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DMN2053UVTQ

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
N-Channel	20V	35mΩ @ V_{GS}= 4.5V	4.6A
		43mΩ @ V_{GS}= 2.5V	4.2A

Description

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

Applications

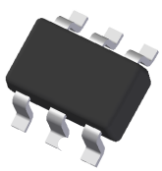
- Backlighting
- DC-DC Converters
- Power Management Functions

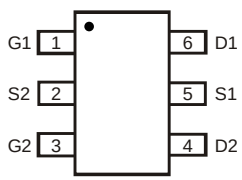
Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMN2053UVTQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

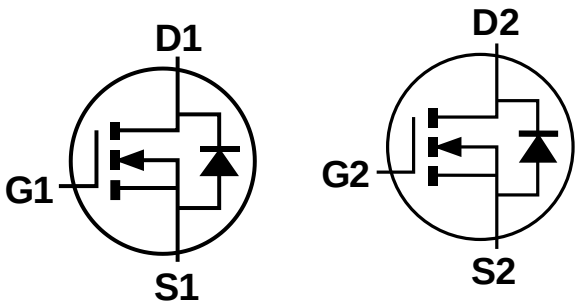
Mechanical Data

- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.013 grams (Approximate)





TSOT26



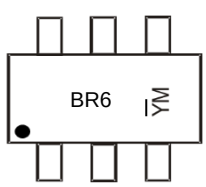
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2053UVTQ-7	TSOT26	3,000 / Tape & Reel
DMN2053UVTQ-13	TSOT26	10,000 / Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



BR6= Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: H = 2020)
M = Month (ex: 9 = September)

Date Code Key

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	G	H	I	J	K	L	M	N	O	P	R	S

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

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	4.6 3.7	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	1.4	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	22	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.7	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	173	°C/W
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	108	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	37	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	1.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	26	35	mΩ	V_{GS} = 4.5V, I_D = 5.0A
			31	43		V_{GS} = 2.5V, I_D = 4.0A
			43	56		V_{GS} = 1.8V, I_D = 2.0A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	369	—	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	54	—		
Reverse Transfer Capacitance	C_{rss}	—	32	—		
Gate Resistance	R_g	—	4.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	3.6	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6A
Gate-Source Charge	Q_{gs}	—	0.4	—		
Gate-Drain Charge	Q_{gd}	—	1.0	—		
Turn-On Delay Time	$t_{D(ON)}$	—	2.6	—	ns	V_{DS} = 10V, V_{GS} = 5V, R_G = 6Ω, I_D = 6A
Turn-On Rise Time	t_R	—	3.0	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	12.5	—		
Turn-Off Fall Time	t_F	—	3.6	—		
Reverse Recovery Time	t_{RR}	—	6.0	—	ns	I_F = 1A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	0.9	—	nC	

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

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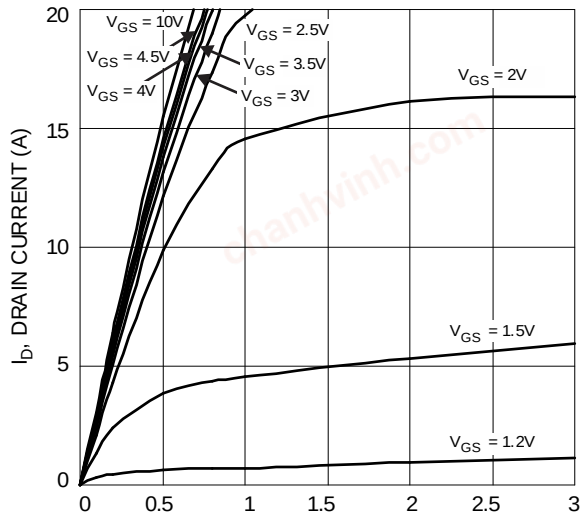


Figure 1 Typical Output Characteristic

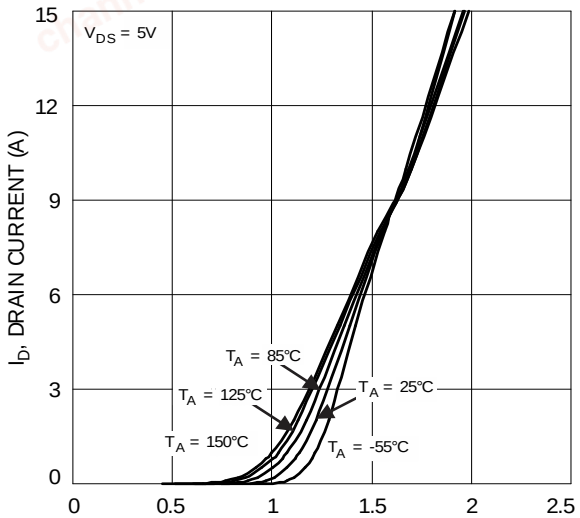


Figure 2 Typical Transfer Characteristics

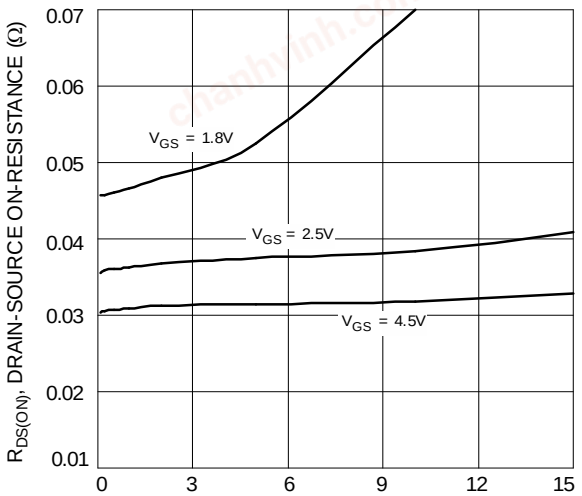


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

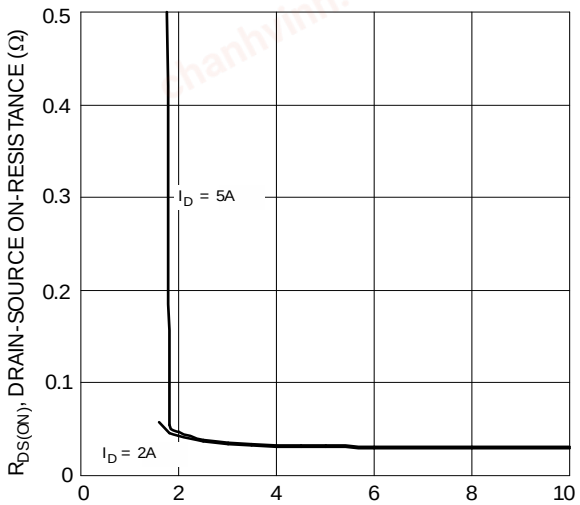


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

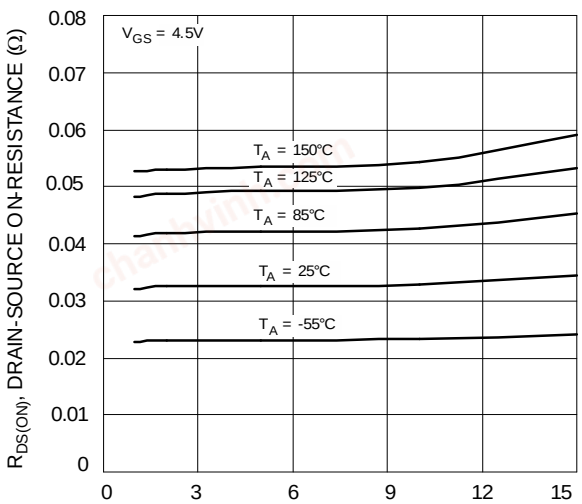


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

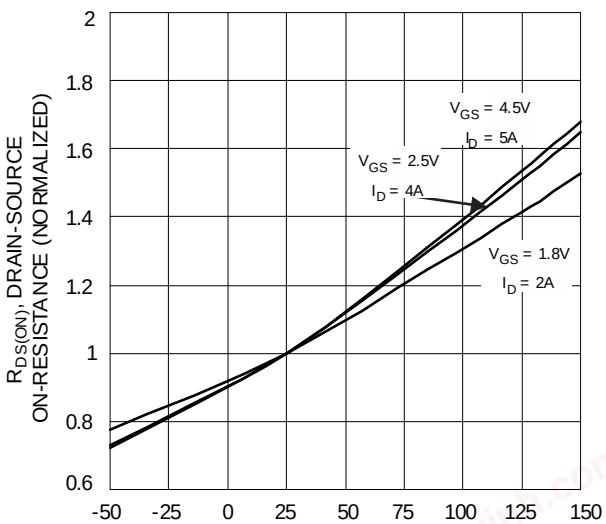


Figure 6 On-Resistance Variation with Temperature

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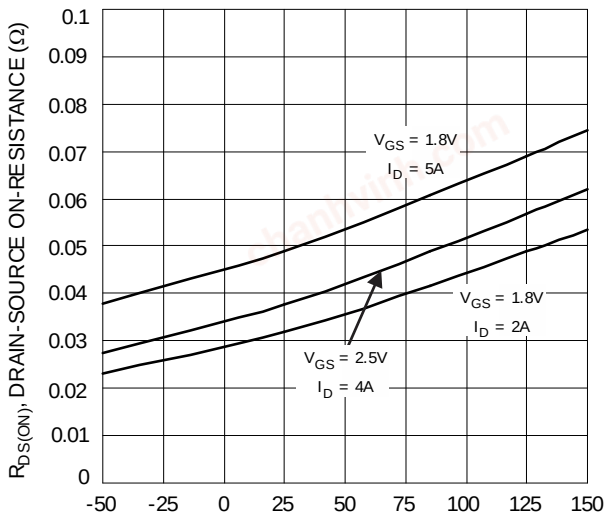


Figure 7 On-Resistance Variation with Temperature

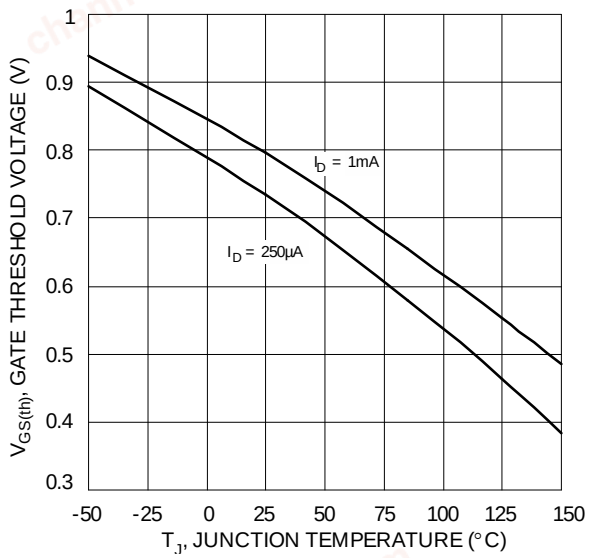


Figure 8 Gate Threshold Variation vs. Junction Temperature

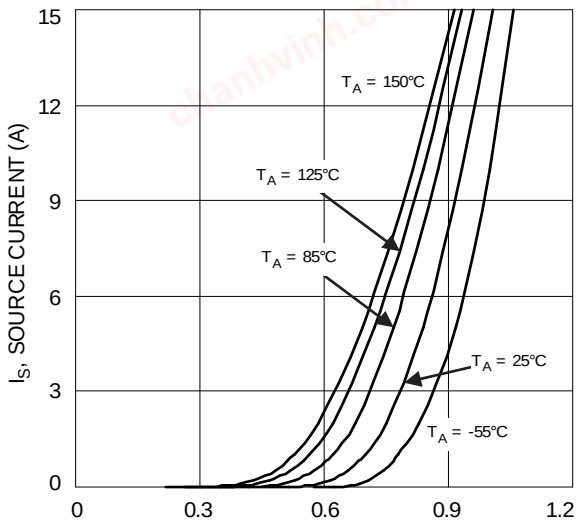


Figure 9 Diode Forward Voltage vs. Current

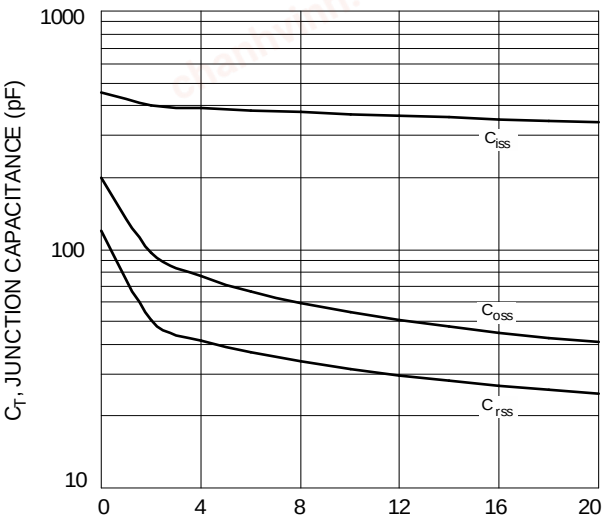


Figure 10 Typical Junction Capacitance

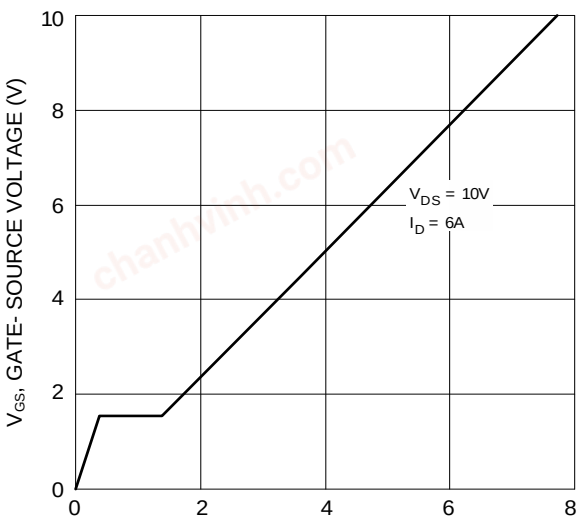


Figure 11 Gate Charge

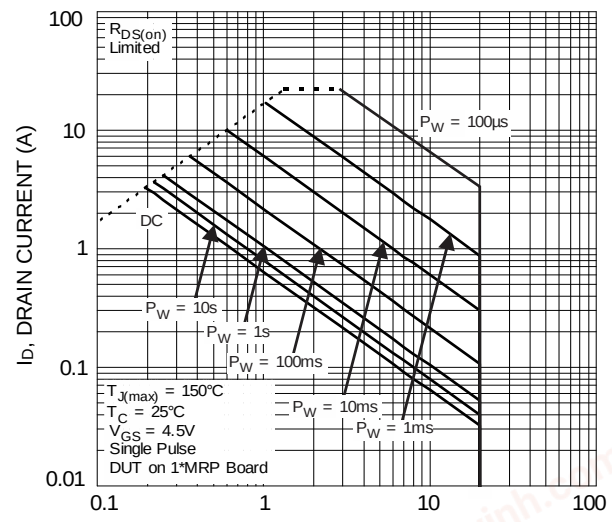


Figure 12 SOA, Safe Operation Area

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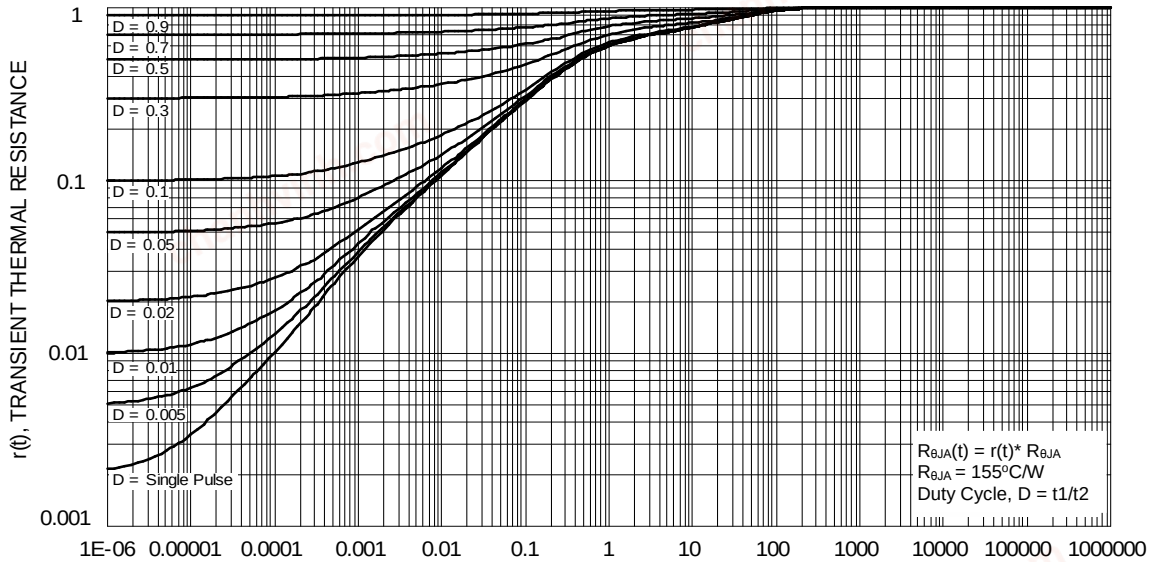


Figure 13 Transient Thermal Resistance

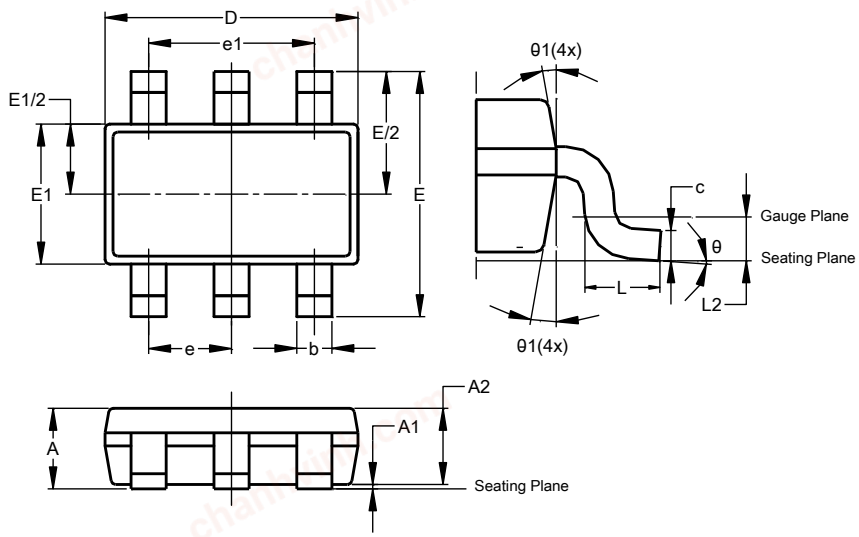
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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

TSOT26

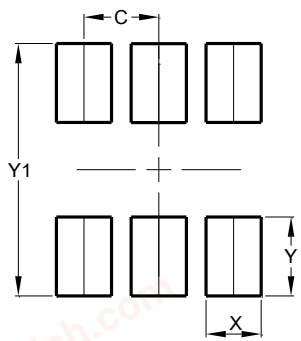


TSOT26			
Dim	**Min**	**Max**	**Typ**
A	—	1.00	—
A1	0.010	0.100	—
A2	0.840	0.900	—
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	—
c	0.120	0.200	—
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	—
L2	0.250 BSC		
θ	0°	8°	4°
θ1	4°	12°	—
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

TSOT26



Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.200

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