

FDC2612 Datasheet

 onsemi

DiGi Electronics Part Number	FDC2612-DG
Manufacturer	onsemi
Manufacturer Product Number	FDC2612
Description	MOSFET N-CH 200V 1.1A SUPERSOT6
Detailed Description	N-Channel 200 V 1.1A (Ta) 1.6W (Ta) Surface Mount SuperSOT™-6

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Purchase and inquiry

Manufacturer Product Number:

FDC2612

Series:

PowerTrench®

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

200 V

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

10V

Vgs(th) (Max) @ Id:

4.5V @ 250µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

SuperSOT™-6

Base Product Number:

FDC2612

Manufacturer:

onsemi

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

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

1.1A (Ta)

Rds On (Max) @ Id, Vgs:

725mOhm @ 1.1A, 10V

Gate Charge (Qg) (Max) @ Vgs:

11 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

234 pF @ 100 V

Power Dissipation (Max):

1.6W (Ta)

Mounting Type:

Surface Mount

Package / Case:

SOT-23-6 Thin, TSOT-23-6

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

MOSFET – N-Channel, POWERTRENCH®

200 V

FDC2612

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 for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

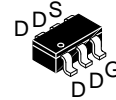
Features

- 1.1 A, 200 V. $R_{DS(ON)} = 725 \text{ m}\Omega @ V_{GS} = 10 \text{ V}$
- High Performance Trench Technology for Extremely Low $R_{DS(ON)}$
- High Power and Current Handling Capability
- Fast Switching Speed
- Low Gate Charge (8 nC Typical)
- This Device is Pb-Free, Halide Free and is RoHS Compliant

Applications

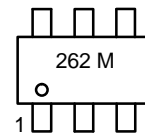
- DC/DC Converter

V_{DSS}	$R_{DS(ON)}$ MAX	I_D MAX
200 V	725 m Ω @ 10 V	1.1 A



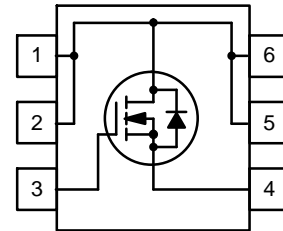
TSOT23 6-Lead
(SUPERSOT™ -6)
CASE 419BL

MARKING DIAGRAM



262 = Device Code
M = Date Code

PIN CONNECTION



ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

FDC2612

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

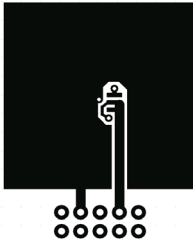
Symbol	Parameter	Ratings	Unit
V_{DSS}	Drain–Source Voltage	200	V
V_{GSS}	Gate–Source Voltage	± 20	V
I_D	Drain Current	Continuous (Note 1a)	1.1
		Pulsed	4
P_D	Maximum Power Dissipation	(Note 1a)	1.6
		(Note 1b)	0.8
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to $+150$	$^\circ\text{C}$

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.

THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Thermal Resistance, Junction–to–Ambient (Note 1a)	78	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction–to–Case (Note 1)	30	$^\circ\text{C}/\text{W}$

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. $78^\circ\text{C}/\text{W}$ when mounted on a 1 in^2 pad of 2 oz copper



- b. $156^\circ\text{C}/\text{W}$ when mounted on a minimum pad of 2 oz copper

Scale 1:1 on letter size paper

FDC2612**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	200	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	–	246	–	mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 160\text{ V}, V_{GS} = 0\text{ V}$	–	–	1	μA
I_{GSSF}	Gate–Body Leakage, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	–	–	100	nA
I_{GSSR}	Gate–Body Leakage, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	–	–	-100	nA

ON CHARACTERISTICS (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2	4	4.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	–	-8.7	–	mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain–Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 1.1\text{ A}$ $V_{GS} = 10\text{ V}, I_D = 1.1\text{ A}, T_J = 125^\circ\text{C}$	–	605 1133	725 1430	m Ω
$I_{D(on)}$	On–State Drain Current	$V_{GS} = 10\text{ V}, V_{DS} = 10\text{ V}$	4	–	–	A
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 1.1\text{ A}$	–	4.4	–	S

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	–	234	–	pF
C_{oss}	Output Capacitance		–	18	–	pF
C_{riss}	Reverse Transfer Capacitance		–	8	–	pF

SWITCHING CHARACTERISTICS (Note 2)

$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = 100\text{ V}, I_D = 1\text{ A}, V_{GS} = 10\text{ V}, R_{GEN} = 6\ \Omega$	–	6	12	ns
t_r	Turn–On Rise Time		–	6	12	ns
$t_{d(off)}$	Turn–Off Delay Time		–	17	30	ns
t_f	Turn–Off Fall Time		–	8	16	ns
Q_g	Total Gate Charge	$V_{DS} = 100\text{ V}, I_D = 1.1\text{ A}, V_{GS} = 10\text{ V}$	–	8	11	nC
Q_{gs}	Gate–Source Charge		–	1.6	–	nC
Q_{gd}	Gate–Drain Charge		–	2.2	–	nC

DRAIN–SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATING

I_S	Maximum Continuous Drain–Source Diode Forward Current	–	–	1.3	A	
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 1.3\text{ A}$ (Note 2)	–	0.8	1.2	V
t_{rr}	Diode Reverse Recovery Time	$I_F = 1.1\text{ A}, d_i/d_t = 300\text{ A}/\mu\text{s}$ (Note 2)	–	74.5	–	nS
Q_{rr}	Diode Reverse Recovery Charge		–	194	–	nC

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%.

FDC2612

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

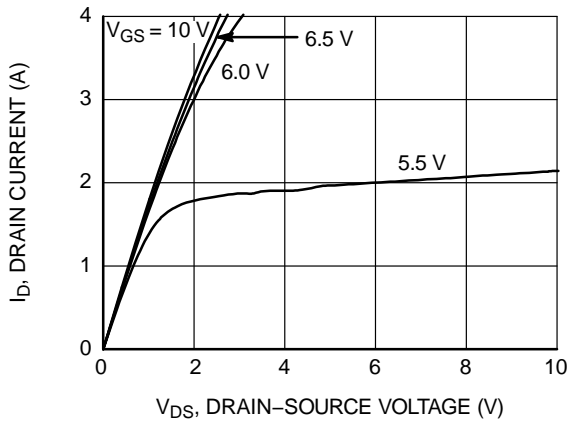


Figure 1. On-Region Characteristics

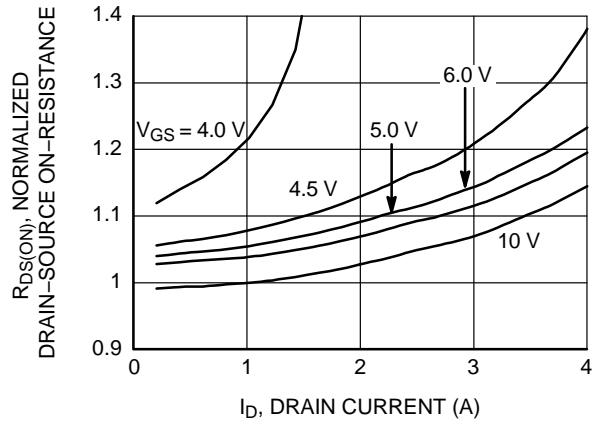


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

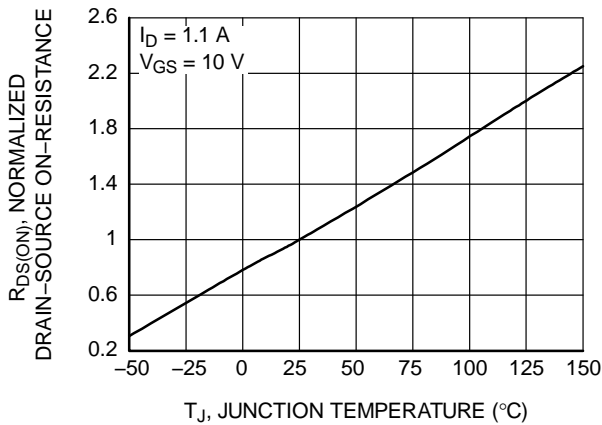


Figure 3. On-Resistance Variation with Temperature

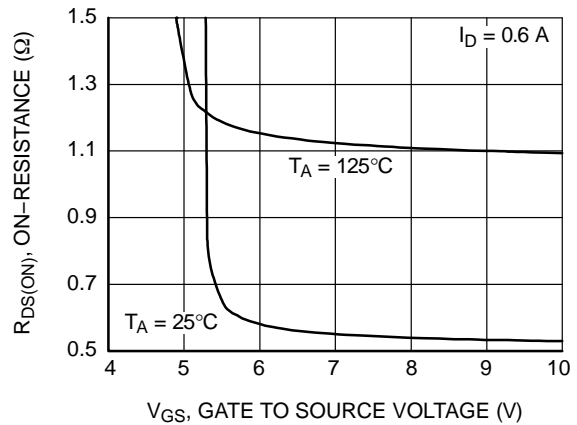


Figure 4. On-Resistance Variation with Gate-to-Source Voltage

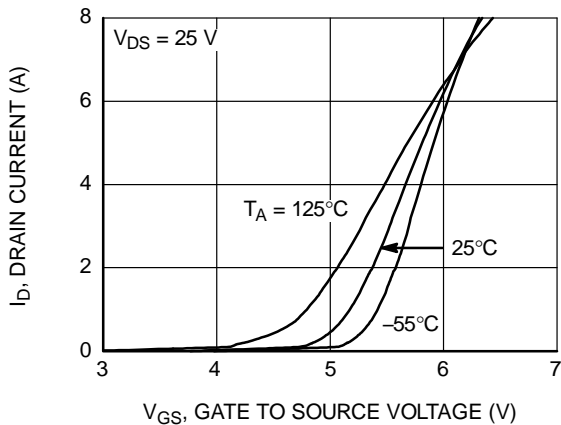


Figure 5. Transfer Characteristics

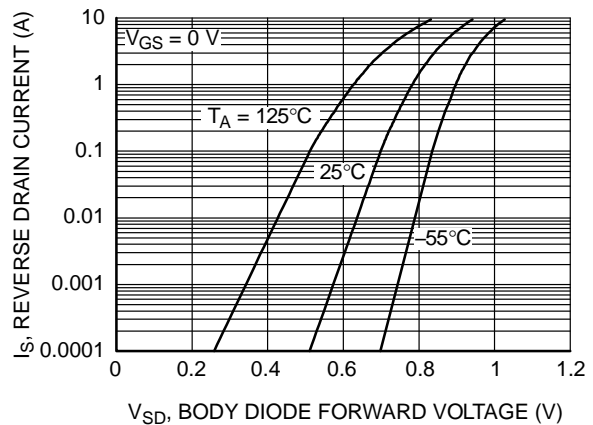


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

FDC2612

TYPICAL CHARACTERISTICS (continued)

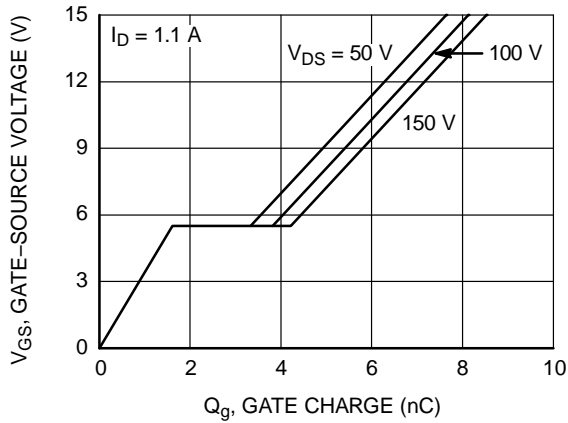


Figure 7. Gate Charge Characteristics

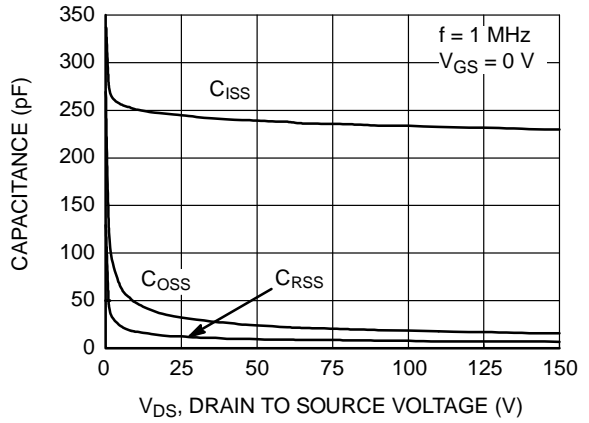


Figure 8. Capacitance Characteristics

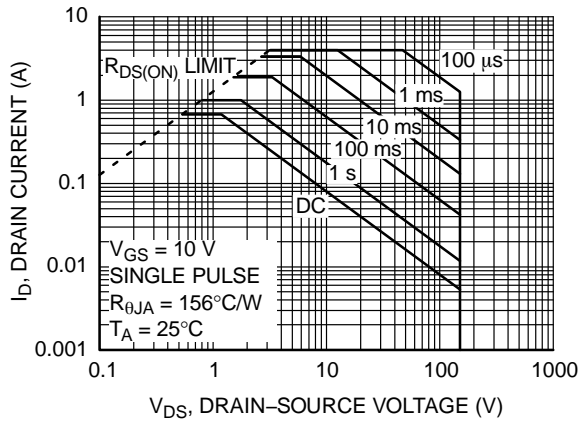


Figure 9. Maximum Safe Operating Area

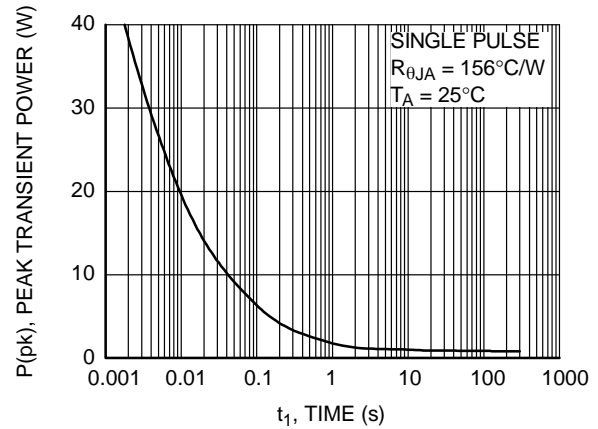


Figure 10. Single Pulse Maximum Power Dissipation

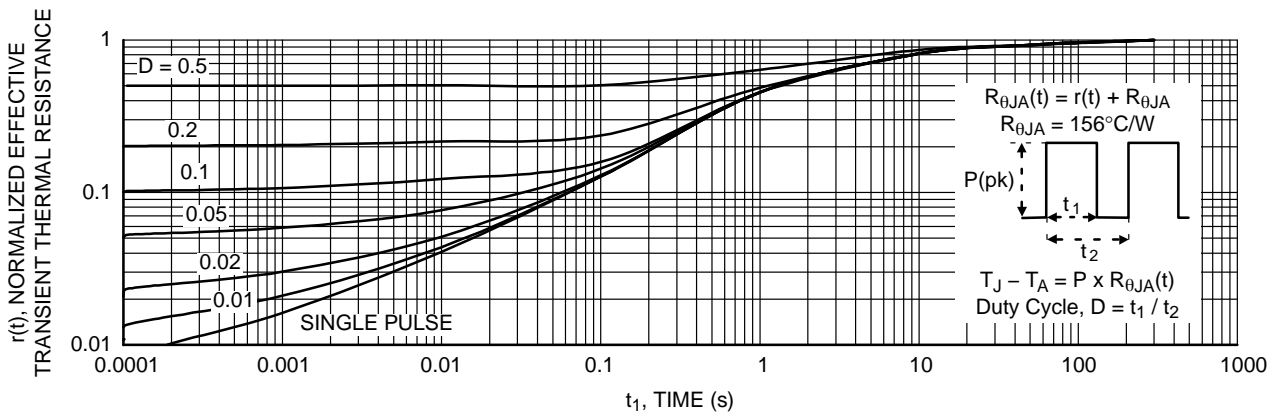


Figure 11. Transient Thermal Response Curve

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

FDC2612**PACKAGE MARKING AND ORDERING INFORMATION**

Device	Device Marking	Package Type	Reel Size	Tape Width	Shipping [†]
FDC2612	262	TSOT23 6-Lead (Pb-Free)	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.

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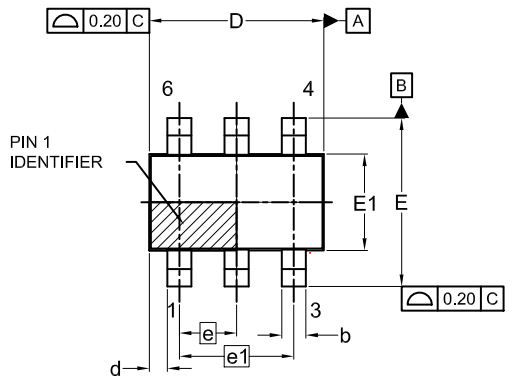
**MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS**



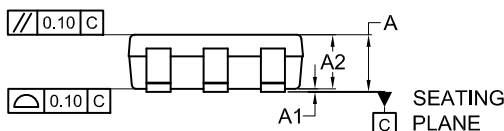
1
SCALE 2:1

**TSOT23 6-Lead
CASE 419BL
ISSUE A**

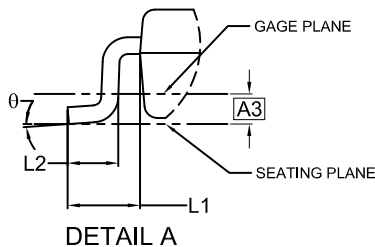
DATE 31 AUG 2020



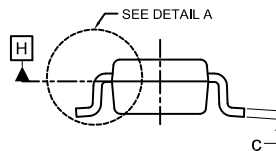
TOP VIEW



FRONT VIEW

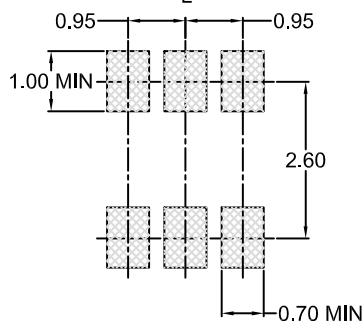


DETAIL A



SIDE VIEW

SYMM
⌀



LAND PATTERN
RECOMMENDATION

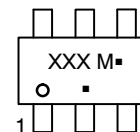
*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25MM PER END. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
4. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.70	0.85	1.00
A3	0.25 BSC		
b	0.25	0.38	0.50
c	0.10	0.18	0.26
D	2.80	2.95	3.10
d	0.30 REF		
E	2.50	2.75	3.00
E1	1.30	1.50	1.70
e	0.95 BSC		
e1	1.90 BSC		
L1	0.60 REF		
L2	0.20	0.40	0.60
⊖	0°	--	10°

GENERIC MARKING DIAGRAM*



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

(Note: Microdot may be in either 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.

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DESCRIPTION:	TSOT23 6-Lead	PAGE 1 OF 1

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