



**THE DATASHEET OF
GN2470K4-G**



 **Insulated Gate Bipolar Transistor**

Features

- ▶ Low voltage drop at high currents
- ▶ Industry standard TO-252 (D-Pak) package
- ▶ 700V breakdown voltage rating

Applications

- ▶ White goods
- ▶ Small appliances
- ▶ Lighting controls
- ▶ Motor drives
- ▶ Meter readers
- ▶ Small off-line power supplies

General Description

The Supertex GN2470 is a 700V, 3.5amp insulated gate bipolar transistor (IGBT) that combines the positive aspects of both BJTs and MOSFETs.

The GN2470 IGBT has lower on-state voltage drop with high blocking voltage capabilities and features many desirable properties including a MOS input gate, low conduction voltage drop at high currents.

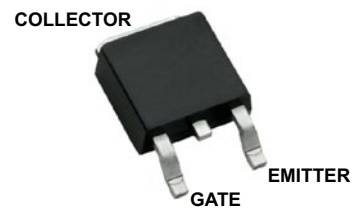
Ordering Information

| Device | Package Option |
|--------|----------------|
| | TO-252 (D-PAK) |
| GN2470 | GN2470K4-G |

-G indicates that the package is RoHS certified ("Green")

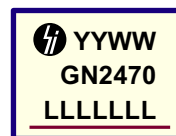


Pin Configuration



TO-252 (D-PAK) (K4)

Pin Configuration



YY = Year Sealed
 WW = Week Sealed
 L = Lot Number
 _____ = "Green" Packaging

TO-252 (D-PAK) (K4)

Absolute Maximum Ratings

| Parameter | Value |
|--|-----------------|
| Collector-to-emitter voltage | 700V |
| Gate-to-emitter voltage | ±20V |
| Operating junction and storage temperature range | -55°C to +150°C |
| Soldering temperature* | 300°C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may affect device reliability. All voltages are referenced to device ground.

* Distance of 1.6mm from case for 10 seconds.

Thermal Characteristics

| Package | I_C (continuous) | I_C (pulsed) | Power Dissipation @ $T_A = 25^\circ\text{C}$ | θ_{jc} ($^\circ\text{C}/\text{W}$) | θ_{ja} ($^\circ\text{C}/\text{W}$) |
|---------|-----------------------|-------------------|---|--|--|
| TO-252 | 1.0A | 3.5A | 2.5W | 10 | 60† |

Notes:

† Mounted on FR4 board, 25mm x 25mm x 1.57mm

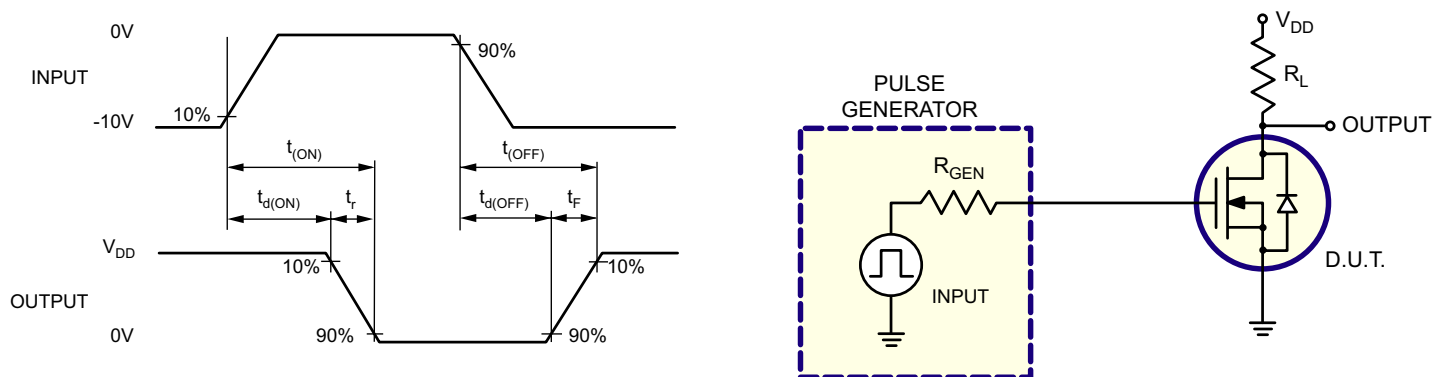
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise specified)

| Sym | Parameter | Min | Typ | Max | Units | Conditions |
|--------------|--|------|------|-----------|---------------|--|
| BV_{CES} | Collector-to-emitter breakdown voltage | 700 | - | - | V | $V_{GE} = 0\text{V}, I_C = 250\mu\text{A}$ |
| BV_{ECS} | Emitter-to-collector breakdown voltage | -6.0 | -10 | - | V | $V_{GE} = 0\text{V}, I_C = 1.0\text{mA}$ |
| $V_{GE(th)}$ | Gate threshold voltage | 1.5 | - | 3.5 | V | $V_{CE} = V_{GE}, I_C = 1.0\text{mA}$ |
| V_{CE} | Collector-to-emitter voltage drop | - | 4.5 | 5.0 | V | $I_C = 3.0\text{A}, V_{GE} = 13\text{V}$ |
| g_{fe} | Forward transconductance | 0.5 | 0.8 | - | mho | $V_{CE} = 25\text{V}, I_C = 2.0\text{A}$ |
| I_{CES} | Zero gate voltage collector current | - | - | 100 | μA | $V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$ |
| I_{GES} | Gate-to-emitter leakage current | - | - | ± 100 | nA | $V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}$ |
| $I_{C(ON)}$ | On-state collector current | 3.0 | 4.0 | - | A | $V_{GE} = 10\text{V}, V_{CE} = 25\text{V}$ |
| $t_{d(ON)}$ | Turn-on delay time | - | 8.0 | 15 | ns | $V_{CC} = 25\text{V}$ $R_{GEN} = 25\Omega$ $R_L = 11\Omega$ |
| t_r | Rise time | - | 400 | 600 | | |
| $t_{d(OFF)}$ | Turn-off delay time | - | 20 | 50 | | |
| t_f | Fall time | - | 7000 | 12000 | | |
| C_{ISS} | Input capacitance | - | 100 | 150 | pF | $V_{CE} = 25\text{V}$ $V_{GE} = 0\text{V}$ $f = 1\text{MHz}$ |
| C_{OSS} | Output capacitance | - | 12 | 25 | | |
| C_{RSS} | Reverse transfer capacitance | - | 2 | 5 | | |

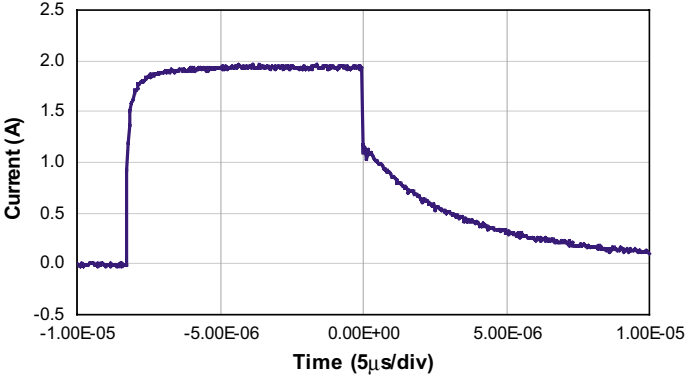
Notes:

1. All D.C. parameters 100% tested at 25°C unless otherwise stated. (Pulse test: 300 μs pulse, 2% duty cycle.)
2. All A.C. parameters sample tested.

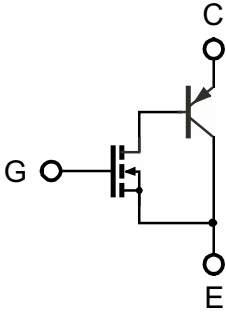
Switching Waveforms and Test Circuit



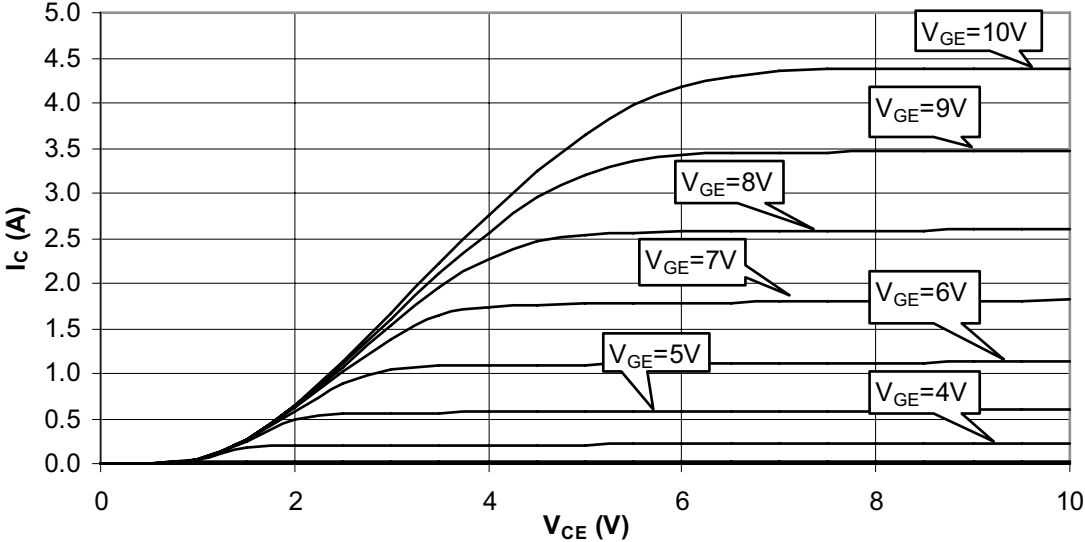
Typical Performance Waveform



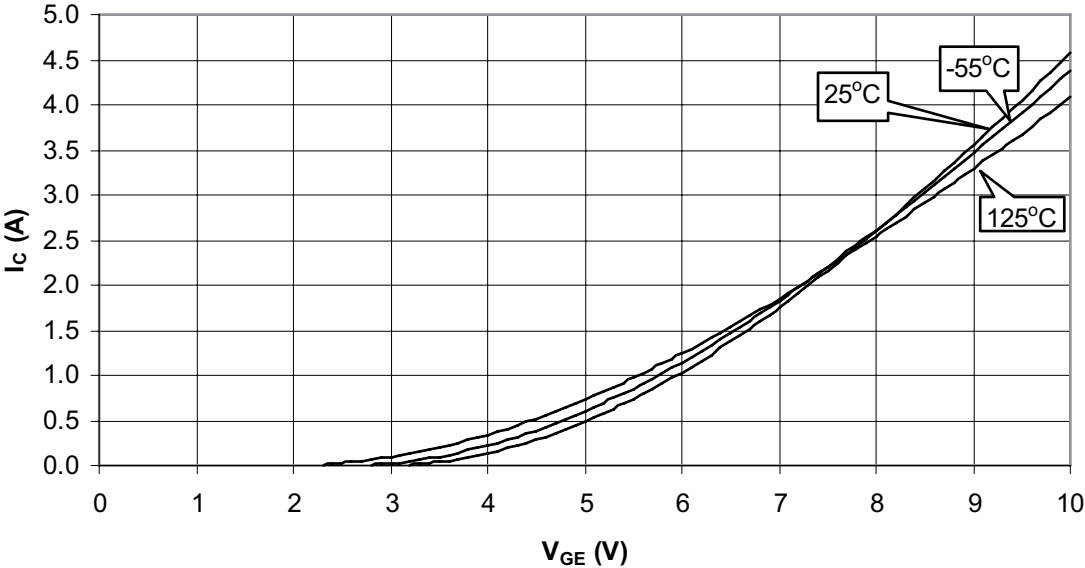
Equivalent Circuit



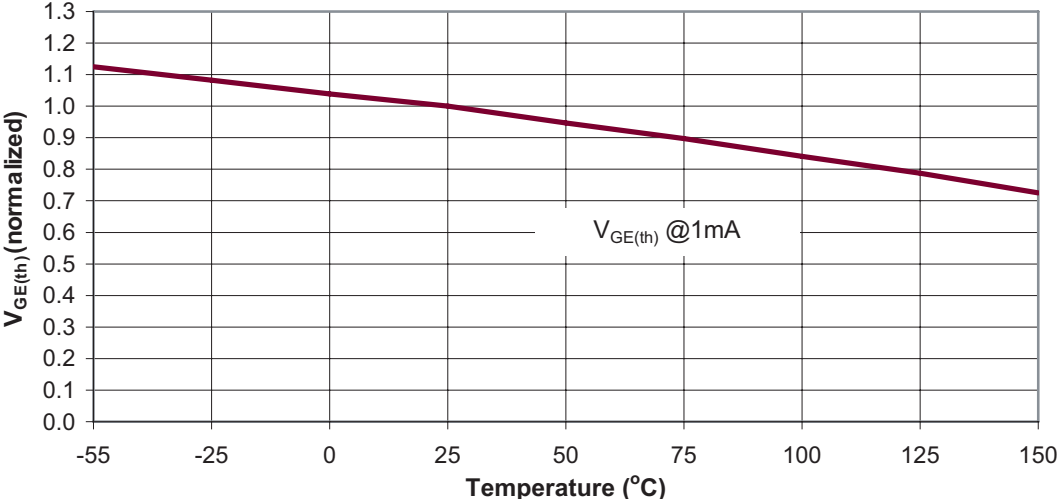
Saturation Characteristics



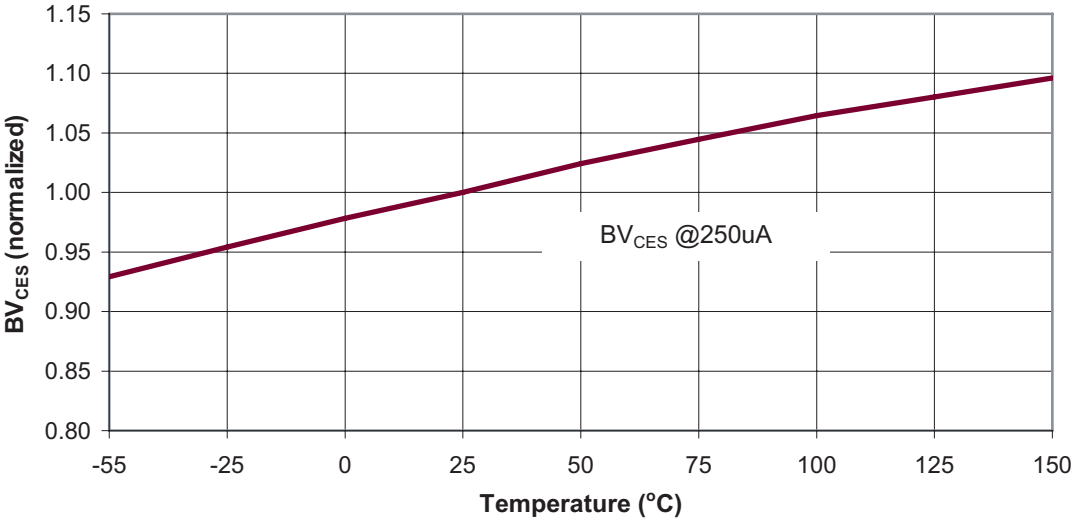
Transfer Characteristics



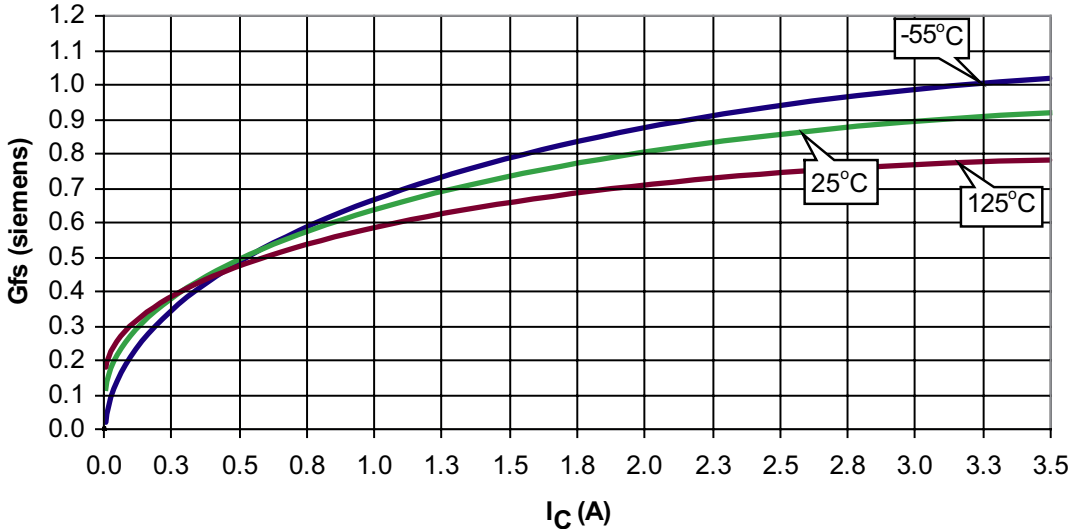
$V_{GE(th)}$ Variation with Temperature



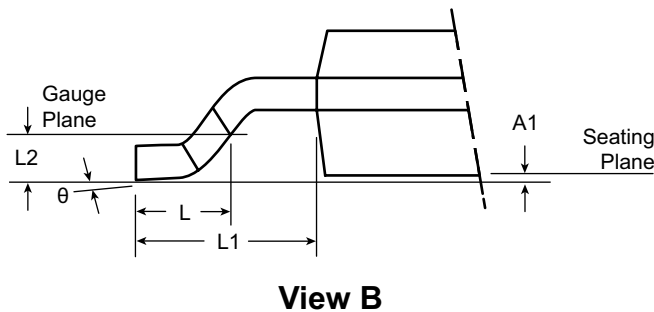
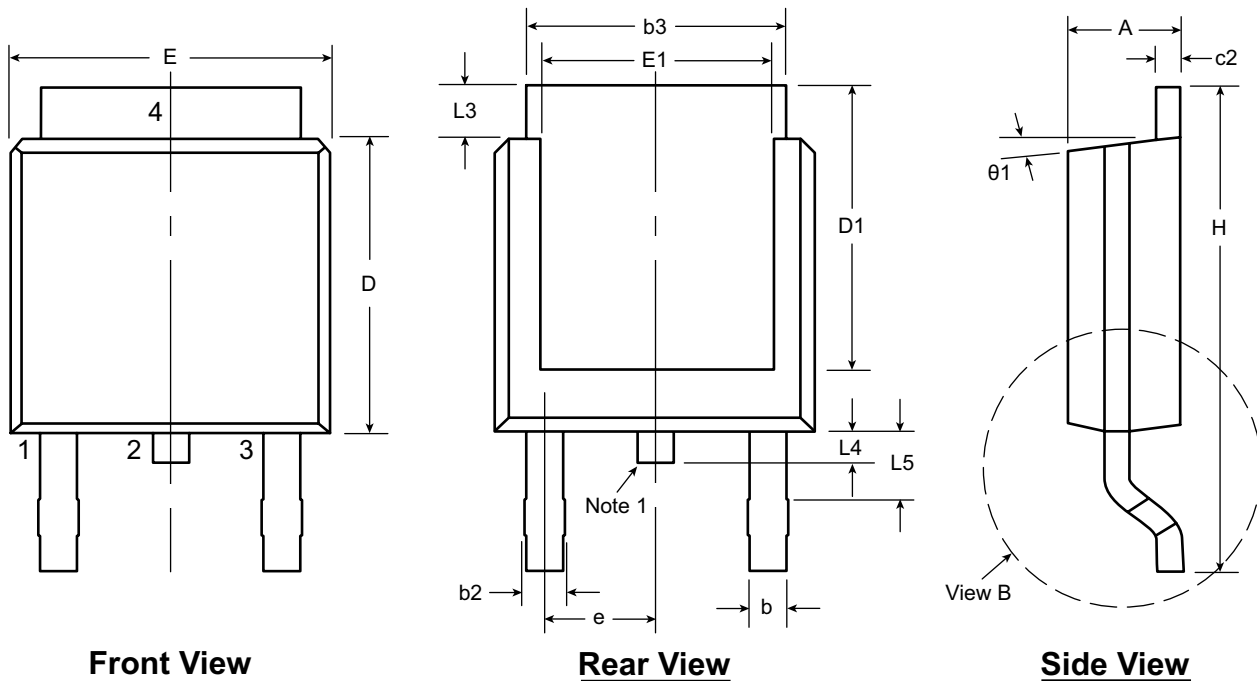
BV_{CES} Variation with Temperature



Transconductance vs. Collector Current



3-Lead TO-252 D-PAK Package Outline (K4)



Note:
 1. Although 4 terminal locations are shown, only 3 are functional. Lead number 2 was removed.

| Symbol | A | A1 | b | b2 | b3 | c2 | D | D1 | E | E1 | e | H | L | L1 | L2 | L3 | L4 | L5 | θ | $\theta1$ | | |
|--------------------|-----|------|-------|------|------|------|------|------|-------|------|----------|-------|------|----------|----------|------|-------|------|----------|-----------|------|-----|
| Dimension (inches) | MIN | .086 | .000* | .025 | .030 | .195 | .235 | .205 | .250 | .170 | .090 BSC | .370 | .055 | .108 REF | .020 BSC | .035 | .025* | .045 | 0° | 0° | | |
| | NOM | - | - | - | - | - | .240 | - | - | - | | - | .060 | | | - | - | - | - | - | - | - |
| | MAX | .094 | .005 | .035 | .045 | .215 | .035 | .245 | .217* | .265 | | .182* | .410 | | | .070 | - | - | .050 | .040 | .060 | 10° |

JEDEC Registration TO-252, Variation AA, Issue E, June 2004.
 * This dimension is not specified in the original JEDEC drawing. The value listed is for reference only.
Drawings not to scale.
Supertex Doc. #: DSPD-3TO252K4, Version D081408.

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to <http://www.supertex.com/packaging.html>.)

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