

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	I_D $T_A = 25^\circ C$
60V	44m Ω @ $V_{GS} = 10V$	5.0A
	60m Ω @ $V_{GS} = 4.5V$	4.3A

Description and Applications

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

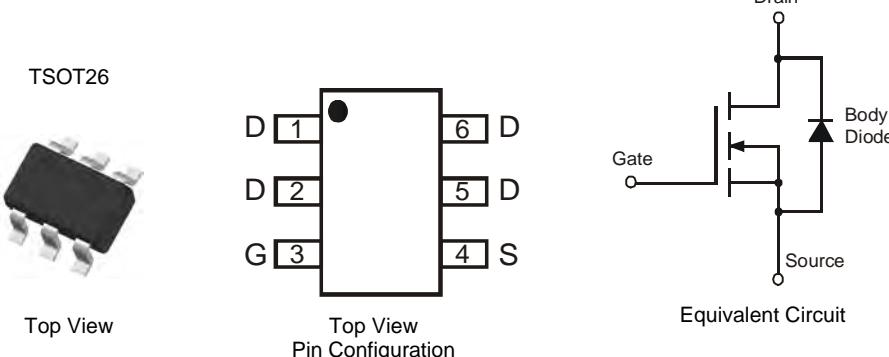
- DC-DC Converters
- Power management functions
- Backlighting

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) test in production
- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- Lead, Halogen, and Antimony Free, RoHS Compliant (Note 1)
- "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)



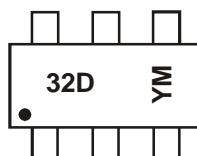
Ordering Information (Note 3)

Part Number	Case	Packaging
DMN6040SVT-7	TSOT26	3,000/Tape & Reel

Notes:

1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
2. Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



32D = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: X = 2010)
 M = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016					
Code	X	Y	Z	A	B	C	D					
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	I_D	5.0 4.0	A
	$t < 10\text{s}$	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	I_D	6.3 5.0	A
Continuous Drain Current (Note 5) $V_{GS} = 5\text{V}$	Steady State	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	I_D	4.3 3.4	A
	$t < 10\text{s}$	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	I_D	5.4 4.3	A
Maximum Body Diode Forward Current (Note 5)			I_S	2.1	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	30	A
Avalanche Current (Note 6) $L = 0.1\text{mH}$			I_{AR}	14.2	A
Avalanche Energy (Note 6) $L = 0.1\text{mH}$			E_{AR}	10	mJ

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)	$T_A = 25^\circ\text{C}$	P_D	1.2	W
	$T_A = 70^\circ\text{C}$		0.75	
Thermal Resistance, Junction to Ambient (Note 4)	Steady state	$R_{\theta JA}$	106	$^\circ\text{C}/\text{W}$
	$t < 10\text{s}$		69	
Total Power Dissipation (Note 5)	$T_A = 25^\circ\text{C}$	P_D	1.8	W
	$T_A = 70^\circ\text{C}$		1.1	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	68	$^\circ\text{C}/\text{W}$
	$t < 10\text{s}$		44	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	20	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

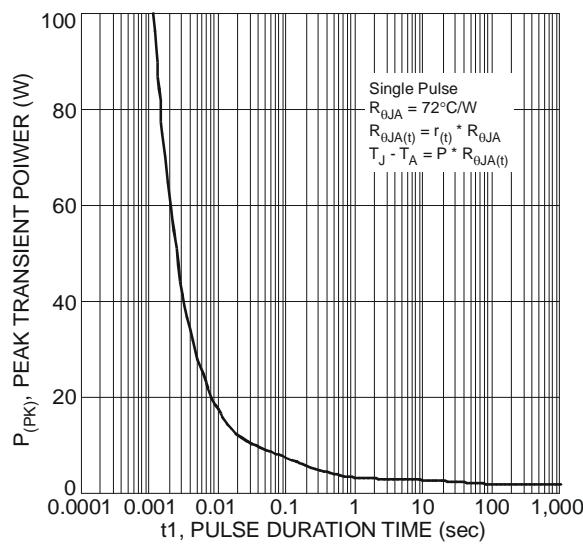


Fig. 1 Single Pulse Maximum Power Dissipation

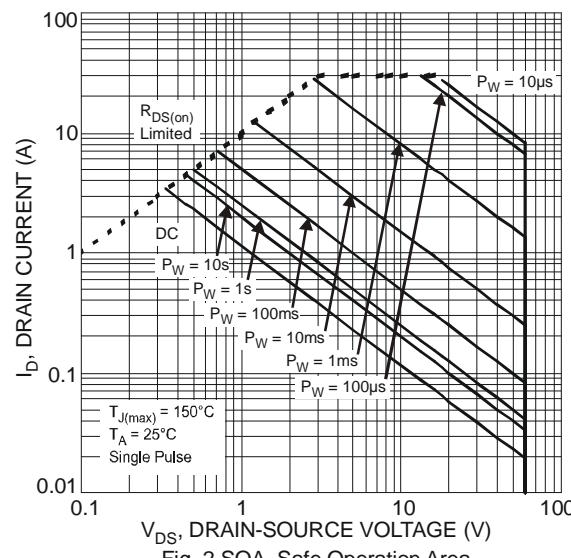


Fig. 2 SOA, Safe Operation Area

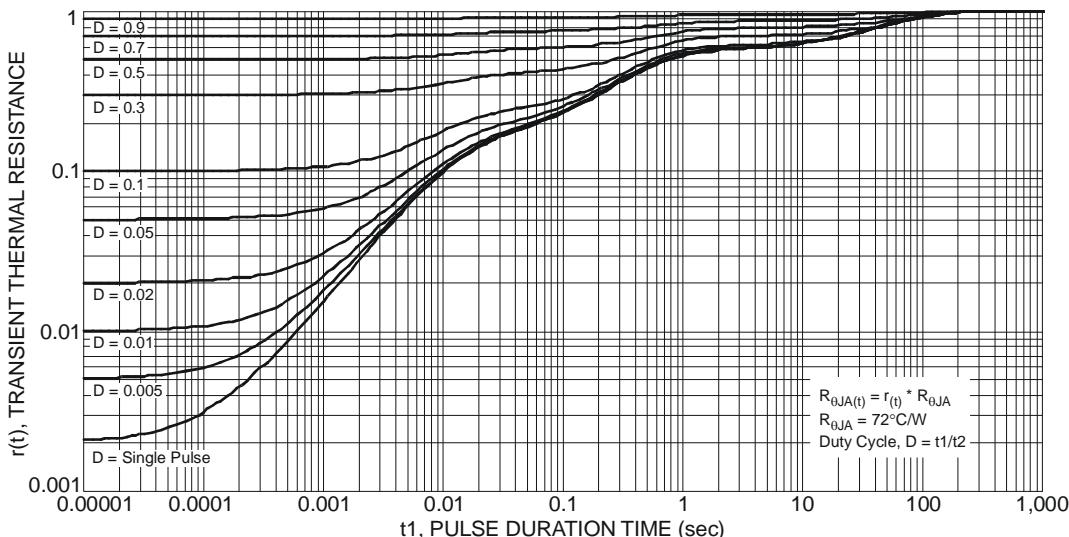


Fig. 3 Transient Thermal Resistance

Electrical Characteristics

@ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	100	nA	$\text{V}_{\text{DS}} = 60\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$\text{V}_{\text{GS(th)}}$	1	—	3	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS (ON)}}$	—	30	44	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 4.3\text{A}$
		—	35	60		$\text{V}_{\text{GS}} = 4.5\text{V}$, $\text{I}_D = 4\text{A}$
Forward Transfer Admittance	$ \text{Y}_{\text{fs}} $	—	4.5	—	S	$\text{V}_{\text{DS}} = 10\text{V}$, $\text{I}_D = 4.3\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1287	—	pF	$\text{V}_{\text{DS}} = 25\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	57	—		
Reverse Transfer Capacitance	C_{rss}	—	44	—		
Gate Resistance	R_{G}	—	1.2	—	Ω	$\text{V}_{\text{DS}} = 0\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Total Gate Charge ($\text{V}_{\text{GS}} = 10\text{V}$)	Q_{g}	—	22.4	—	nC	$\text{V}_{\text{DS}} = 30\text{V}$, $\text{I}_D = 4.3\text{A}$
Total Gate Charge ($\text{V}_{\text{GS}} = 4.5\text{V}$)	Q_{g}	—	10.4	—		
Gate-Source Charge	Q_{gs}	—	4.9	—		
Gate-Drain Charge	Q_{gd}	—	3.0	—		
Turn-On Delay Time	$\text{t}_{\text{D(on)}}$	—	6.6	—	nS	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{V}_{\text{DD}} = 30\text{V}$, $\text{R}_{\text{G}} = 6\Omega$, $\text{I}_D = 4.3\text{A}$
Turn-On Rise Time	t_{r}	—	8.1	—		
Turn-Off Delay Time	$\text{t}_{\text{D(off)}}$	—	20.1	—		
Turn-Off Fall Time	t_{f}	—	4.0	—		
Body Diode Reverse Recovery Time	t_{rr}	—	18	—	nS	$\text{I}_S = 4.3\text{A}$, $d\text{I}/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{rr}	—	11.9	—	nC	$\text{I}_S = 4.3\text{A}$, $d\text{I}/dt = 100\text{A}/\mu\text{s}$

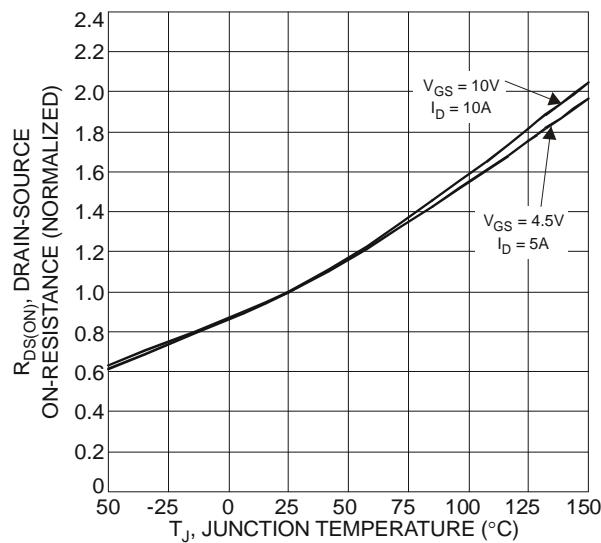
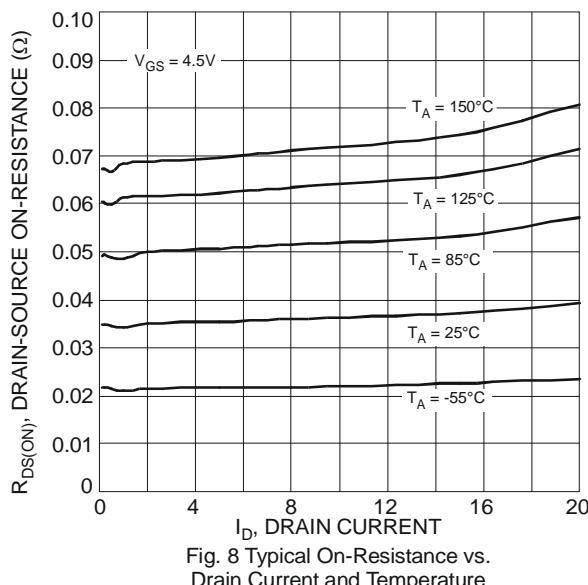
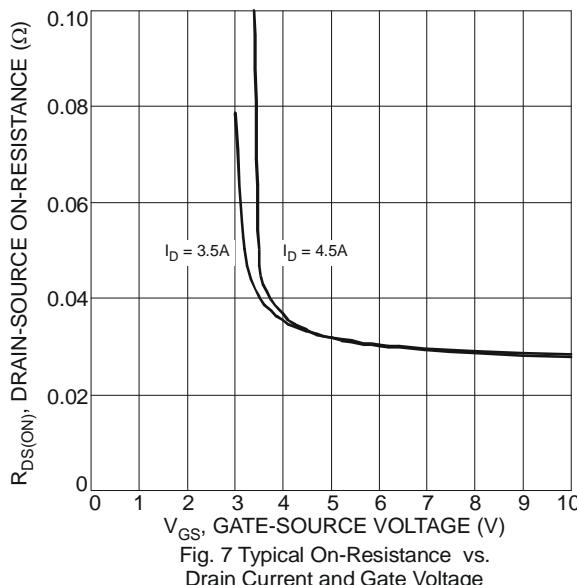
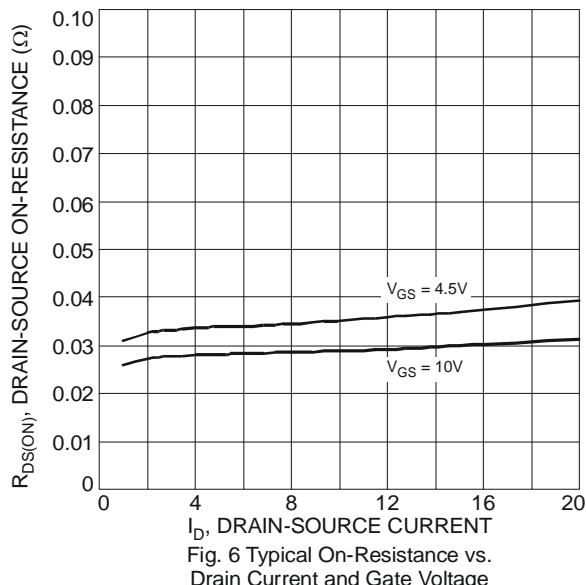
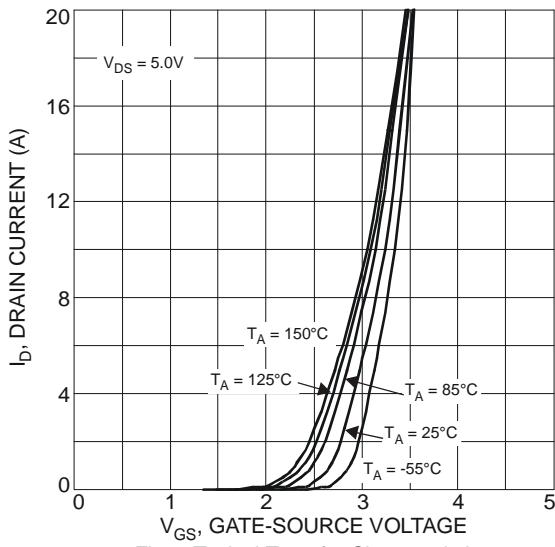
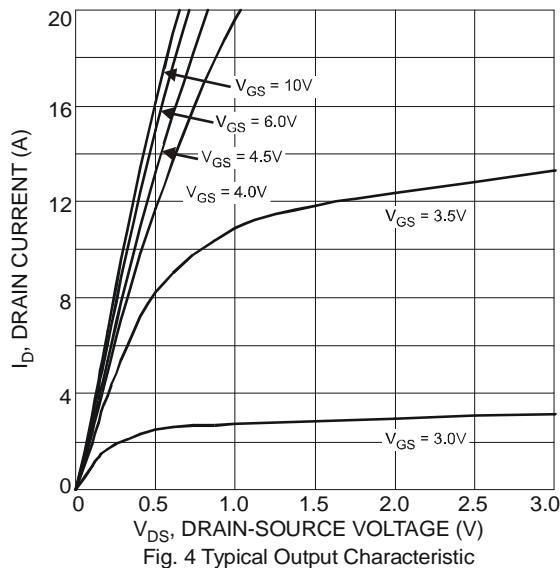
Notes: 4. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

6. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep $\text{T}_J = 25^\circ\text{C}$

7. Short duration pulse test used to minimize self-heating effect.

8. Guaranteed by design. Not subject to product testing.



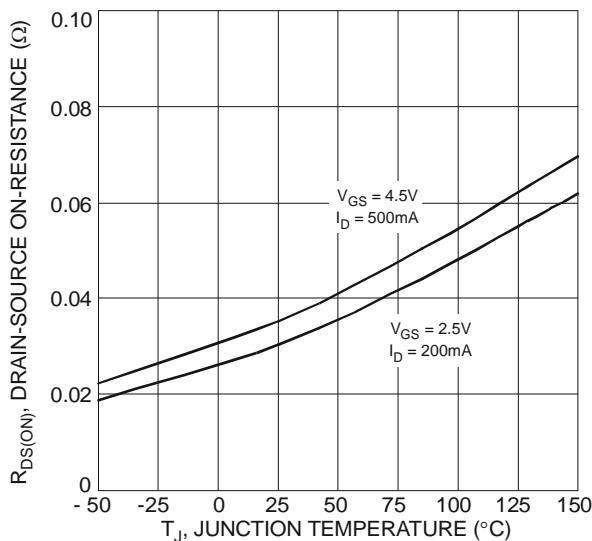


Fig. 10 On-Resistance Variation with Temperature

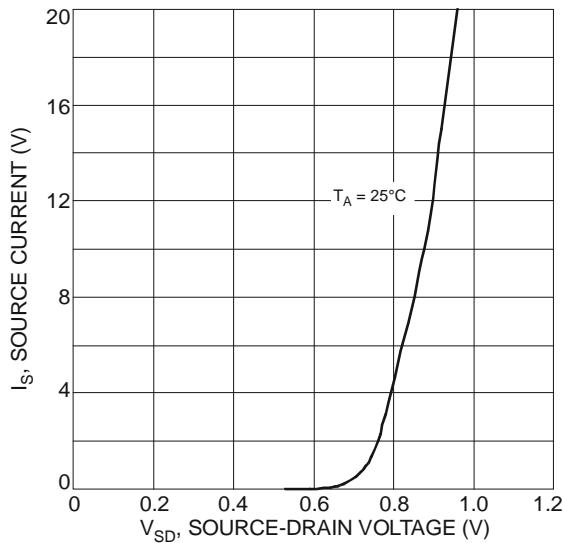


Fig. 12 Diode Forward Voltage vs. Current

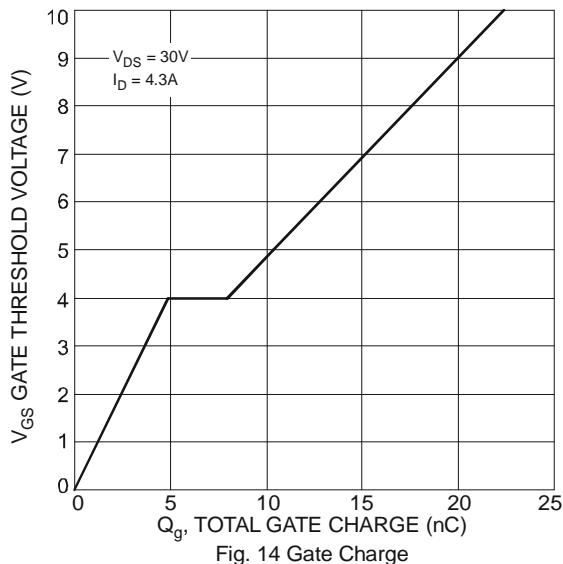


Fig. 14 Gate Charge

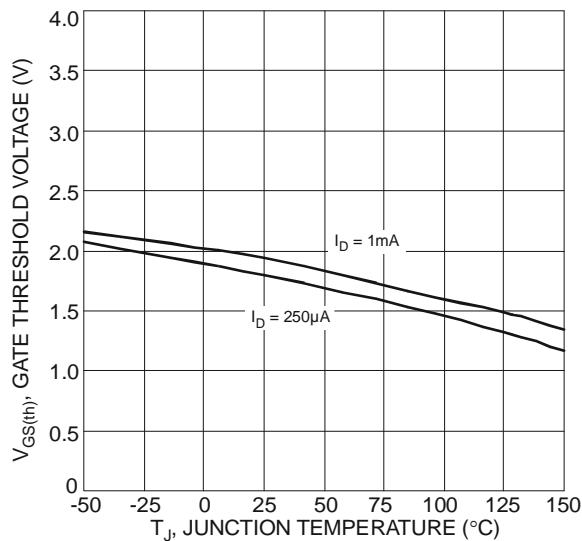


Fig. 11 Gate Threshold Variation vs. Ambient Temperature

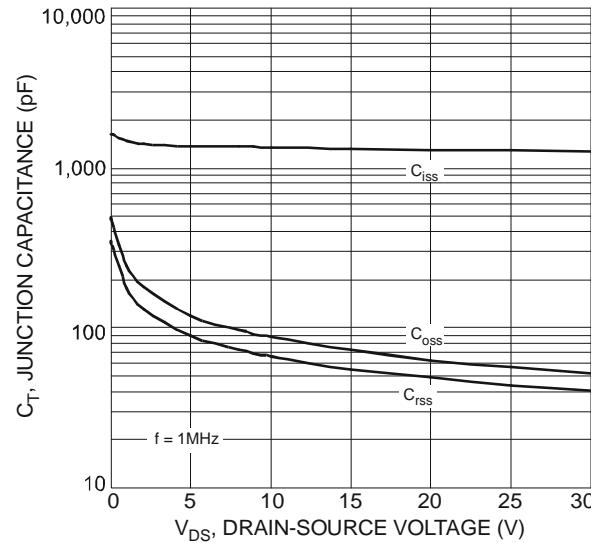
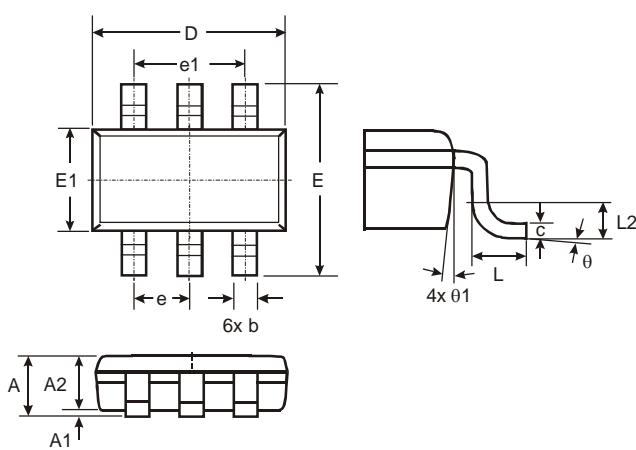


Fig. 13 Typical Junction Capacitance

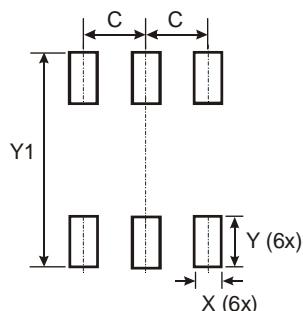
Package Outline Dimensions



TSOT26			
Dim	Min	Max	Typ
A	—	1.00	—
A1	0.01	0.10	—
A2	0.84	0.90	—
D	—	—	2.90
E	—	—	2.80
E1	—	—	1.60
b	0.30	0.45	—
c	0.12	0.20	—
e	—	—	0.95
e1	—	—	1.90
L	0.30	0.50	—
L2	—	—	0.25
theta	0°	8°	4°
theta1	4°	12°	—

All Dimensions in mm

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.199

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