Initial Release

Insulated Gate Bipolar Transistor

Features

- Low voltage drop at high currents
- Optimized for use with the Supertex SR03x Inductorless Off-Line Switcher
- 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

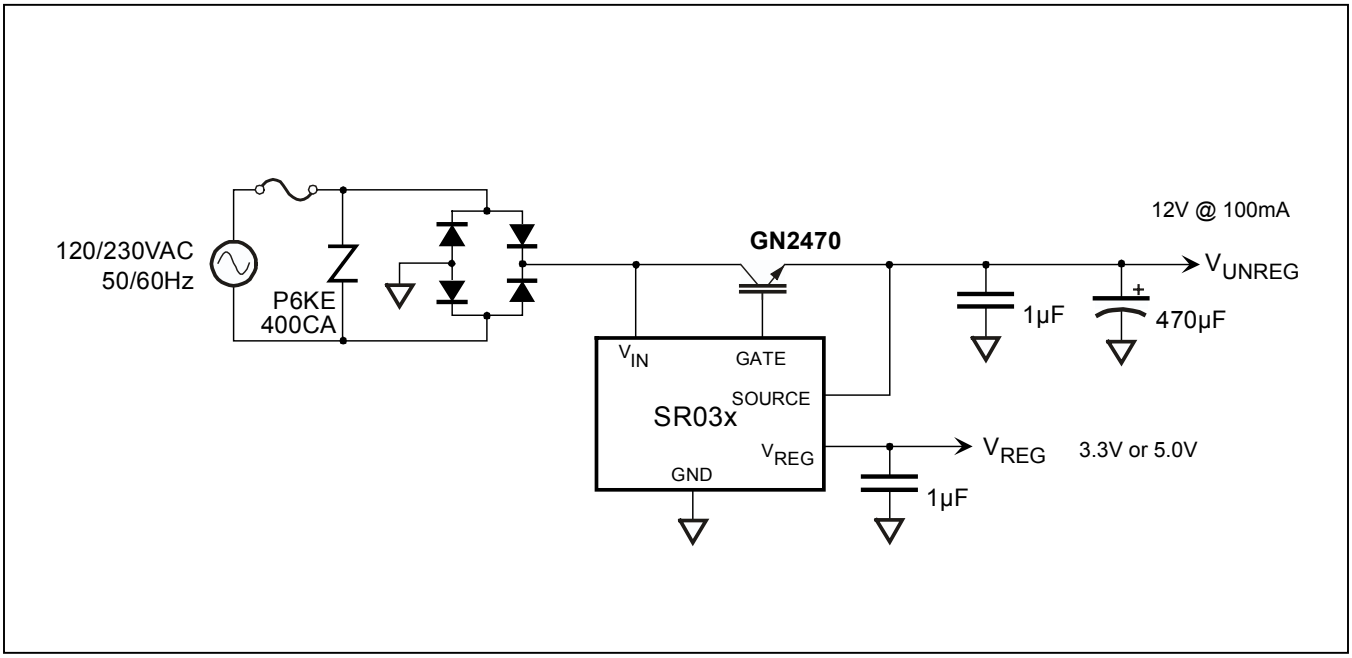
Description

The Supertex GN2470 is a 700V, 3.5 amp 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.

The GN2470 is designed to work with the Supertex SR03x inductorless dual output off-line regulators. See the SR03x datasheet for details.

Typical Application



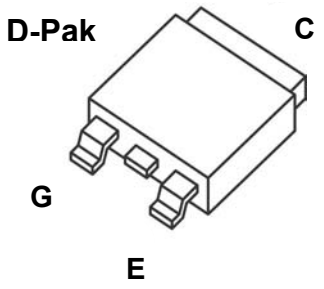
Rev. B – 4-22-04

Ordering Information

Device	Package Options
	D-Pak*
GN2470	GN2470K4

** Only available in 2000 piece Tape & Reel*

Package Option



Absolute Maximum Ratings

Collector-to-EmItter Voltage	700V
Gate-to-Emitter Voltage	+/-20V
Operating Junction and Storage Temperature Range T_J and T_{STG}	-55°C to +150°C
Soldering Temperature*	300°C

**Distance if 1.6mm from case for 10 seconds.*

Thermal Characteristics

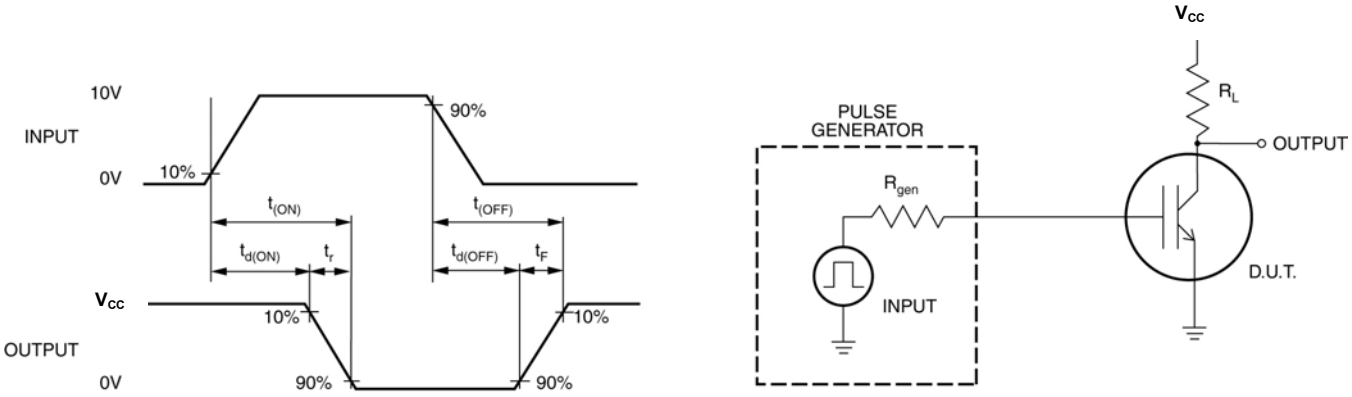
Package	Ic (continuous)	Ic (pulsed)	Power Dissipation @ T_A = 25°C	θja °C/W	θjc °C/W
D-Pak	1.0A	3.5A	2.5W	60*	10

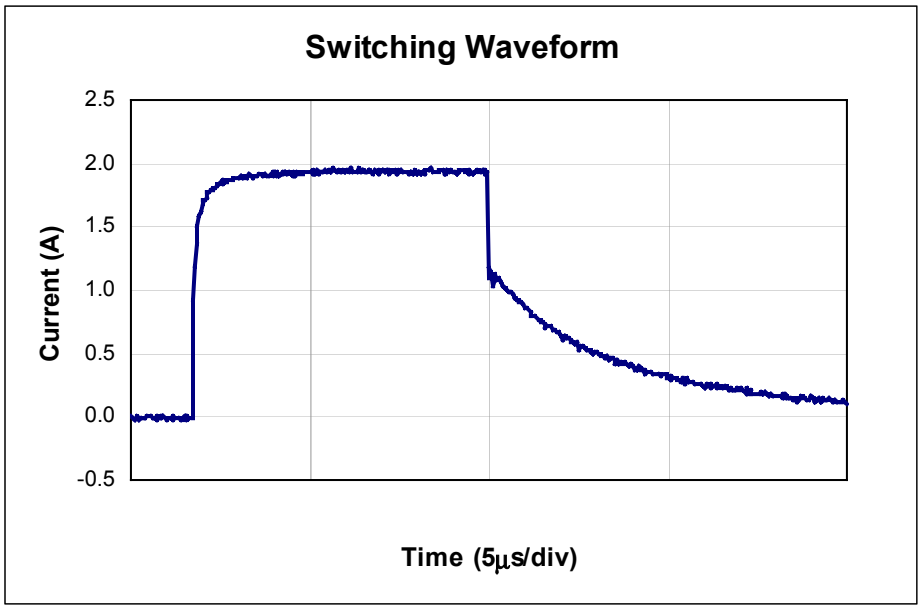
**When mounted on FR4 board, 25mm x 25mm x 1.57mm*

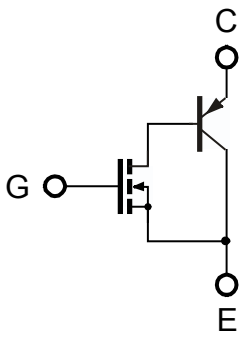
Electrical Characteristics *(at T_A=25°C, unless otherwise specified)*

Symbol	Parameter	Min	Typ	Max	Units	Conditions
BV_{CES}	Collector-Emitter Breakdown Voltage	700	-	-	V	V_{GE} = 0V, I_C = 250uA
BV_{ECS}	Emitter-Collector Breakdown Voltage	-6	-10		V	V_{GE} = 0V, I_C = 1mA
$V_{GE(th)}$	Gate Threshold voltage	1.5	-	3.5	V	V_{CE} = V_{GE}, I_C = 1mA
V_{CE}	Collector-Emitter Voltage Drop	-	4.5	5.0	V	I_C = 3A, V_{GE} = 13V
g_{fe}	Forward Transconductance	0.5	0.8	-	mho	V_{CE} = 25V, I_C = 2A
I_{CES}	Zero Gate Voltage Collector Current	-	-	100	uA	V_{GE} = 0V, V_{CE} =600V
I_{GES}	Gate-Emitter Leakage Current	-	-	±100	nA	V_{GE} = +/-20V, V_{CE} =0V
$I_{C(on)}$	On-State Collector Current	3.0	4.0	-	A	V_{GE} = 10V, V_{CE} = 25V
$t_{d(on)}$	Turn-on delay time	-	8.0	15.0	ns	V_{CC} = 25V R_{GEN} = 25Ω R_L = 11Ω
t_r	Rise time	-	400	600	ns	
$t_{d(off)}$	Turn-off delay time	-	20	50	ns	
t_f	Fall Time	-	7000	12000	ns	
C_{ies}	Input Capacitance	-	100	150	pF	V_{CE} = 25V V_{GE} = 0V f = 1MHz
C_{oes}	Output Capacitance	-	12	25	pF	
C_{res}	Reverse Transfer Capacitance	-	2	5	pF	

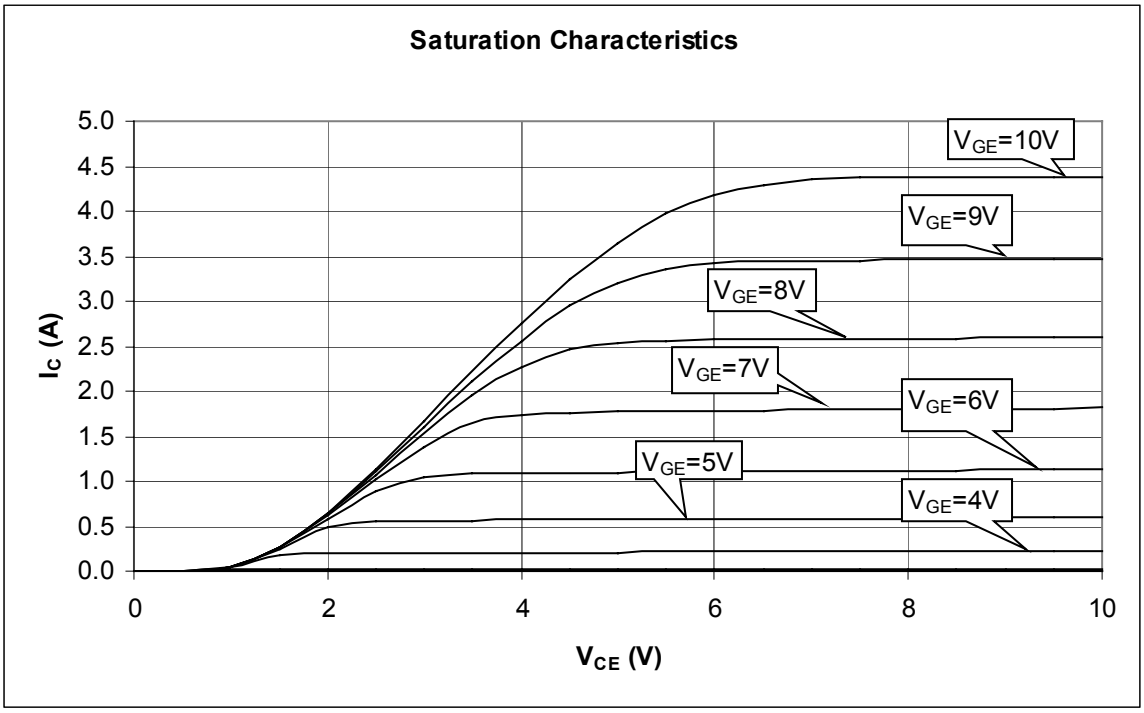
Switching Waveforms and Test Circuit

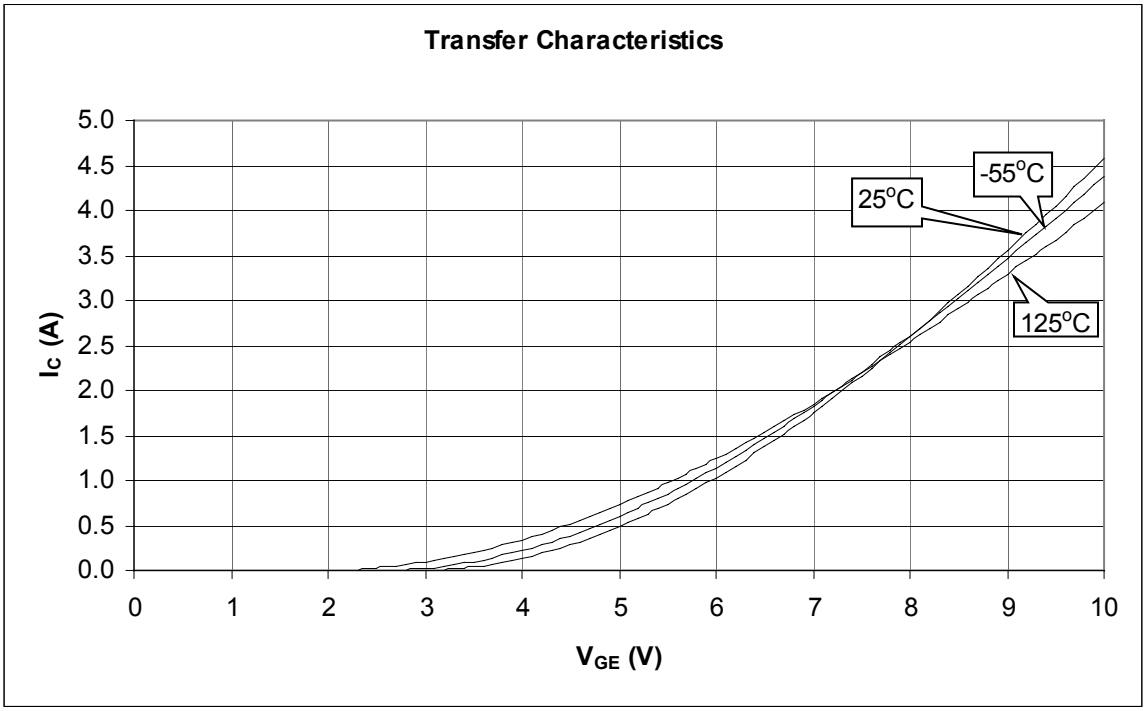


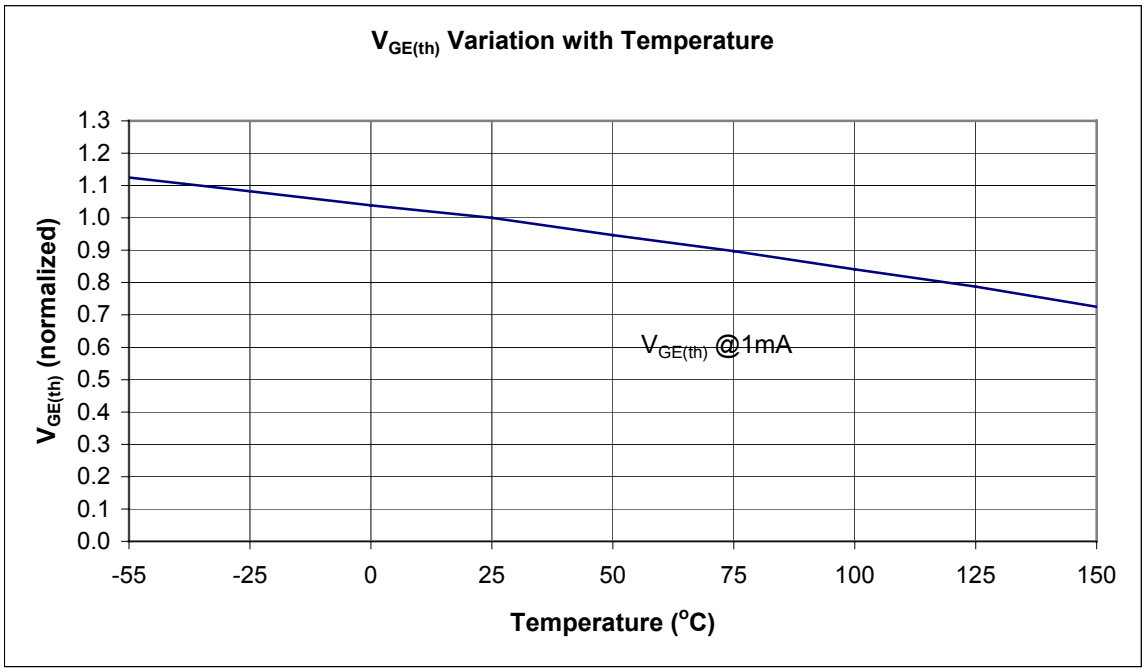


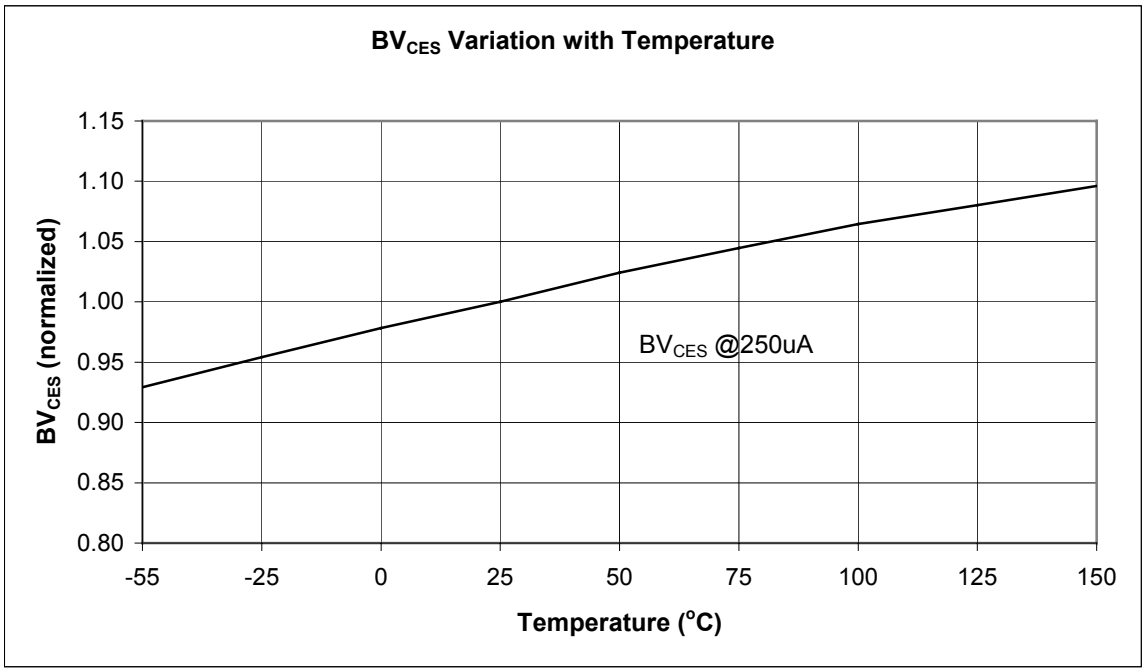


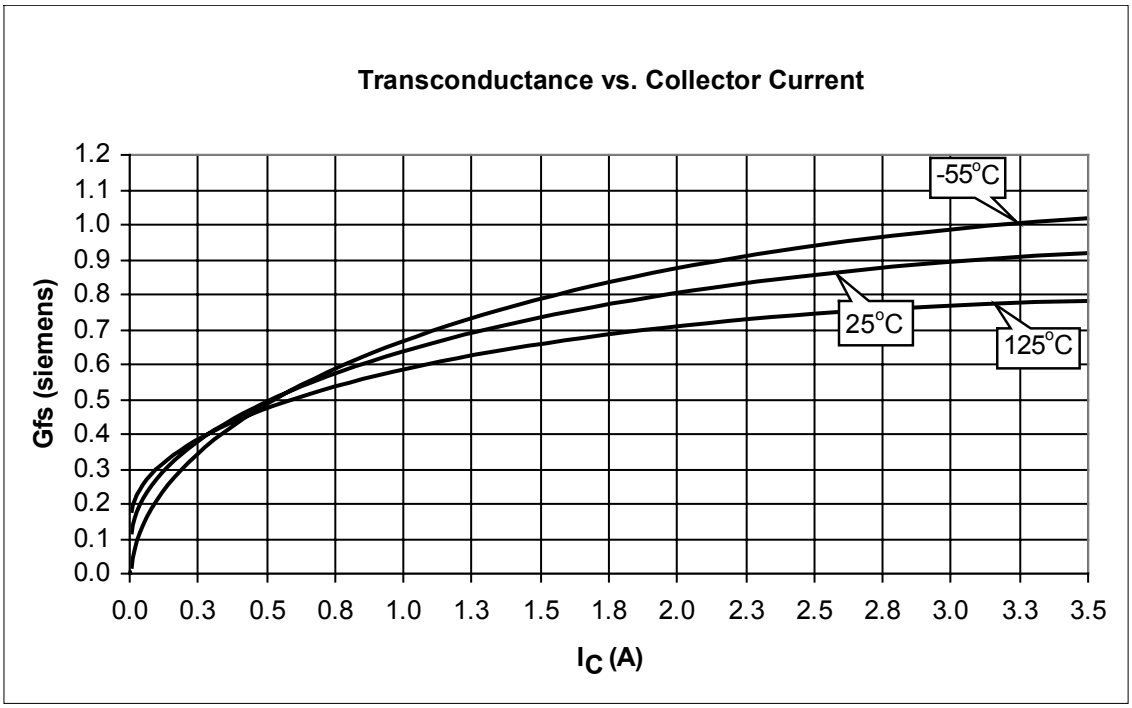
Equivalent Circuit


Saturation Characteristics
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
I_C (A)
0
2
4
6
8
10
V_{CE} (V)
V_{GE}=10V
V_{GE}=9V
V_{GE}=8V
V_{GE}=7V
V_{GE}=6V
V_{GE}=5V
V_{GE}=4V


Transfer Characteristics
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
I_C (A)
0
1
2
3
4
5
6
7
8
9
10
V_{GE} (V)
-55°C
25°C
125°C

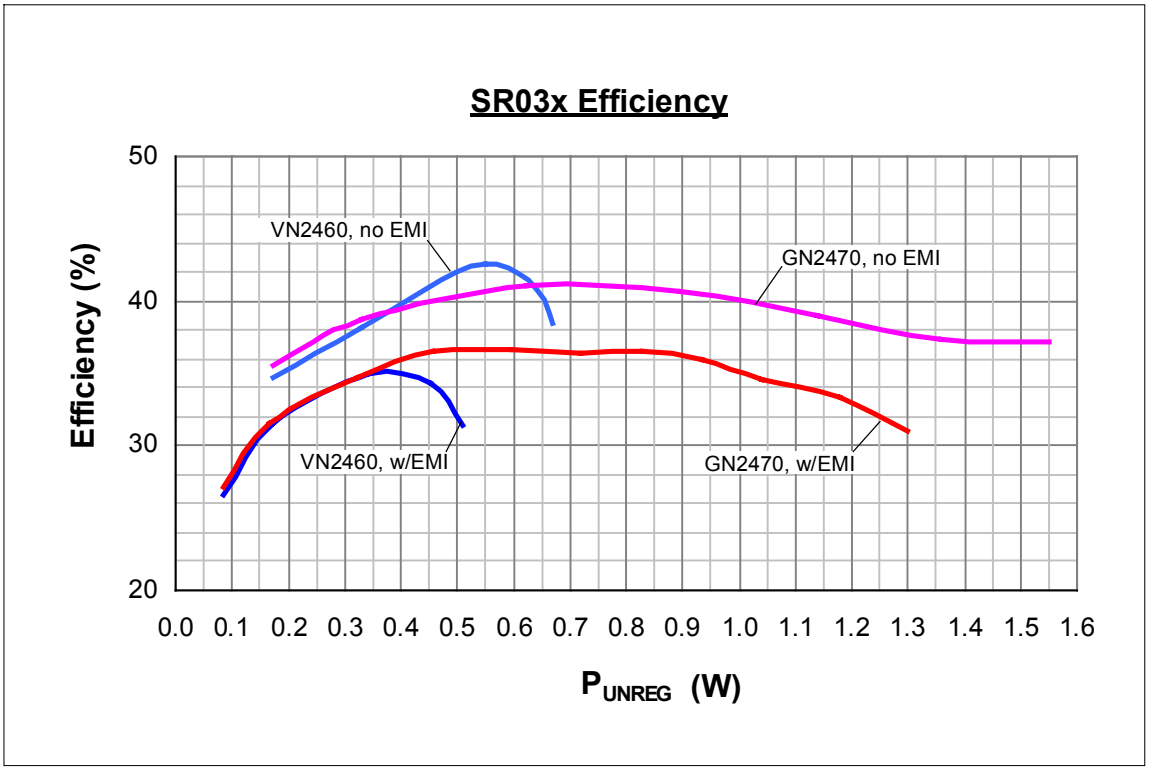

$V_{GE(th)}$ Variation with Temperature
$V_{GE(th)}$ (normalized)
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
$V_{GE(th)}$ @1mA
-55
-25
0
25
50
75
100
125
150
Temperature (°C)

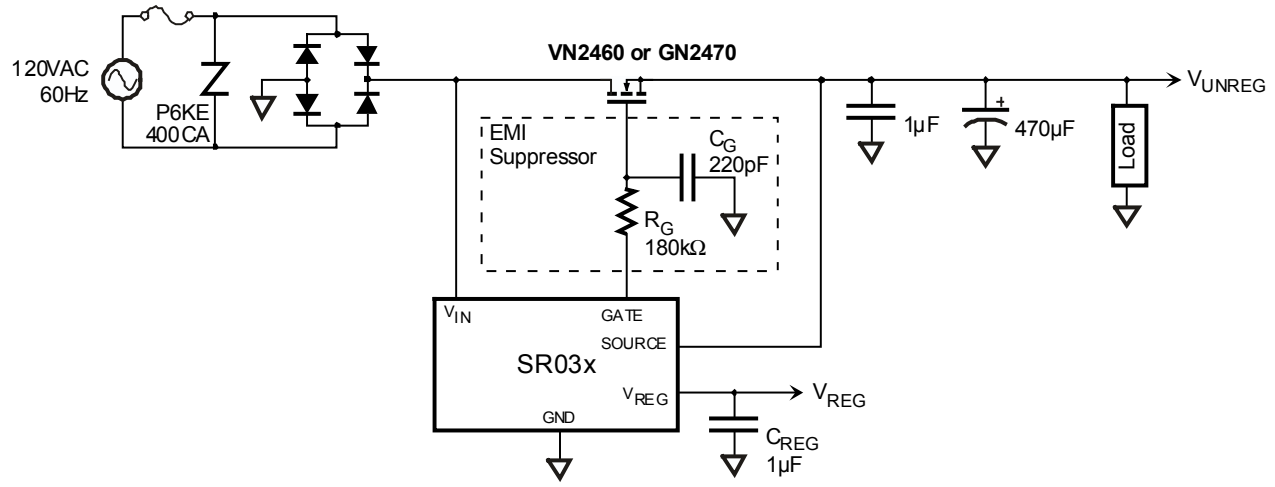

BV_{CES} Variation with Temperature
BV_{CES} (normalized)
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
BV_{CES} @250uA
-55
-25
0
25
50
75
100
125
150
Temperature (°C)



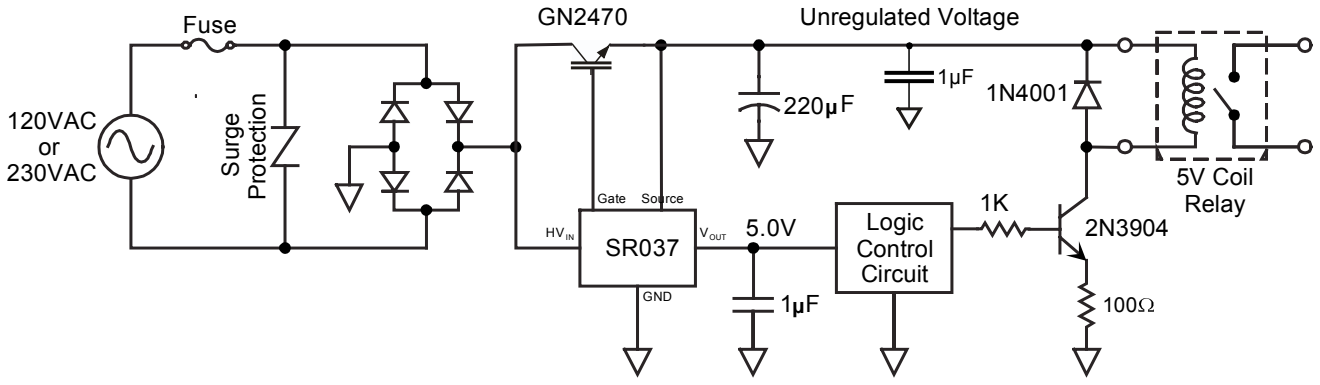
Application

Using the GN2470 IGBT in place of a MOSFET improves the performance of SR03x-based power supplies.





SR03 Efficiency Test Circuit



SR03/GN2470 Relay Driver

Supertex inc.

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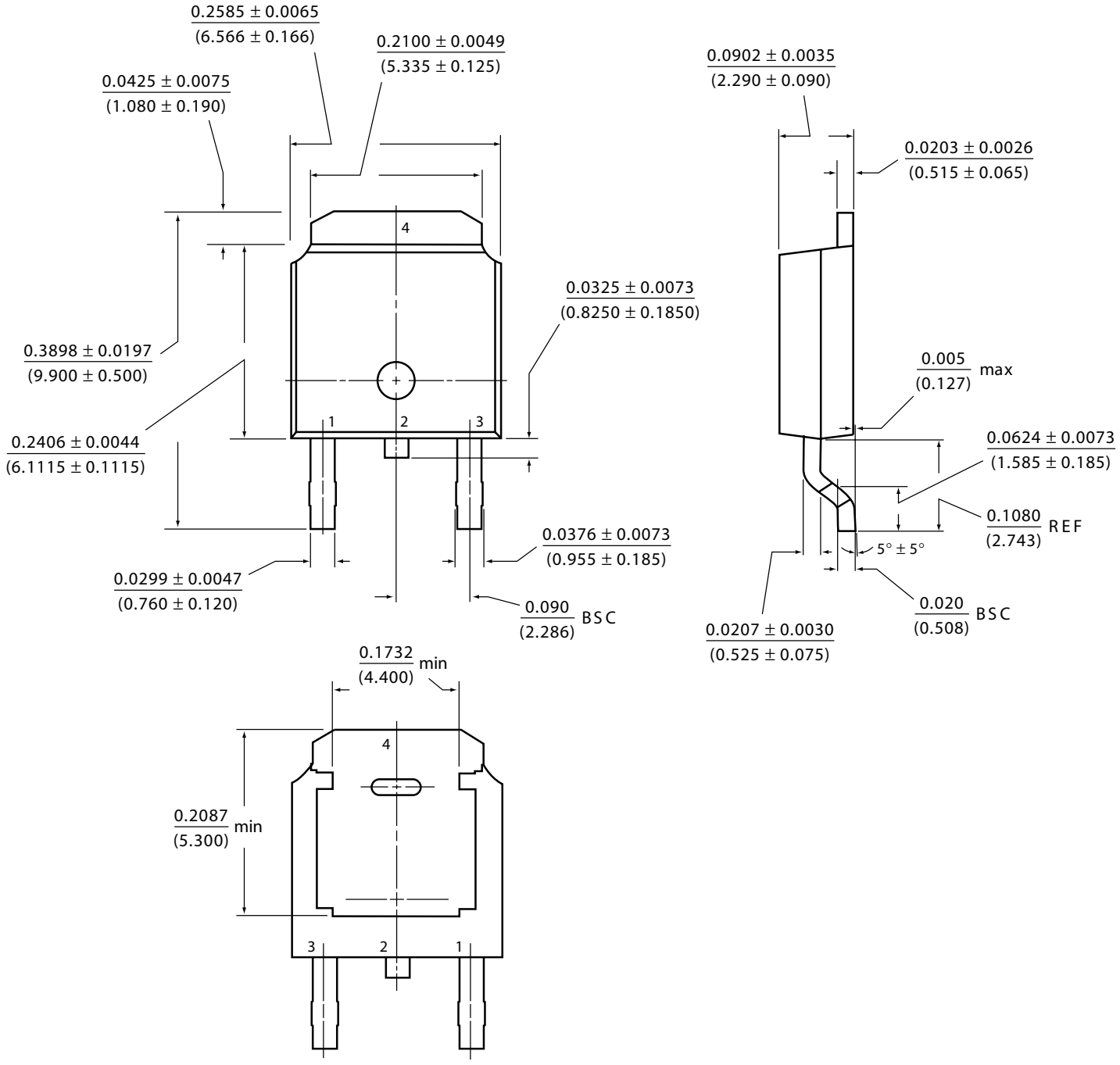
www.supertex.com

TO-252 (DPAK: K4)



Note: Circle (e.g. (B)) indicates JEDEC Reference.

Measurement Legend = Dimensions in Inches / (Dimensions in Millimeters)

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