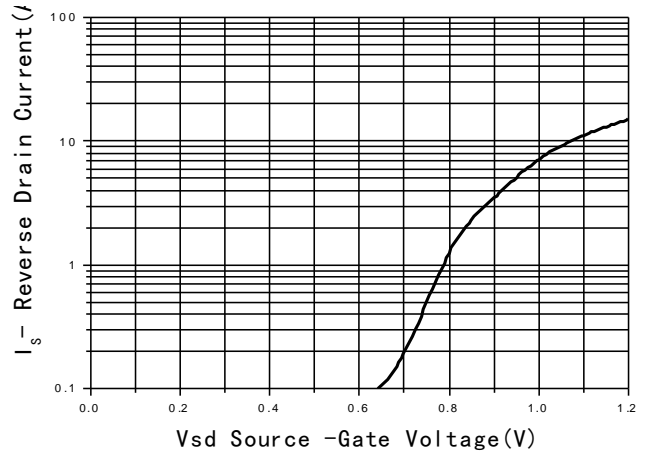


Fig8 Source-Drain Diode Forward

P-Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------------------|---------------------|--|------|-------|------|------|
| OFF Characteristics | | | | | | |
| Drain-source breakdown voltage | BV _{DSS} | V _{GS} =0V, I _D =-250μA | -30 | - | - | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =-30V, V _{GS} =0V | - | - | -1 | μA |
| Gate-body leakage | I _{GSS} | V _{DS} =0V, V _{GS} =±20V | - | - | ±100 | nA |
| ON Characteristics | | | | | | |
| Gate threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250μA | -1.0 | -1.35 | -2.5 | V |
| Drain-source on-state resistance | R _{DS(ON)} | V _{GS} =-10V, I _D =-10A | - | 28 | 32 | mΩ |
| | | V _{GS} =-4.5V, I _D =-10A | - | 36 | 42 | |
| Forward transconductance | g _{fs} | V _{DS} =-5V, I _D =-10A | - | 18 | - | S |
| Dynamic Characteristics | | | | | | |
| Input capacitance | C _{ISS} | V _{DS} =-15V, V _{GS} =0V f=1.0MHz | - | 911 | - | pF |
| Output capacitance | C _{OSS} | | - | 94 | - | |
| Reverse transfer capacitance | C _{RSS} | | - | 82 | - | |
| Gate resistance | R _g | V _{GS} =0V, V _{DS} =0V, f=1.0MHz | - | 4 | - | Ω |
| Switching Characteristics | | | | | | |
| Turn-on delay time | t _{D(ON)} | V _{DS} =-15V V _{GS} =-10V R _L =2.3Ω R _{GEN} =3Ω | - | 10 | - | ns |
| Rise time | t _r | | - | 5.5 | - | |
| Turn-off delay time | t _{D(OFF)} | | - | 3.6 | - | |
| Fall time | t _f | | - | 4.6 | - | |
| Total gate charge | Q _g | V _{DS} =-15V, I _D =-10A V _{GS} =-10V | - | 18.7 | - | nC |
| Gate-source charge | Q _{gs} | | - | 3.8 | - | |
| Gate-drain charge | Q _{gd} | | - | 2.6 | - | |

Typical Performance Characteristics

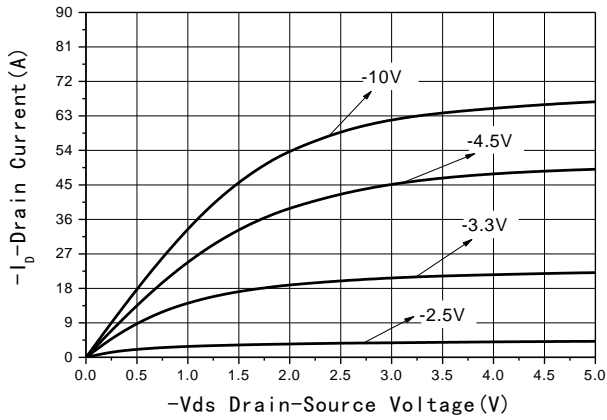


Fig1 Output Characteristics

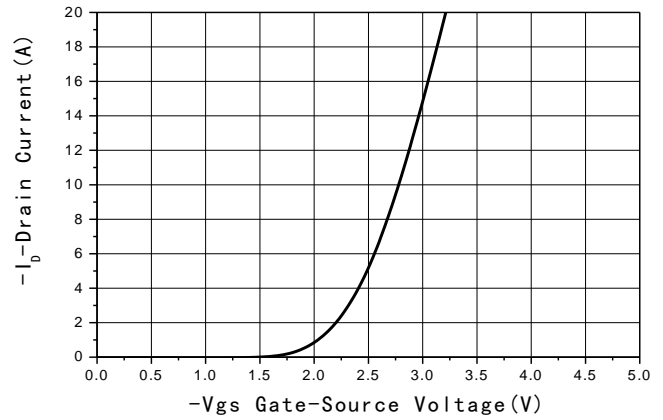


Fig2 Transfer Characteristics

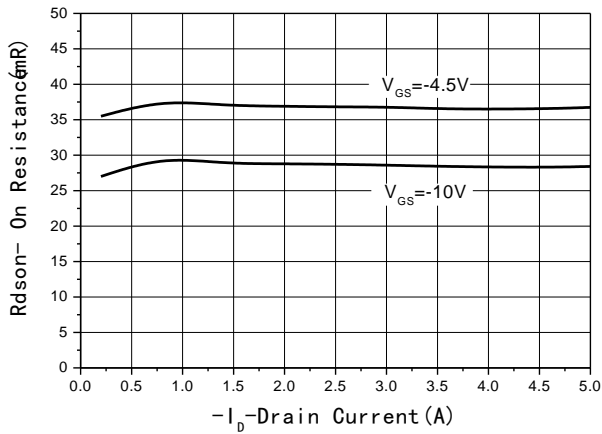


Fig3 R_{DS(on)}-Drain current

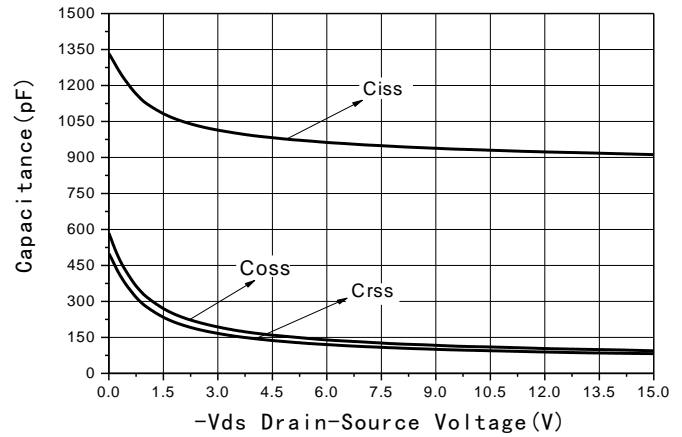


Fig4 Capacitance vs V_{DS}

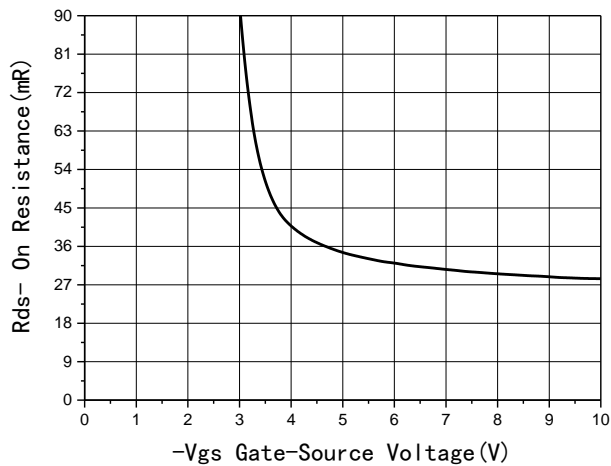


Fig5 R_{DS(on)}-Gate Drain voltage

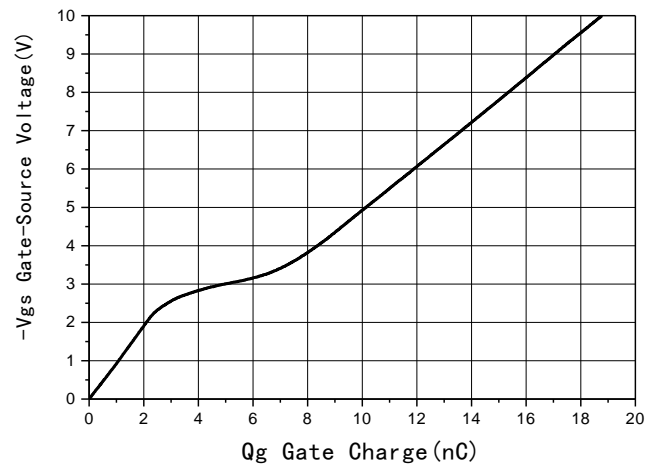


Fig6 Gate Charge

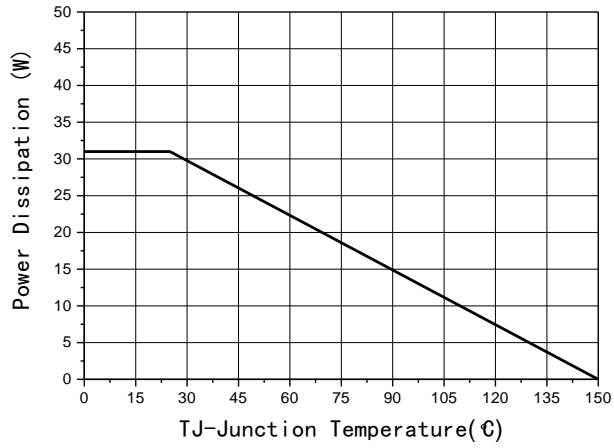


Fig7 Power De-rating

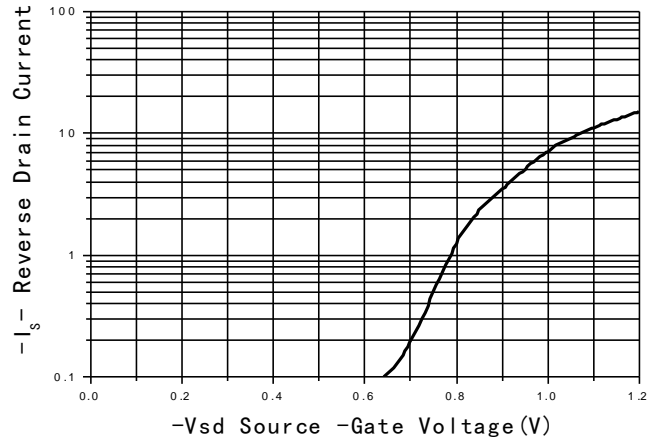


Fig8 Source-Drain Diode Forward

Package Information

- TO252-4L

