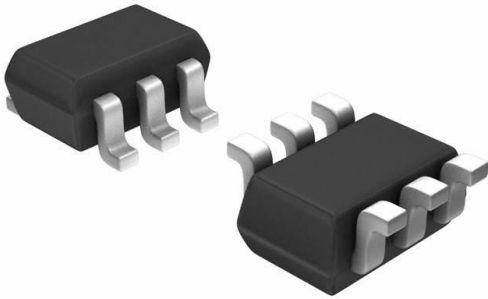


FDG327N Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	FDG327N-DG
Manufacturer	onsemi
Manufacturer Product Number	FDG327N
Description	MOSFET N-CH 20V 1.5A SC88
Detailed Description	N-Channel 20 V 1.5A (Ta) 420mW (Ta) Surface Mount SC-88 (SC-70-6)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

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Purchase and inquiry

Manufacturer Product Number:

FDG327N

Series:

PowerTrench®

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

20 V

Drive Voltage (Max Rds On, Min Rds On):

1.8V, 4.5V

Vgs(th) (Max) @ Id:

1.5V @ 250µA

Vgs (Max):

±8V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

SC-88 (SC-70-6)

Base Product Number:

FDG327

Manufacturer:

onsemi

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

1.5A (Ta)

Rds On (Max) @ Id, Vgs:

90mOhm @ 1.5A, 4.5V

Gate Charge (Qg) (Max) @ Vgs:

6.3 nC @ 4.5 V

Input Capacitance (Ciss) (Max) @ Vds:

423 pF @ 10 V

Power Dissipation (Max):

420mW (Ta)

Mounting Type:

Surface Mount

Package / Case:

6-TSSOP, SC-88, SOT-363

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

MOSFET– N-Channel, POWERTRENCH® 20 V

FDG327N

General Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized use in small switching regulators, providing an extremely low $R_{DS(ON)}$ and gate charge (Q_G) in a small package.

Features

- 1.5 A, 20 V
 - ◆ $R_{DS(ON)} = 90 \text{ m}\Omega @ V_{GS} = 4.5 \text{ V}$
 - ◆ $R_{DS(ON)} = 100 \text{ m}\Omega @ V_{GS} = 2.5 \text{ V}$
 - ◆ $R_{DS(ON)} = 140 \text{ m}\Omega @ V_{GS} = 1.8 \text{ V}$
- Fast Switching Speed
- Low Gate Charge (4.5 nC Typical)
- High Performance Trench Technology for Extremely Low $R_{DS(ON)}$
- High Power and Current Handling Capability
- These Devices are Pb-Free and are RoHS Compliant

Applications

- DC/DC Converter
- Load Switch
- Power Management

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

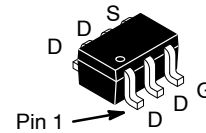
Symbol	Parameter	Ratings	Units
V_{DSS}	Drain-Source Voltage	20	V
V_{GSS}	Gate-Source Voltage	± 8	V
I_D	Drain Current	Continuous (Note 1a)	1.5
		Pulsed	6
P_D	Power Dissipation for Single Operation	(Note 1a)	0.42
		(Note 1b)	0.38
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



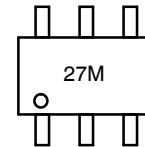
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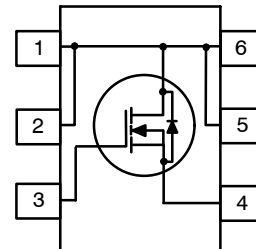
SC-88/SC70-6/SOT-363
CASE 419B-02

MARKING DIAGRAM



27 = Specific Device Code
M = Assembly Operation Month

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

FDG327N**THERMAL CHARACTERISTICS**

Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	300	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b)	333	$^{\circ}\text{C}/\text{W}$

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) $300^{\circ}\text{C}/\text{W}$ when mounted on a 1 in² pad of 2 oz copper.



b) $333^{\circ}\text{C}/\text{W}$ when mounted on a minimum pad of 2 oz copper..

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Reel Size	Tape Width	Shipping [†]
27	FDG327N	7"	8 mm	3000 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

FDG327N**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	20	–	–	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	–	12	–	mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$	–	–	1	μA
I_{GSSF}	Gate–Body Leakage, Forward	$V_{GS} = 8\text{ V}, V_{DS} = 0\text{ V}$	–	–	100	nA
I_{GSSR}	Gate–Body Leakage, Reverse	$V_{GS} = -8\text{ V}, V_{DS} = 0\text{ V}$	–	–	-100	nA

ON CHARACTERISTICS (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.4	0.7	1.5	V
$\Delta V_{GS(th)} / \Delta T_J$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	–	-3	–	mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = 4.5\text{ V}, I_D = 1.5\text{ A}$ $V_{GS} = 2.5\text{ V}, I_D = 1.4\text{ A}$ $V_{GS} = 1.8\text{ V}, I_D = 1.2\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 1.5\text{ A}, T_J = 125^\circ\text{C}$	–	57 66 82 72	90 100 140 115	m Ω
$I_{D(on)}$	On–State Drain Current	$V_{GS} = 4.5\text{ V}, V_{DS} = 5\text{ V}$	6	–	–	A
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 1.5\text{ A}$	–	9	–	S

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	–	423	–	pF
C_{oss}	Output Capacitance		–	87	–	pF
C_{rss}	Reverse Transfer Capacitance		–	48	–	pF

SWITCHING CHARACTERISTICS (Note 2)

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 10\text{ V}, I_D = 1\text{ A},$ $V_{GS} = 4.5\text{ V}, R_{GEN} = 6\ \Omega$	–	6	12	ns
t_r	Turn-On Rise Time		–	6.5	13	ns
$t_{d(off)}$	Turn-Off Delay Time		–	14	29	ns
t_f	Turn-Off Fall Time		–	2	4	ns
Q_g	Total Gate Charge	$V_{DS} = 10\text{ V}, I_D = 1.5\text{ A},$ $V_{GS} = 4.5\text{ V}$	–	4.5	6.3	nC
Q_{gs}	Gate–Source Charge		–	0.89	–	nC
Q_{gd}	Gate–Drain Charge		–	0.95	–	nC

DRAIN–SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

I_S	Maximum Continuous Drain–Source Diode Forward Current	–	–	0.32	A	
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 0.32\text{ A}$ (Note 2)	–	0.75	1.2	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%

FDG327N

TYPICAL PERFORMANCE CHARACTERISTICS

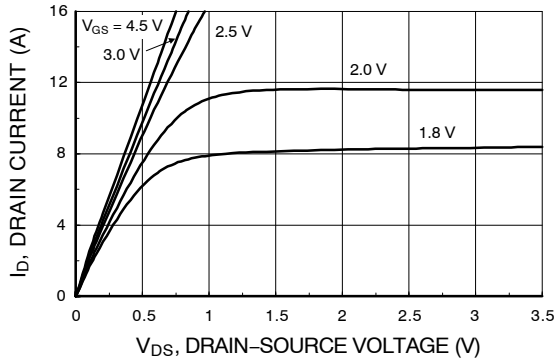


Figure 1. On-Region Characteristics

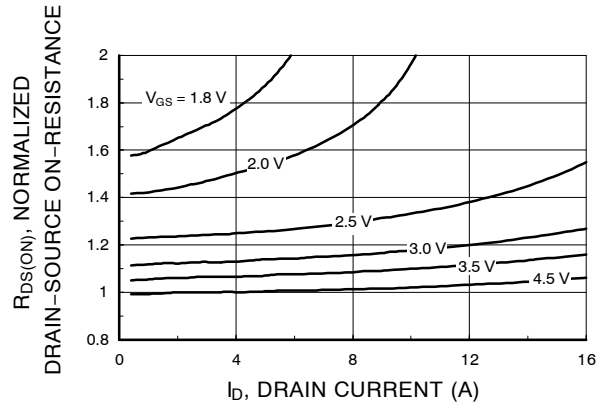


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

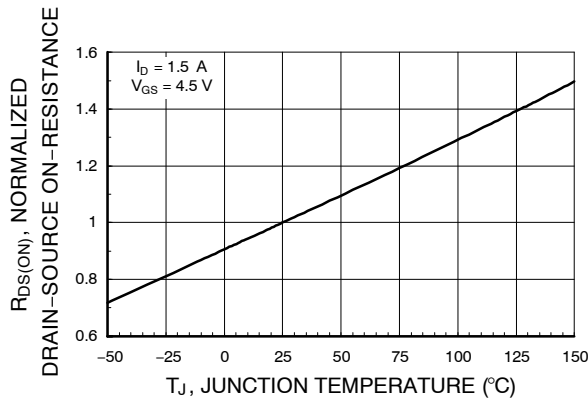


Figure 3. On-Resistance Variation with Temperature

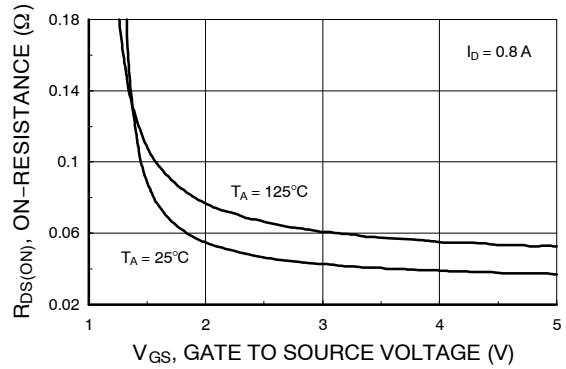


Figure 4. On-Resistance Variation with Gate-to-Source Voltage

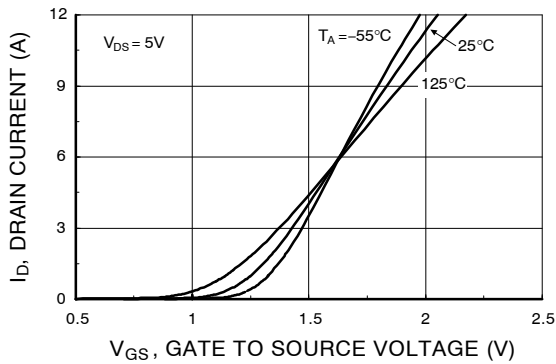


Figure 5. Transfer Characteristics

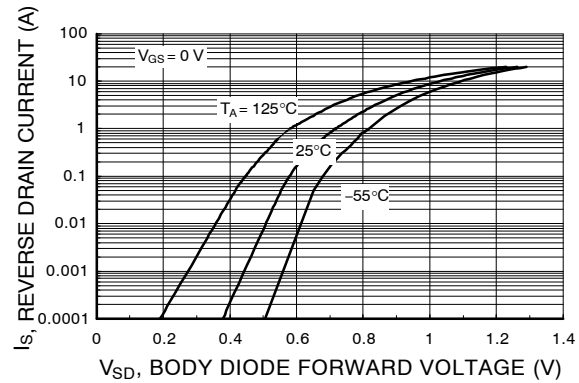


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

FDG327N

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

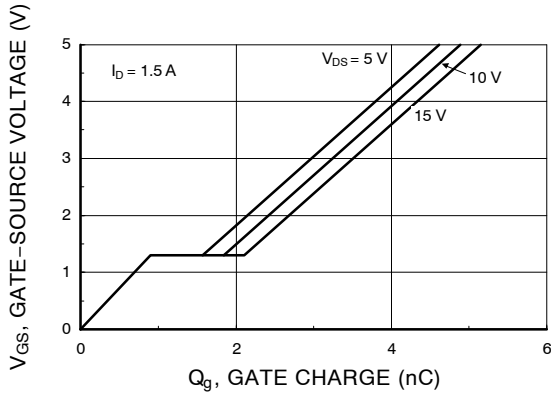


Figure 7. Gate Charge Characteristics

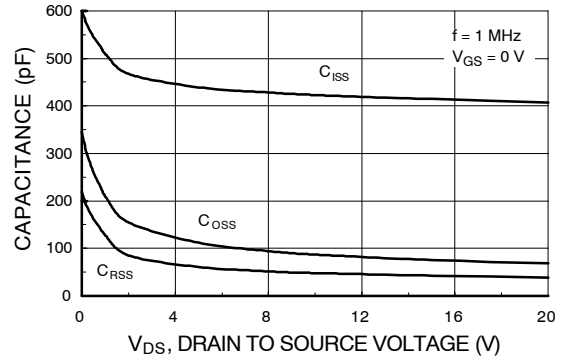


Figure 8. Capacitance Characteristics

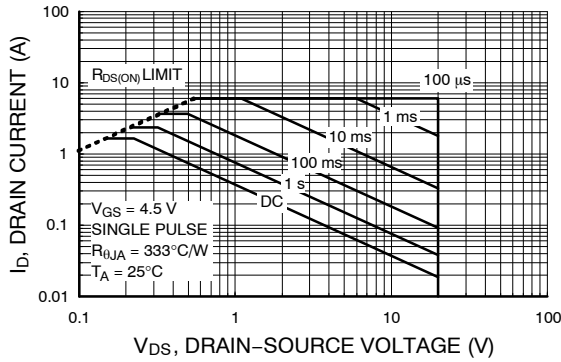


Figure 9. Maximum Safe Operating Area

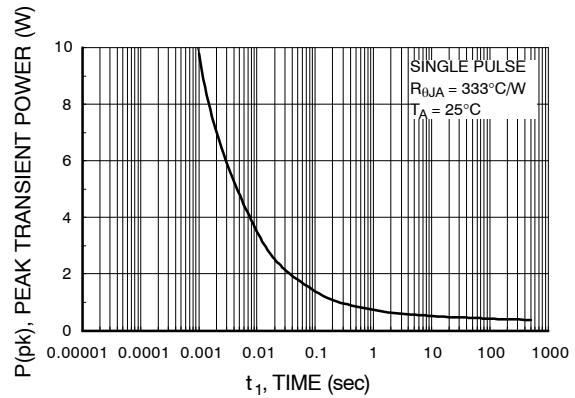
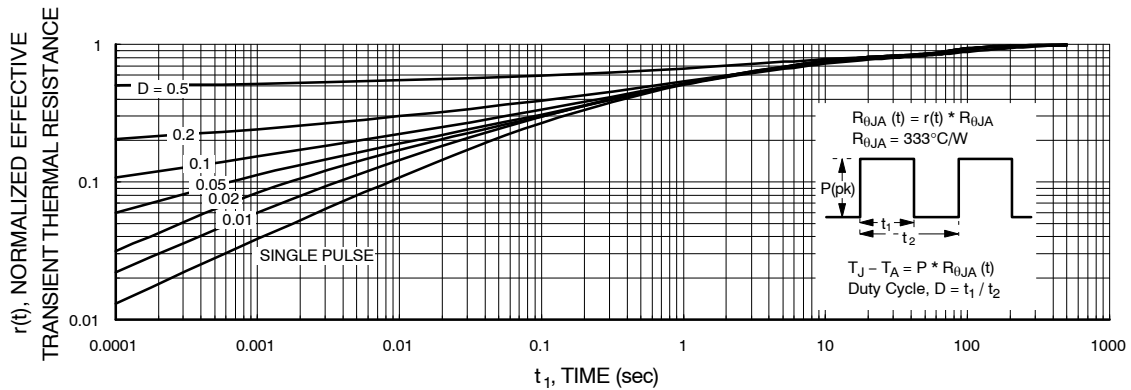


Figure 10. Single Pulse Maximum Power Dissipation



Thermal characterization performed using the conditions described in Note 1b.
Transient thermal response will change depending on the circuit board design.

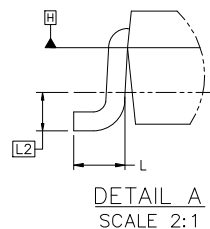
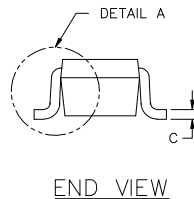
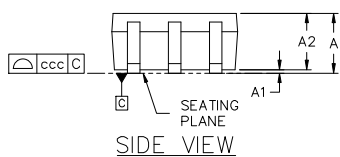
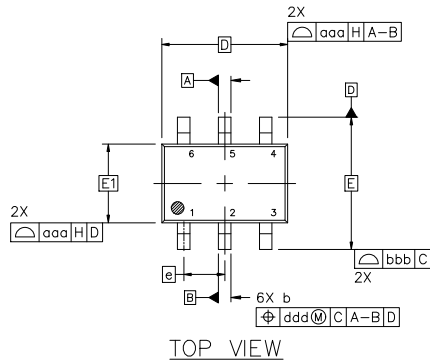
Figure 11. Transient Thermal Response Curve


SC-88 2.00x1.25x0.90, 0.65P
CASE 419B-02
ISSUE Z

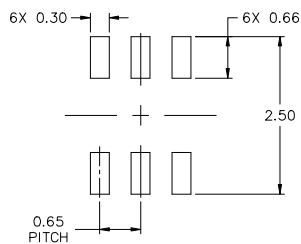
DATE 18 APR 2024

NOTES:

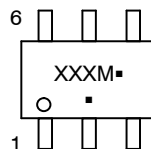
- DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
- ALL DIMENSION ARE IN MILLIMETERS.
- DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
- DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
- DATUMS A AND B ARE DETERMINED AT DATUM H.
- DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
- DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.10
A1	0.00	---	0.10
A2	0.70	0.90	1.00
b	0.15	0.20	0.25
c	0.08	0.15	0.22
D	2.00 BSC		
E	2.10 BSC		
E1	1.25 BSC		
e	0.65 BSC		
L	0.26	0.36	0.46
L2	0.15 BSC		
aaa	0.15		
bbb	0.30		
ccc	0.10		
ddd	0.10		



* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

GENERIC MARKING DIAGRAM*


XXX = Specific Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLES ON PAGE 2

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CASE 419B-02
ISSUE Z

DATE 18 APR 2024

STYLE 1: PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2	STYLE 2: CANCELLED	STYLE 3: CANCELLED	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. COLLECTOR 4. EMITTER 5. BASE 6. ANODE	STYLE 5: PIN 1. ANODE 2. ANODE 3. COLLECTOR 4. EMITTER 5. BASE 6. CATHODE	STYLE 6: PIN 1. ANODE 2 2. N/C 3. CATHODE 1 4. ANODE 1 5. N/C 6. CATHODE 2
STYLE 7: PIN 1. SOURCE 2 2. DRAIN 2 3. GATE 1 4. SOURCE 1 5. DRAIN 1 6. GATE 2	STYLE 8: CANCELLED	STYLE 9: PIN 1. EMITTER 2 2. EMITTER 1 3. COLLECTOR 1 4. BASE 1 5. BASE 2 6. COLLECTOR 2	STYLE 10: PIN 1. SOURCE 2 2. SOURCE 1 3. GATE 1 4. DRAIN 1 5. DRAIN 2 6. GATE 2	STYLE 11: PIN 1. CATHODE 2 2. CATHODE 2 3. ANODE 1 4. CATHODE 1 5. CATHODE 1 6. ANODE 2	STYLE 12: PIN 1. ANODE 2 2. ANODE 2 3. CATHODE 1 4. ANODE 1 5. ANODE 1 6. CATHODE 2
STYLE 13: PIN 1. ANODE 2. N/C 3. COLLECTOR 4. EMITTER 5. BASE 6. CATHODE	STYLE 14: PIN 1. VREF 2. GND 3. GND 4. IOUT 5. VEN 6. VCC	STYLE 15: PIN 1. ANODE 1 2. ANODE 2 3. ANODE 3 4. CATHODE 3 5. CATHODE 2 6. CATHODE 1	STYLE 16: PIN 1. BASE 1 2. EMITTER 2 3. COLLECTOR 2 4. BASE 2 5. EMITTER 1 6. COLLECTOR 1	STYLE 17: PIN 1. BASE 1 2. EMITTER 1 3. COLLECTOR 2 4. BASE 2 5. EMITTER 2 6. COLLECTOR 1	STYLE 18: PIN 1. VIN1 2. VCC 3. VOUT2 4. VIN2 5. GND 6. VOUT1
STYLE 19: PIN 1. IOUT 2. GND 3. GND 4. V CC 5. V EN 6. V REF	STYLE 20: PIN 1. COLLECTOR 2. COLLECTOR 3. BASE 4. EMITTER 5. COLLECTOR 6. COLLECTOR	STYLE 21: PIN 1. ANODE 1 2. N/C 3. ANODE 2 4. CATHODE 2 5. N/C 6. CATHODE 1	STYLE 22: PIN 1. D1 (i) 2. GND 3. D2 (i) 4. D2 (c) 5. VBUS 6. D1 (c)	STYLE 23: PIN 1. Vn 2. CH1 3. Vp 4. N/C 5. CH2 6. N/C	STYLE 24: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE
STYLE 25: PIN 1. BASE 1 2. CATHODE 3. COLLECTOR 2 4. BASE 2 5. EMITTER 6. COLLECTOR 1	STYLE 26: PIN 1. SOURCE 1 2. GATE 1 3. DRAIN 2 4. SOURCE 2 5. GATE 2 6. DRAIN 1	STYLE 27: PIN 1. BASE 2 2. BASE 1 3. COLLECTOR 1 4. EMITTER 1 5. EMITTER 2 6. COLLECTOR 2	STYLE 28: PIN 1. DRAIN 2. DRAIN 3. GATE 4. SOURCE 5. DRAIN 6. DRAIN	STYLE 29: PIN 1. ANODE 2. ANODE 3. COLLECTOR 4. EMITTER 5. BASE/ANODE 6. CATHODE	STYLE 30: PIN 1. SOURCE 1 2. DRAIN 2 3. DRAIN 2 4. SOURCE 2 5. GATE 1 6. DRAIN 1

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

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