Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

2N6660

N-Channel, Enhancement-Mode, Vertical DMOS FET

Features

- Free 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

Applications

- Motor controls
- Converters
- Amplifiers
- Switches
- Power supply circuits
- Drivers: relays, hammers, solenoids, lamps, memories, displays, bipolar transistors, etc.

Description

2N6660 is an enhancement-mode (normally-off) transistor that utilizes a vertical DMOS structure and a well-proven silicon-gate manufacturing process. This combination produces a device with the power-handling capabilities of bipolar transistors, and the high input impedance and positive temperature coefficient inherent in MOS devices. Characteristic of all MOS structures, this device is free from thermal runaway and thermally-induced secondary breakdown.

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

Package Types

GATE
SOURCE
DRAIN

TO-39
Case: Drain
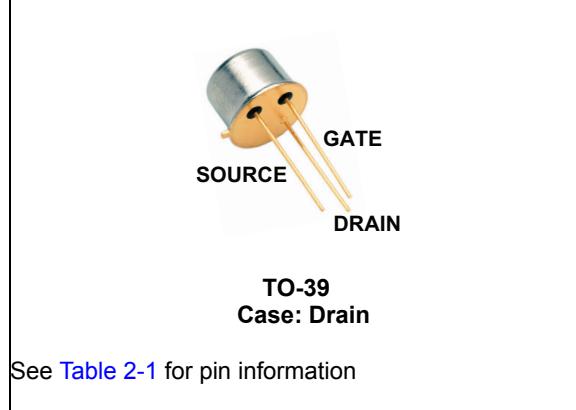
See Table 2-1 for pin information

2N6660

1.0   ELECTRICAL CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS†

Drain-to-source voltage ....BV$_{DSS}$
Drain-to-gate voltage..BV$_{DGS}$
Gate-to-source voltage.. ±20V
Operating and Storage Temperature .... -55 to 150 °C

> **† Notice:** Stresses above those listed under "Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

Electrical Specifications: Unless otherwise specified, for all specifications T$_A$ = +25°C

Parameter	Symbol	Min	Typ	Max	Units	Conditions
DC Parameters (**Note 1,** unless otherwise stated)						
Drain-to-source breakdown voltage	BV$_{DSS}$	60	-	-	V	V$_{GS}$= 0V, I$_D$= 10µA
Gate threshold voltage	V$_{GS(th)}$	0.8	-	2.0	V	V$_{GS}$= V$_{DS}$, I$_D$= 1.0mA
V$_{GS(th)}$ change with temperature	ΔV$_{GS(th)}$	-	-3.8	-5.5	mV/°C	V$_{GS}$= V$_{DS}$, I$_D$= 1.0mA (**Note 2**)
Gate body leakage current	I$_{GSS}$	-	-	100	nA	V$_{GS}$= ±20V, V$_{DS}$= 0V
Zero gate voltage drain current	I$_{DSS}$	-	-	10	µA	V$_{GS}$= 0V, V$_{DS}$= Max rating
		-	-	500		V$_{DS}$= 0.8 Max Rating, V$_{GS}$= 0V, T$_A$= 125°C (**Note 2**)
On-state drain current	I$_{D(ON)}$	1.5	-	-	A	V$_{GS}$= 10V, V$_{DS}$= 10V
Static drain-to-source on-state resistance	R$_{DS(ON)}$	-	-	5.0	Ω	V$_{GS}$= 5.0V, I$_D$= 0.3A
		-	-	3.0		V$_{GS}$= 10V, I$_D$= 1.0A
AC Parameters (**Note 2**)						
Forward transconductance	G$_{FS}$	170	-	-	mmho	V$_{DS}$= 25V, I$_D$= 0.5A
Input capacitance	C$_{ISS}$	-	-	50	pF	V$_{GS}$= 0V, V$_{DS}$= 24V, f = 1.0MHz
Common source output capacitance	C$_{OSS}$	-	-	40		
Reverse transfer capacitance	C$_{RSS}$	-	-	10		
Turn-on time	t$_{(ON)}$	-	-	10	ns	V$_{DD}$= 25V, I$_D$= 1.0A, R$_{GEN}$= 25Ω
Turn-off time	t$_{(OFF)}$	-	-	10		
Diode Parameters						
Diode forward voltage drop	V$_{SD}$	-	1.2	-	V	V$_{GS}$= 0V, I$_{SD}$= 1.0A (**Note 1**)
Reverse recovery time	t$_{rr}$	-	350	-	ns	V$_{GS}$= 0V, I$_{SD}$= 1.0A (**Note 2**)

Note 1: All DC parameters are 100% tested at 25°C unless otherwise stated. Pulse test: 300 µs pulse, 2% duty cycle.

2: Specification is obtained by characterization and is not 100% tested.

TEMPERATURE SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Temperature Ranges						
Operating and Storage Temperature	T$_A$	-55	–	150	°C	

THERMAL CHARACTERISTICS

Package	I_D[1] continuous (mA)	I_D pulsed (A)	Power Dissipation @T_A = 25°C (W)	I_{DR}[1] (mA)	I_{DRM} (A)
TO-39	410	3.0	6.25	410	3.0

Note 1: I_D (continuous) is limited by max rated T_J.

Product Summary

BV_{DSX}/BV_{DGS} (V)	$R_{DS(ON)}$ (max) (Ω)	I_{DSS} (min) (A)
60	3.0	1.5

2.0   PIN DESCRIPTION

The locations of the pins are listed in Package Types and Packaging Information.

TABLE 2-1:   PIN DESCRIPTION

Pin # TO-39	Function
1	SOURCE
2	GATE
3	DRAIN

2N6660

3.0   FUNCTIONAL DESCRIPTION

Figure 3-1 shows the switching waveform and test circuit for 2N6660.
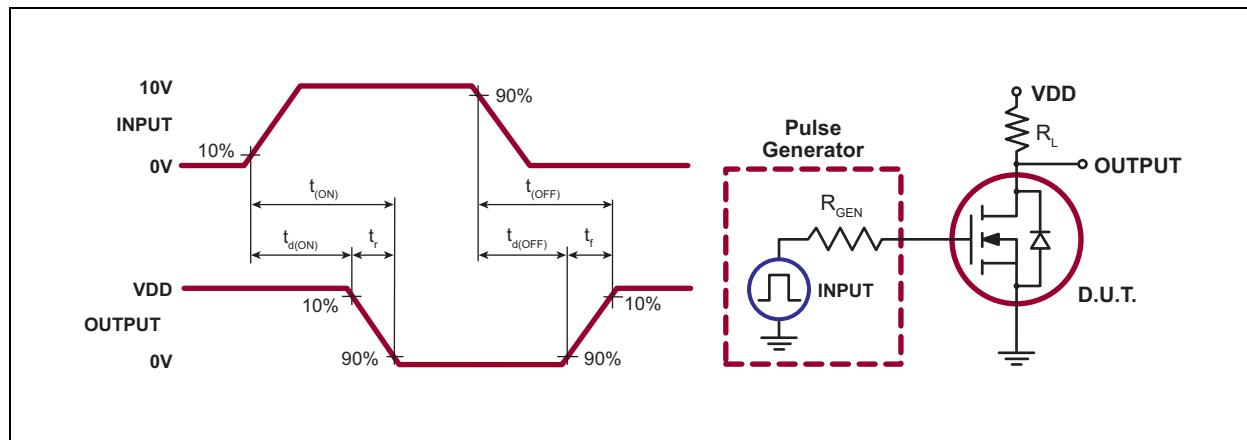
FIGURE 3-1:   *Switching Waveforms and Test Circuit*

4.0   PACKAGING INFORMATION

4.1   Package Marking Information

3-Lead TO-39

XX
XXXXXXXXXX
YYWW
NNN (e4)

Example

2N6660
1605
343   (e4)
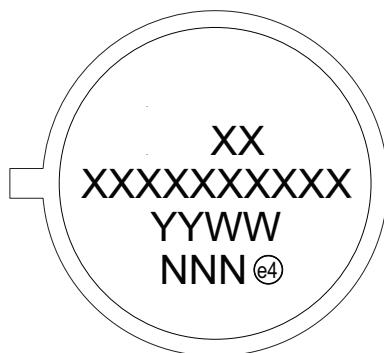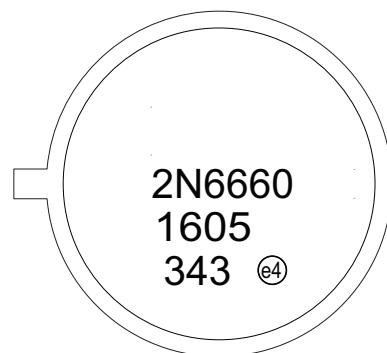
Legend:	XX...X	Product Code or Customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week '01')
	NNN	Alphanumeric traceability code
	(e3)	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator ((e3)) can be found on the outer packaging for this package.

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for product code or customer-specific information. Package may or not include the corporate logo.

3-Lead TO-39 Package Outline (N2)
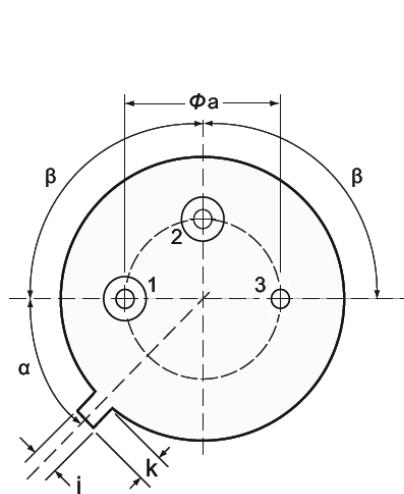
Bottom View
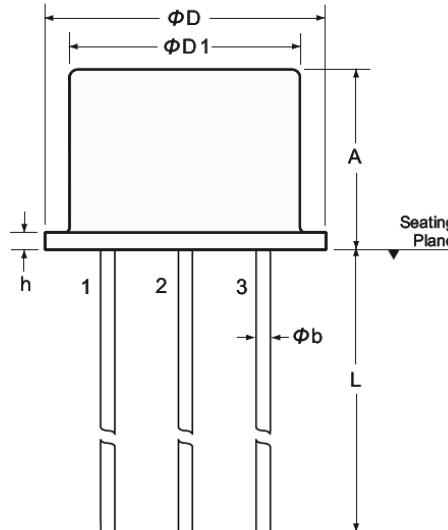
Side View

Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		α	β	A	Φa	Φb	ΦD	ΦD1	h	j	k	L
Dimension (inches)	MIN	45º NOM	90º NOM	.240	.190	.016	.350	.315	.009	.028	.029	.500
	NOM			-	-	-	-	-	-	-	-	-
	MAX			.260	.210	.021	.370	.335	.125	.034	.040	.560*

JEDEC Registration TO-39.
* This dimension is not specified in the JEDEC drawing.
Drawings not to scale.

APPENDIX A: REVISION HISTORY

Revision A (March 2016)

• Converted Supertex Doc #DSFP-2N6660 to Microchip DS20005509A.

• Minor text changes throughout.

• Update to **Features**.

2N6660

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

PART NO.	XX	- X	- X	Examples:
Device	Package Options	Environmental	Media Type	a) 2N6660

Device: 2N6660 = N-Channel, Enhancement-Mode,
                                      Vertical DMOS FET

Package: (blank) = TO-39, 3-lead

Environmental (blank) =   Lead (Pb)-free/ROHS-compliant package

Media Type: (blank) = 500/Bag for TO-39 packages

Examples:

a)   2N6660   TO-39 package,
                              500/bag

© 2016 Microchip Technology Inc.

Note the following details of the code protection feature on Microchip devices:

•   Microchip products meet the specification contained in their particular Microchip Data Sheet.

•   Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.

•   There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.

•   Microchip is willing to work with the customer who is concerned about the integrity of their code.

•   Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/
support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Cleveland
Independence, OH
Tel: 216-447-0464
Fax: 216-447-0643

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110

Canada - Toronto
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon

Hong Kong
Tel: 852-2943-5100
Fax: 852-2401-3431

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8569-7000
Fax: 86-10-8528-2104

China - Chengdu
Tel: 86-28-8665-5511
Fax: 86-28-8665-7889

China - Chongqing
Tel: 86-23-8980-9588
Fax: 86-23-8980-9500

China - Dongguan
Tel: 86-769-8702-9880

China - Hangzhou
Tel: 86-571-8792-8115
Fax: 86-571-8792-8116

China - Hong Kong SAR
Tel: 852-2943-5100
Fax: 852-2401-3431

China - Nanjing
Tel: 86-25-8473-2460
Fax: 86-25-8473-2470

China - Qingdao
Tel: 86-532-8502-7355
Fax: 86-532-8502-7205

China - Shanghai
Tel: 86-21-5407-5533
Fax: 86-21-5407-5066

China - Shenyang
Tel: 86-24-2334-2829
Fax: 86-24-2334-2393

China - Shenzhen
Tel: 86-755-8864-2200
Fax: 86-755-8203-1760

China - Wuhan
Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xian
Tel: 86-29-8833-7252
Fax: 86-29-8833-7256

ASIA/PACIFIC

China - Xiamen
Tel: 86-592-2388138
Fax: 86-592-2388130

China - Zhuhai
Tel: 86-756-3210040
Fax: 86-756-3210049

India - Bangalore
Tel: 91-80-3090-4444
Fax: 91-80-3090-4123

India - New Delhi
Tel: 91-11-4160-8631
Fax: 91-11-4160-8632

India - Pune
Tel: 91-20-3019-1500

Japan - Osaka
Tel: 81-6-6152-7160
Fax: 81-6-6152-9310

Japan - Tokyo
Tel: 81-3-6880- 3770
Fax: 81-3-6880-3771

Korea - Daegu
Tel: 82-53-744-4301
Fax: 82-53-744-4302

Korea - Seoul
Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur
Tel: 60-3-6201-9857
Fax: 60-3-6201-9859

Malaysia - Penang
Tel: 60-4-227-8870
Fax: 60-4-227-4068

Philippines - Manila
Tel: 63-2-634-9065
Fax: 63-2-634-9069

Singapore
Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsin Chu
Tel: 886-3-5778-366
Fax: 886-3-5770-955

Taiwan - Kaohsiung
Tel: 886-7-213-7828

Taiwan - Taipei
Tel: 886-2-2508-8600
Fax: 886-2-2508-0102

Thailand - Bangkok
Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Dusseldorf
Tel: 49-2129-3766400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Venice
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Poland - Warsaw
Tel: 48-22-3325737

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820

07/14/15