VN2406B ■ VN1706B ■ VN1206B
VN2406D ■ VN1706D ■ VN1206D

Siliconix

240V N-Channel Enhancement Mode MOSPOWER

These power FETs are designed especially for off-line switching regulators, converters, solenoid and relay drivers.

FEATURES

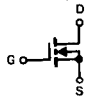
- **High Voltage**
- **No Second Breakdown**
- **High Input Impedance**
- **Internal Drain-Source Diode**
- **Very Rugged: Excellent SOA**
- **Extremely Fast Switching**

BENEFITS

- **Reduced Component Count**
- **Improved Performance**
- **Simpler Designs**
- **Improved Reliability**

Product Summary

Part Number	BV_{DSS}	$R_{DS(ON)}$	I_D	Package
VN2406B	240V	6Ω	0.8A	TO-39
VN1706B	170V			
VN1206B	120V			
VN2406D	240V	6Ω	1.4A	TO-220AB
VN1706D	170V			
VN1206D	120V			



ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Drain-Source Voltage
- VN1210B, D 120V
- VN1710B, D 170V
- VN2410B, D 240V

Drain-Gate Voltage
- VN1210B, D 120V
- VN1710B, D 170V
- VN2410B, D 240V

Gate Current (Peak) ..... ±1A

Gate Source Voltage ..... ±40V

Drain Current
- Continuous[1]
  - B Suffix ..... ±0.8A
  - D Suffix ..... ±1.4A
- Pulsed[2] ..... ±3A

	TO-39	TO-220AB
Total Power Dissipation	6.25W	20W
Linear Derating Factor	50mW/°C	160mW/°C

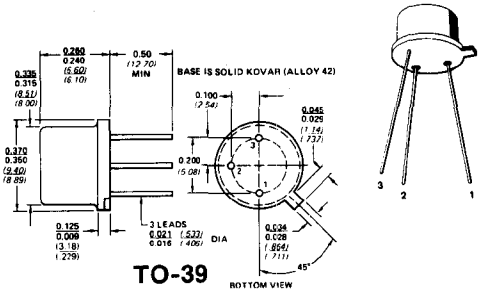
Operating and Storage Temperature ..... −55°C to +150°C

Lead Temperature (1 1/16" from Case for 10 secs) ..... +300°C

Notes:
1. Limited by package dissipation.
2. Pulse test—80μs to 300μs, 1% duty cycle.

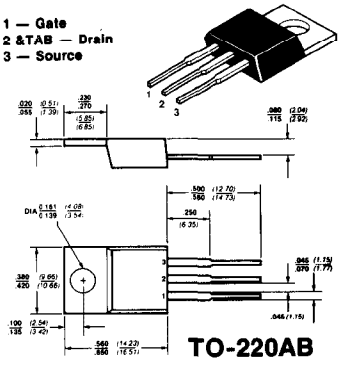
PACKAGE DIMENSIONS

PIN 1 — Source
PIN 2 — Gate
PIN 3 & CASE — Drain



TO-39

PIN 1 — Gate
PIN 2 &TAB — Drain
PIN 3 — Source



TO-220AB

ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

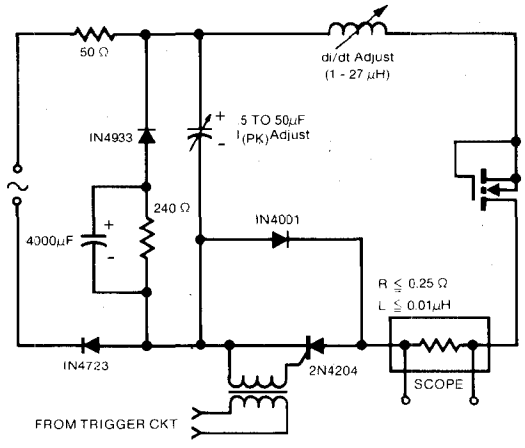
Symbol	Characteristics	Type	Min	Max	Unit	Test Conditions
			Static			
BV_{DSS}	Drain-Source Breakdown	VN2406B VN1706B VN1206B	240 170 120		V	V_{GS} = 0, I_D = 100μA
		VN2406D VN1706D VN1206D	240 170 120			
$V_{GS(th)}$	Gate Threshold Voltage	All	0.8	2.0	V	V_{DS} = V_{GS}, I_D = 1mA
I_{GSS}	Gate Body Leakage	All		100	nA	V_{DS} = 0, V_{GS} = 15V
				500		V_{DS} = 0, V_{GS} = 15V, T_A = 125°C
I_{DSS}	Zero Gate Voltage Drain Current	All		10	μA	V_{DS} = 120V, V_{GS} = 0
				500		V_{DS} = 120V, V_{GS} = 0, T_A = 125°C
$V_{DS(on)}$	Drain-Source Saturation Voltage[1]			1.0	V	V_{GS} = 2.5V, I_D = 0.1A
				3.0		V_{GS} = 10V, I_D = 0.5A
$r_{DS(on)}$	Drain-Source On Resistance[1]			10	Ω	V_{GS} = 2.5V, I_D = 0.1A
				6		V_{GS} = 10V, I_D = 0.5A
$I_{D(on)}$	On-State Drain Current[1]	All	1.0		A	V_{DS} = 25V, V_{GS} = 10V
			Dynamic			
g_{fs}	Forward Transconductance[1]	All	300		mS	V_{DS} = 25V, I_D = 0.5A
C_{iss}	Input Capacitance	All		125	pF	V_{GS} = 0, V_{DS} = 25V, f = 1 MHz
C_{rss}	Reverse Transfer Capacitance	All		20		
C_{oss}	Common-Source Output Capacitance	All		50		
			Drain-Source Diode Characteristics			
			Typ			
V_{SD}	Forward ON Voltage[1]		−1.2		V	I_S = −1.0A, V_{GS} = 0
t_{rr}	Reverse Recovery Time		100		ns	I_F = I_R = 1.0A, V_{GS} = 0 (Figure 1)

Note 1: Pulse test — 80 μs to 300 μs, 1% duty cycle

Refer to VNDB24 Design Curves (See Section 4)

TEST CIRCUIT

Reverse Recovery Test Circuit

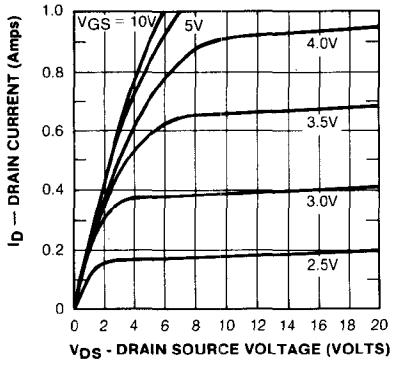


TYPICAL STATIC CHARACTERISTICS

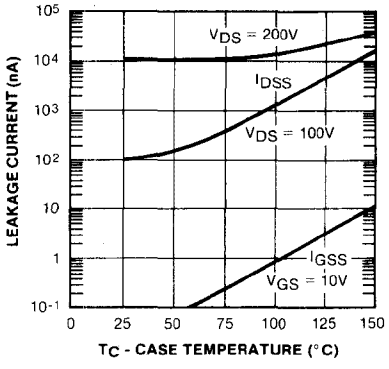
(Pulse width 80μs—300μs, Duty cycle 1%, T_C=25°C)

Part Numbers: VN2406L, VN1706L, VN1206L, VN2406M, VN1706M, VN1206M, VN2406B, VN1706B, VN1206B, VN2406D, VN1706D, VN1206D, VN2410L, VN1710L, VN1210L, VN2410M, VN1710M, VN1210M

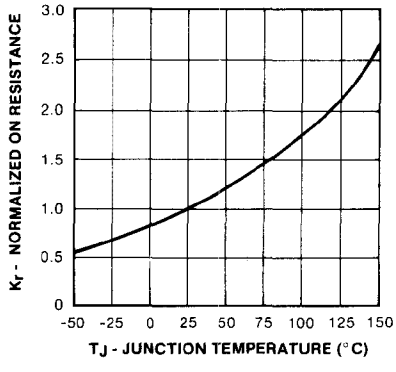
Ohmic Region



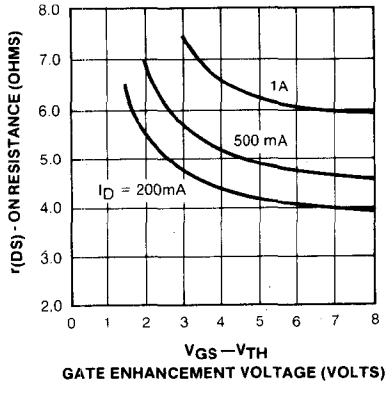
Leakage Current



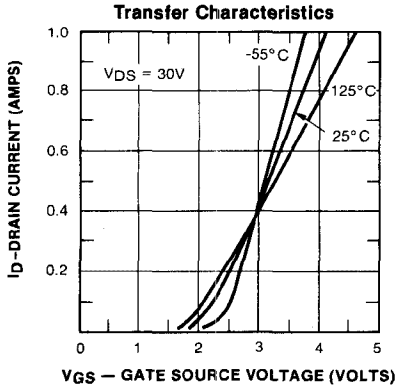
Temperature Effects on $r_{DS(on)}$



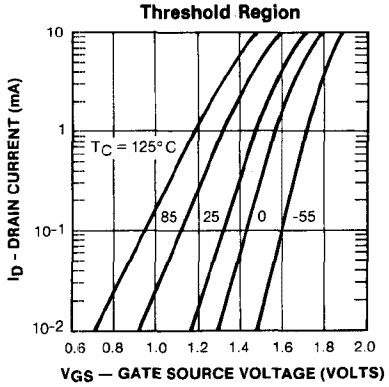
ON Resistance Characteristics



Transfer Characteristics



Threshold Region



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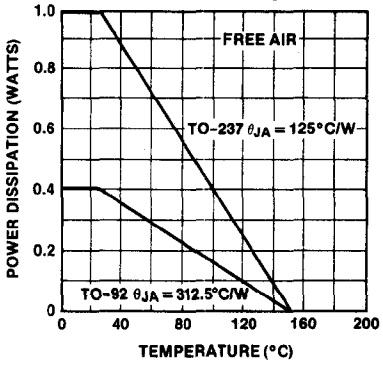
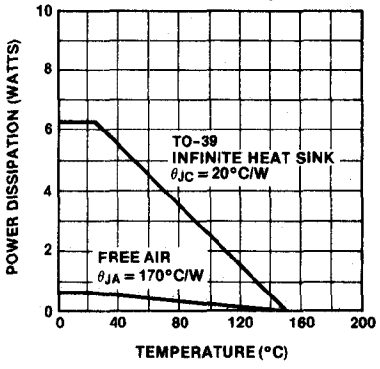
TYPICAL CHARACTERISTICS (Cont'd)

Part Numbers: VN2406L, VN1706L, VN1206L, VN2406M, VN1706M, VN1206M, VN2406B, VN1706B, VN1206B, VN2406D, VN1706D, VN1206D, VN2410L, VN1710L, VN1210L, VN2410M, VN1710M, VN1210M

Power Derating



Power Derating



Power Derating