Supertex inc.

N-Channel Enhancement-Mode Vertical DMOS Power FET

Ordering Information

BV_{DSS} / BV_{DGS}	$R_{DS(ON)}$ (max)	$I_{D(ON)}$ (min)	Order Number / Package
			TO-39
35V	1.8Ω	1.5A	2N6659

Features

- ☐ Freedom from secondary breakdown
- ☐ Low power drive requirement
- ☐ Ease of paralleling
- ☐ Low C_{ISS} and fast switching speeds
- ☐ Excellent thermal stability
- ☐ Integral Source-Drain diode
- ☐ High input impedance and high gain
- ☐ Complementary N- and P-Channel devices

Advanced DMOS Technology

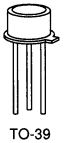
These enhancement-mode (normally-off) power transistors utilize a vertical DMOS structure and Supertex's well-proven silicon-gate manufacturing process. This combination produces devices with the power handling capabilities of bipolar transistors and with the high input impedance and negative temperature coefficient inherent in MOS devices. Characteristic of all MOS structures, these devices are free from thermal runaway and thermally-induced secondary breakdown.

Supertex Vertical DMOS Power FETs are ideally suited to a wide range of switching and amplifying applications where high breakdown voltage, high input impedance, low input capacitance, and fast switching speeds are desired.

Applications

- ☐ Motor control
- ☐ Converters
- ☐ Amplifiers
- ☐ Switches
- ☐ Power supply circuits
- ☐ Drivers (Relays, Hammers, Solenoids, Lamps, Memories, Displays, Bipolar Transistors, etc.)

Package Options (Note 1)



TO-39

Note 1: See Package Outline section for discrete pinouts.

Absolute Maximum Ratings

Drain-to-Source Voltage	BV_{DSS}
Drain-to-Gate Voltage	BV_{DGS}
Gate-to-Source Voltage	±40V
Operating and Storage Temperature	-55°C to +150°C
Soldering Temperature*	300°C

*Distance of 1.6 mm from case for 10 seconds.

Thermal Characteristics

Package	I_D (continuous)*	I_D (pulsed)	Power Dissipation @ T_C = 25°C	θ_{ja} °C/W	θ_{jc} °C/W
TO-39	1.4A	3A	6.25	170	20

*I_D (continuous) is limited by max rated T_j.

Electrical Characteristics (@ 25°C unless otherwise specified)

(Notes 1 and 2)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	35			V	I_D = 10μA, V_{GS} = 0
$V_{GS(th)}$	Gate Threshold Voltage	0.8		2.0	V	V_{GS} = V_{DS}, I_D = 1mA
I_{GSS}	Gate Body Leakage			100	nA	V_{GS} = ±15V, V_{DS} = 0
I_{DSS}	Zero Gate Voltage Drain Current			10		V_{GS} = 0, V_{DS} = Max Rating
				500	μA	V_{GS} = 0, V_{DS} = 0.8 Max Rating, T_A = 125°C
$I_{D(ON)}$	ON-State Drain Current	1.5			A	V_{GS} = −10V, V_{DS} ≥ 2 $V_{DS(ON)}$
$R_{DS(ON)}$	Static Drain-to-Source ON-State Resistance			5.0	Ω	V_{GS} = 5V, I_D = 0.3A
				1.8		V_{GS} = 10V, I_D = 1A
G_{FS}	Forward Transconductance	170			m℧	V_{DS} = 24V, I_D = 0.5A
C_{ISS}	Input Capacitance			50	pF	V_{GS} = 0, V_{DS} = 25V, f = 1MHz
C_{OSS}	Common Source Output Capacitance			65		
C_{RSS}	Reverse Transfer Capacitance			10		
$t_{(ON)}$	Turn-ON Time			10	ns	V_{DD} = 25V, I_D = 1A, R_S = 50Ω
$t_{(OFF)}$	Turn-OFF Time			10		
V_{SD}	Diode Forward Voltage Drop		0.9		V	I_{SD} = −1.4A, V_{GS} = 0

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

Switching Waveforms and Test Circuit