

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	$I_D$ $T_A = +25^\circ C$
20V	24m $\Omega$ @ $V_{GS} = 4.5V$	7A
	28m $\Omega$ @ $V_{GS} = 2.5V$	5A

## Description

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

## Applications

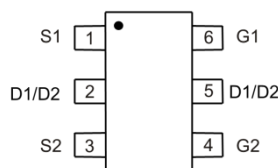
- Backlighting
- DC-DC Converters
- Power Management Functions



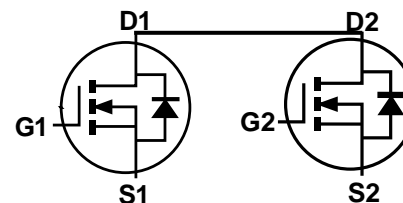
ESD Protected Gate



TSOT26



Top View



Equivalent Circuit

## Features and Benefits

- Low On-Resistance
- Low-Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

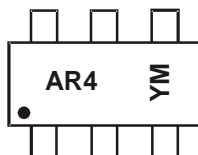
- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed Over Copper Leadframe. Solderable per MIL-STD-202, Method 208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

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2024UVT-7	TSOT26	3000/Tape & Reel
DMN2024UVT-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, refer to <http://www.diodes.com/products/packages.html>.

## Marking Information



AR4 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025
Code	F	G	H	I	J	K	L	M

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±10	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	7.0	A
		T <sub>A</sub> = +70°C		5.0	
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	2.3	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	35	A

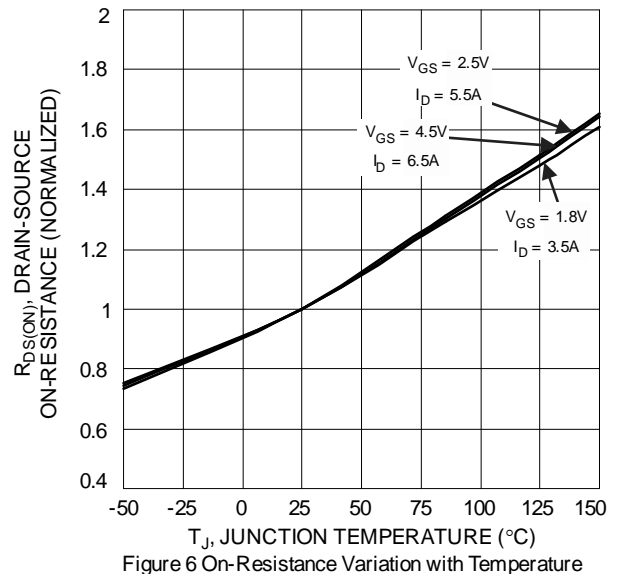
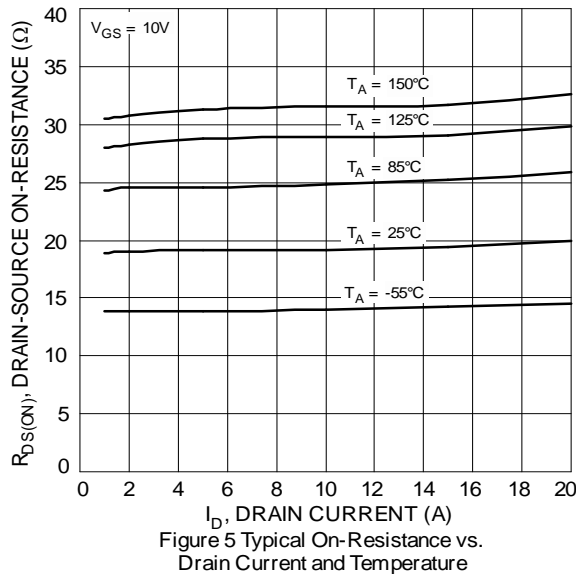
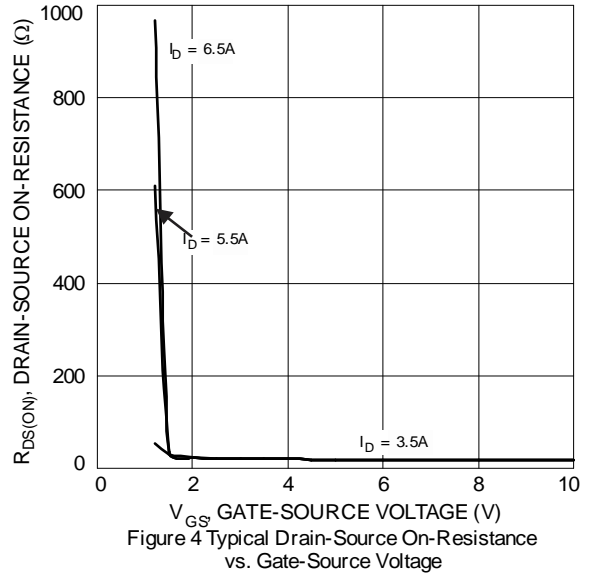
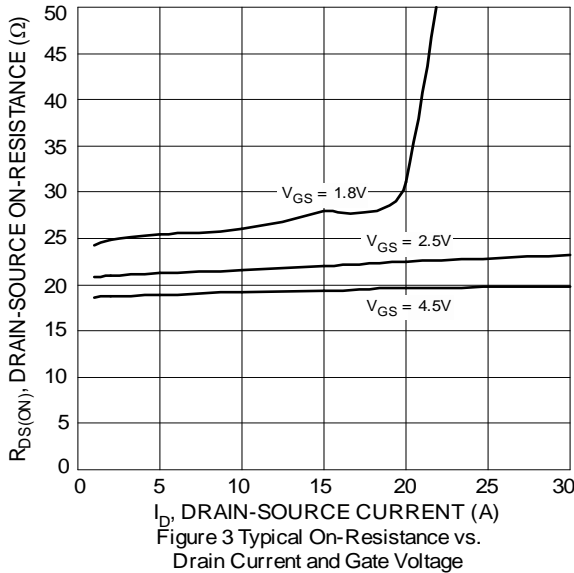
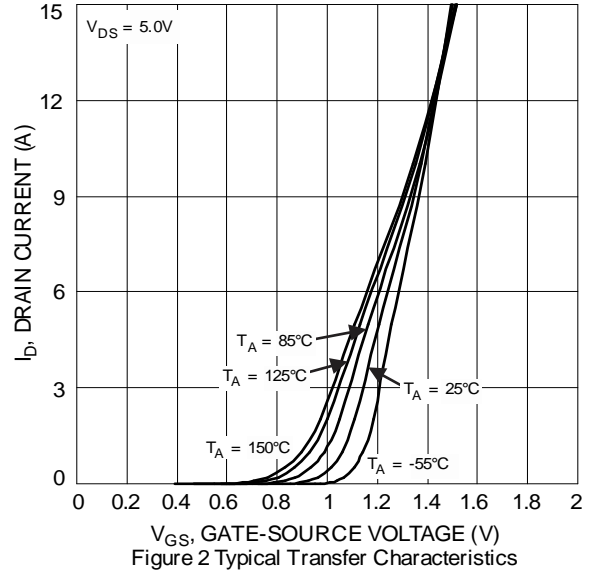
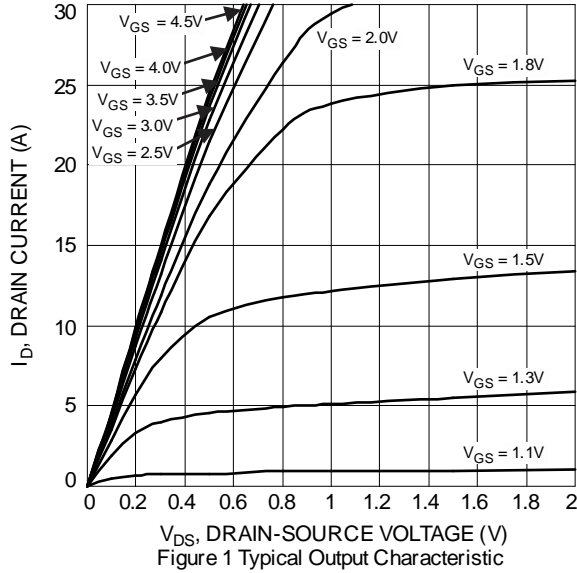
**Thermal Characteristics**

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P <sub>D</sub>	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R <sub>θJA</sub>	124	°C/W
Total Power Dissipation (Note 6)			P <sub>D</sub>	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R <sub>θJA</sub>	78	°C/W
Operating and Storage Temperature Range			T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0	μA	T <sub>J</sub> = +25°C, V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.5	—	0.9	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	19	24	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6.5A
			22	28		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5.5A
			25	34		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 3.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.9	1.2	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 5A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>ISS</sub>	—	647	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	78	—	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	38	—	pF	
Gate Resistance	R <sub>g</sub>	—	628	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	7.1	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 6.5A
Gate-Source Charge	Q <sub>gs</sub>	—	0.9	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.7	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	98	—	ns	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 4.5V, R <sub>L</sub> = 10Ω, R <sub>G</sub> = 6Ω, I <sub>D</sub> = 1A
Turn-On Rise Time	t <sub>R</sub>	—	140	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	1024	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	434	—	ns	
Reverse Recovery Time	t <sub>RR</sub>	—	245	—	ns	I <sub>F</sub> = 1.0A, di/dt = 100A/μs
Reverse Recovery Charge	Q <sub>RR</sub>	—	149	—	nC	I <sub>F</sub> = 1.0A, di/dt = 100A/μs

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
  6. Device mounted on 1" x 1" FR-4 PCB with high-coverage 2oz. copper, single sided.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.



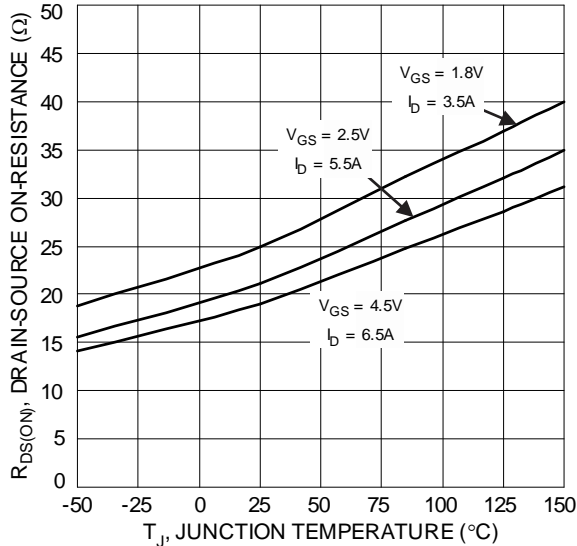


Figure 7 On-Resistance Variation with Temperature

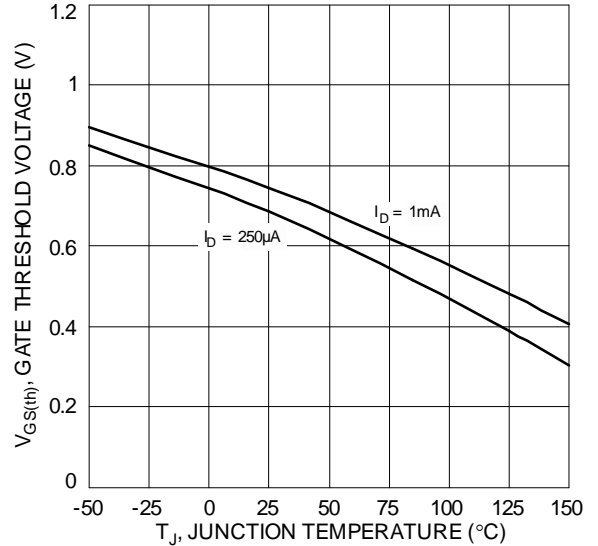


Figure 8 Gate Threshold Variation vs. Ambient Temperature

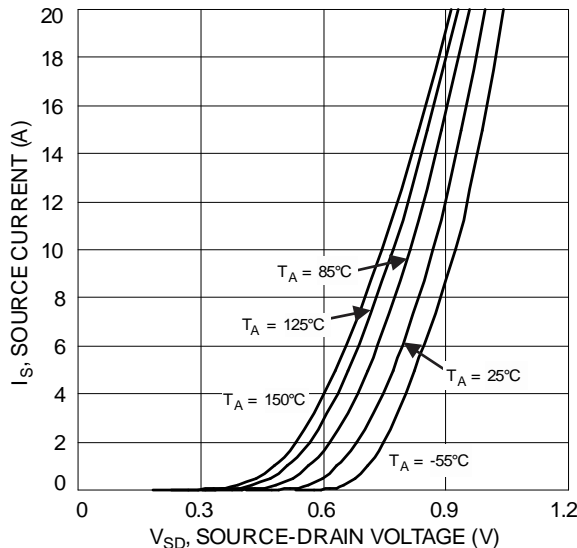


Figure 9 Diode Forward Voltage vs. Current

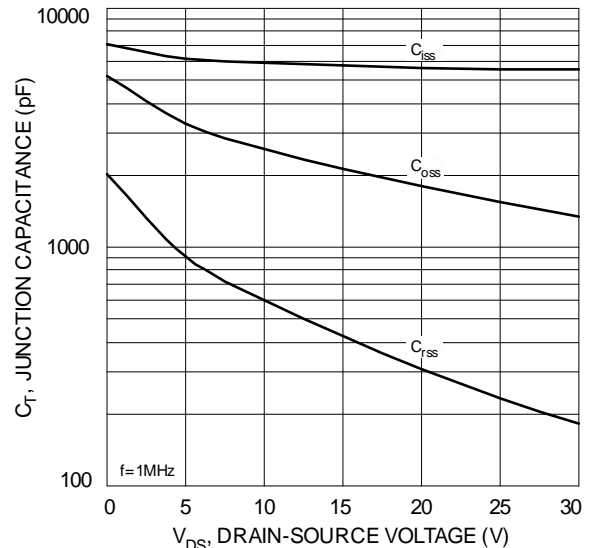


Figure 10 Typical Junction Capacitance

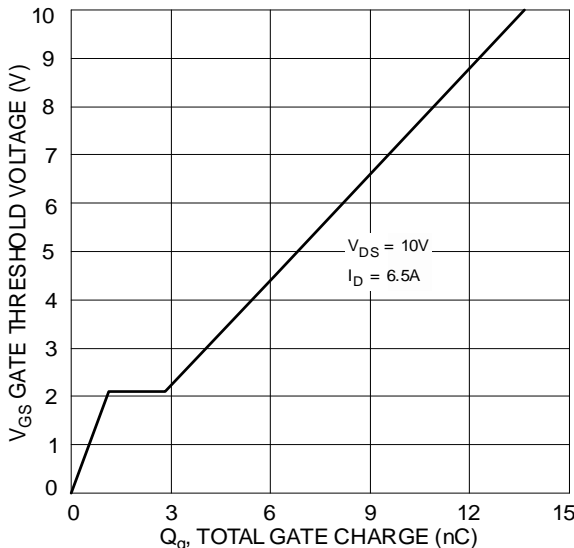


Figure 11 Gate Charge

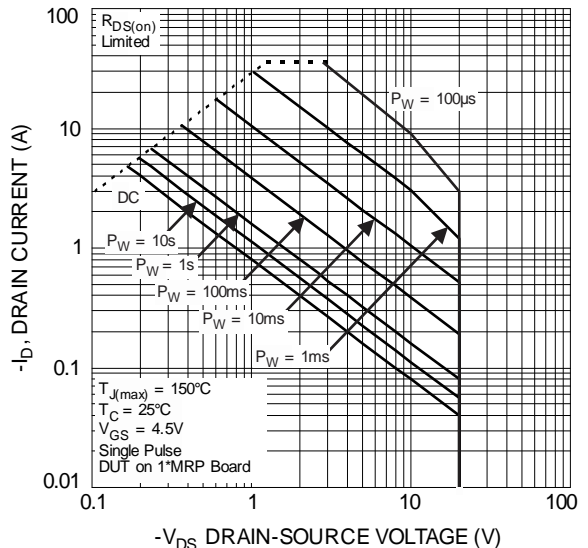
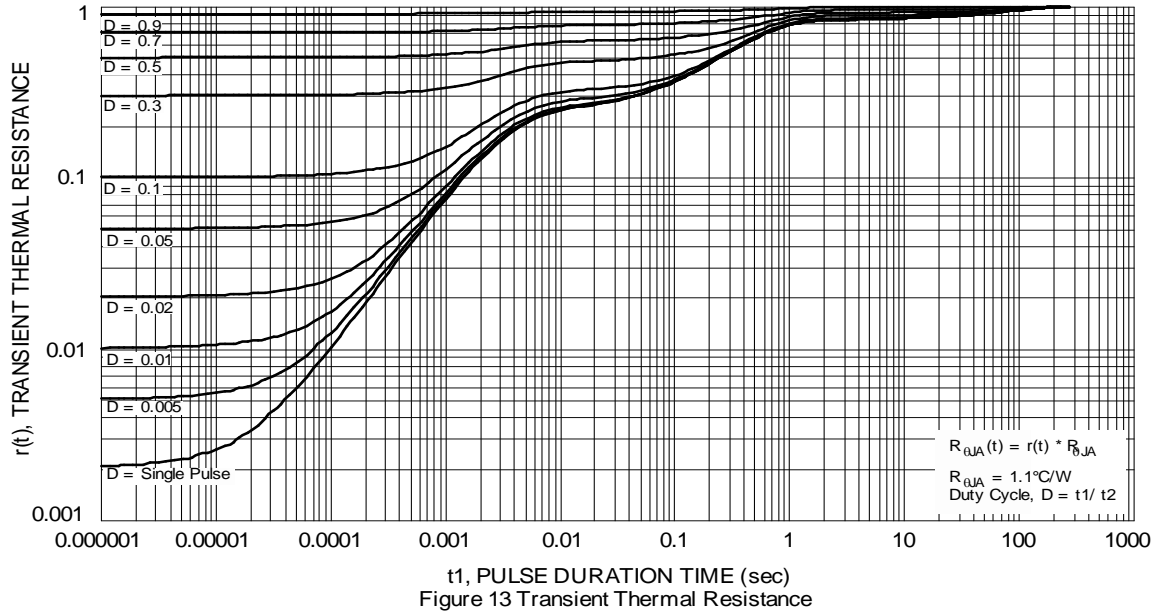


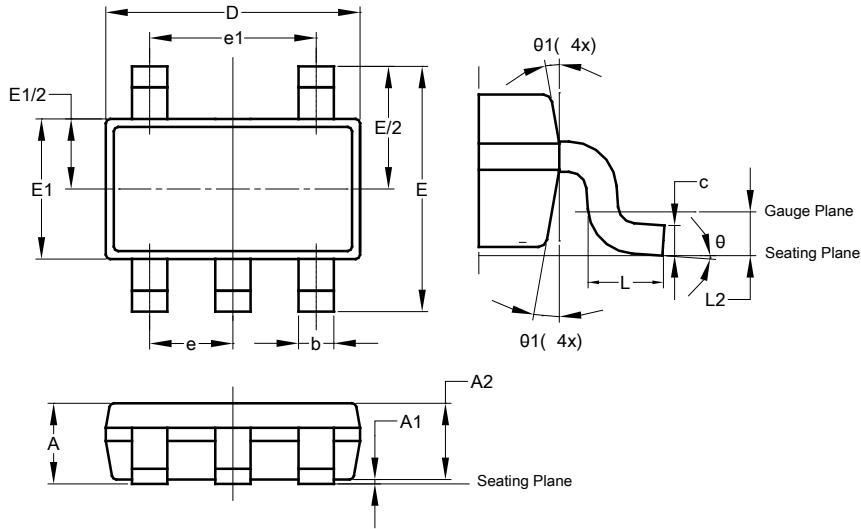
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

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

**TSOT25**

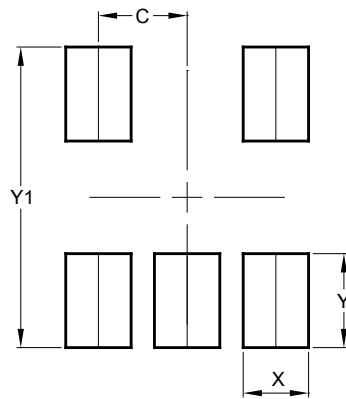


TSOT25			
Dim	Min	Max	Typ
A	—	1.00	—
A1	0.01	0.10	—
A2	0.84	0.90	—
b	0.30	0.45	—
c	0.12	0.20	—
D	—	—	2.90
E	—	—	2.80
E1	—	—	1.60
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.50	—
L2	0.25 BSC		
θ	0°	8°	4°
θ1	4°	12°	—
All Dimensions in mm			

**Suggested Pad Layout**

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

**TSOT25**



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

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