

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

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 standards for High Reliability**
- **PPAP Capable (Note 4)**

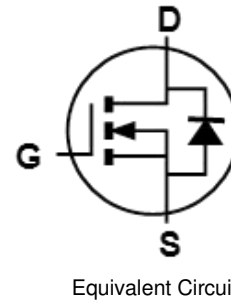
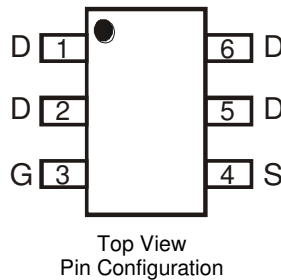
Description and Applications

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.

- DC-DC Converters
- Power Management Functions
- Backlighting

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 (E3)
- Weight: 0.013 grams (Approximate)

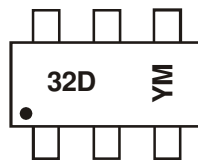


Ordering Information (Note 5)

Part Number	Case	Packaging
DMN6040SVTQ-7	TSOT26	3,000/Tape & Reel
DMN6040SVTQ-13	TSOT26	10,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

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	...	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	X	...	E	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 (@ $T_A = +25^\circ\text{C}$, 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 7) $V_{GS} = 10\text{V}$	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 7) $V_{GS} = 5\text{V}$	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 7)			I_S	2.1	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)			I_{DM}	30	A
Avalanche Current (Note 8) $L = 0.1\text{mH}$			I_{AR}	14.2	A
Avalanche Energy (Note 8) $L = 0.1\text{mH}$			E_{AR}	10	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.2	W
	$T_A = +70^\circ\text{C}$		0.75	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	106	$^\circ\text{C/W}$
	$t < 10\text{s}$		69	$^\circ\text{C/W}$
Total Power Dissipation (Note 7)	$T_A = +25^\circ\text{C}$	P_D	1.8	W
	$T_A = +70^\circ\text{C}$		1.1	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	68	$^\circ\text{C/W}$
	$t < 10\text{s}$		44	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	20	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1 inch square copper plate.
 8. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.

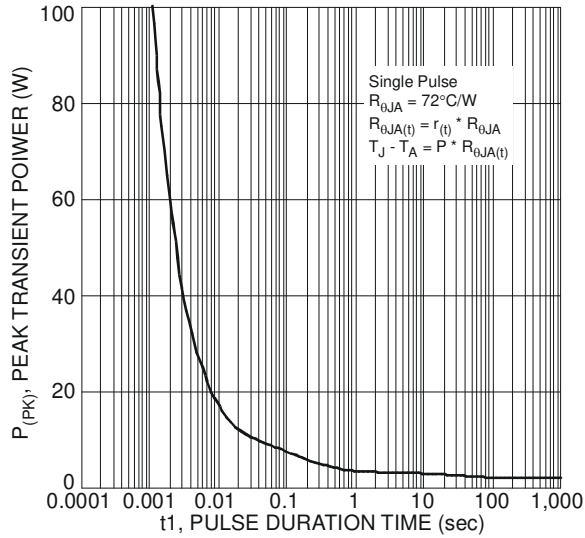


Fig. 1 Single Pulse Maximum Power Dissipation

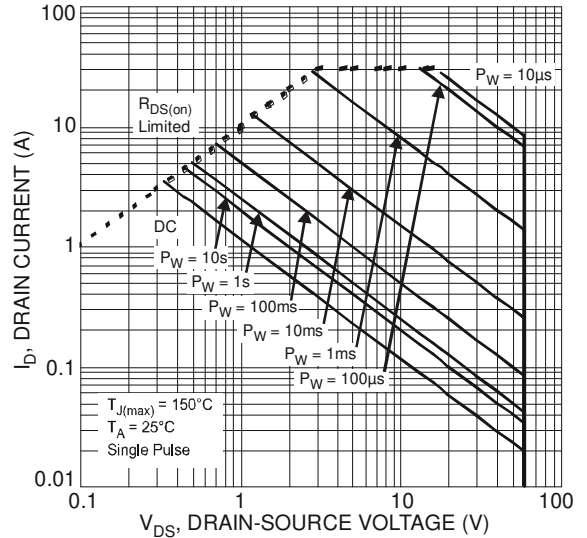


Fig. 2 SOA, Safe Operation Area

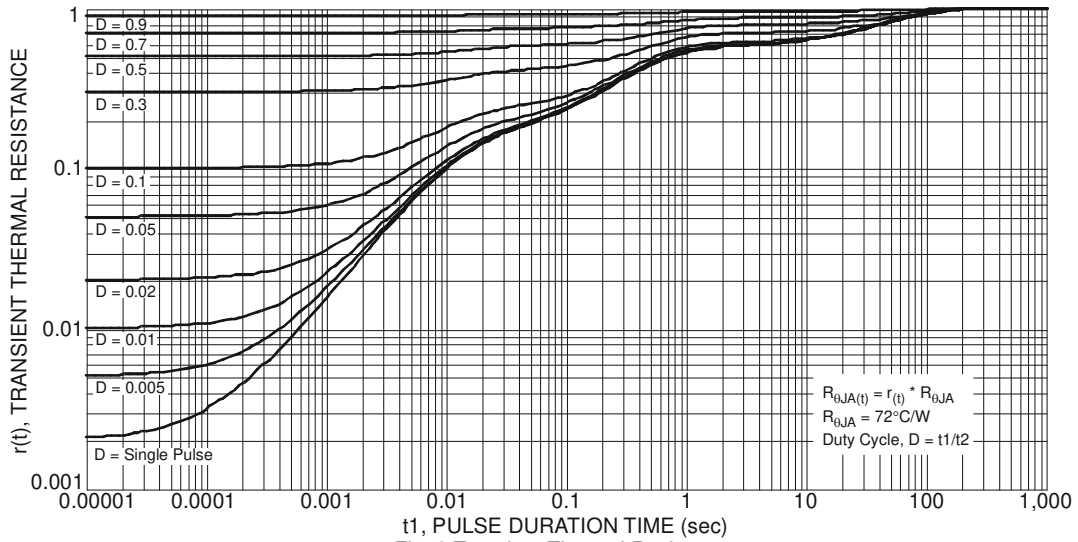
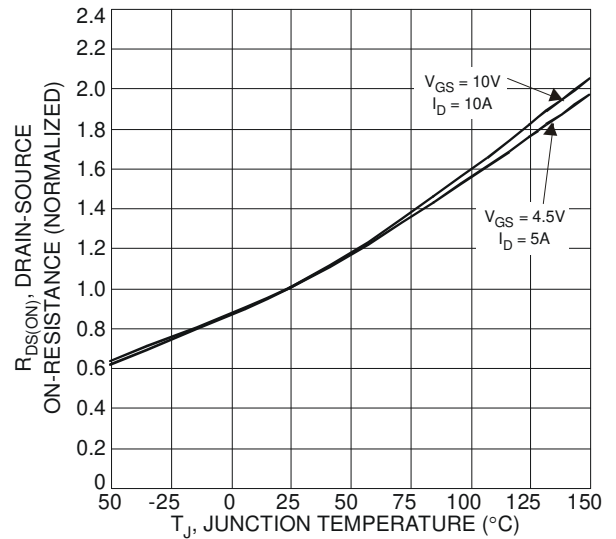
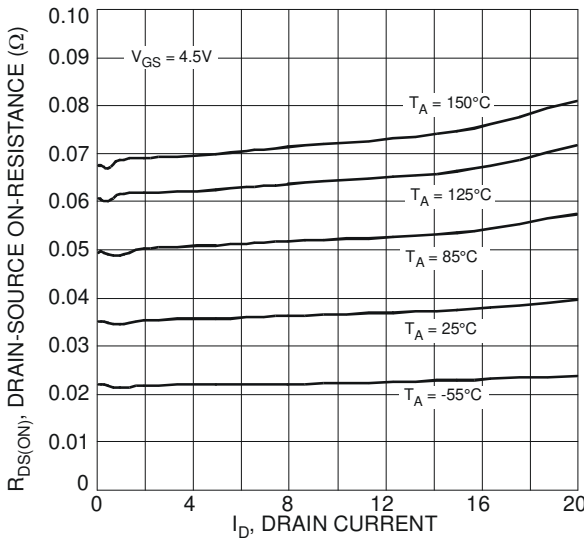
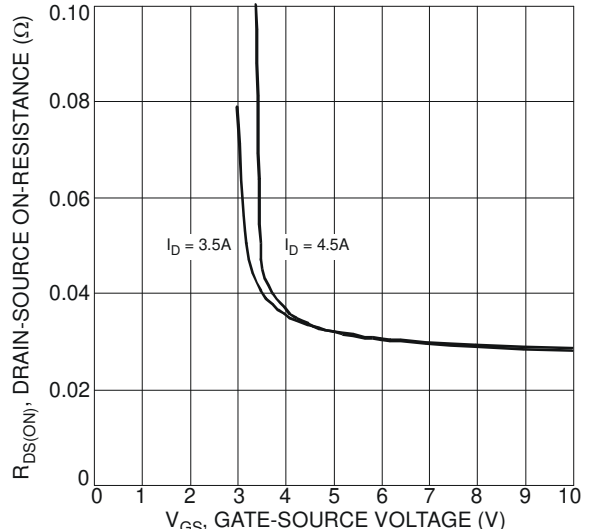
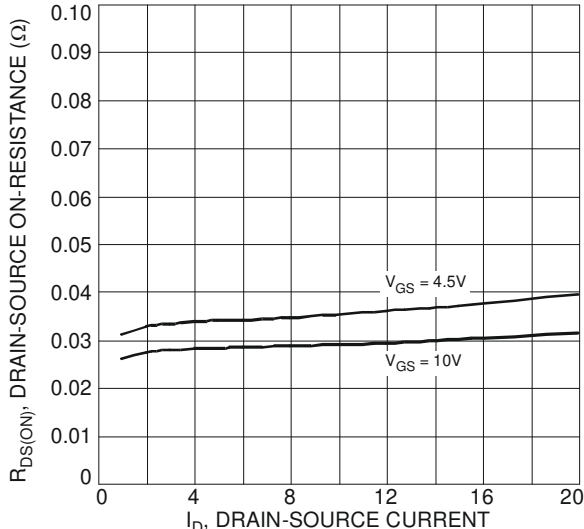
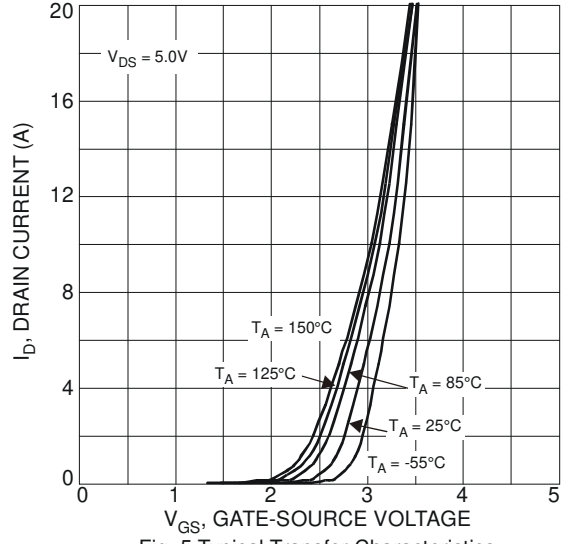
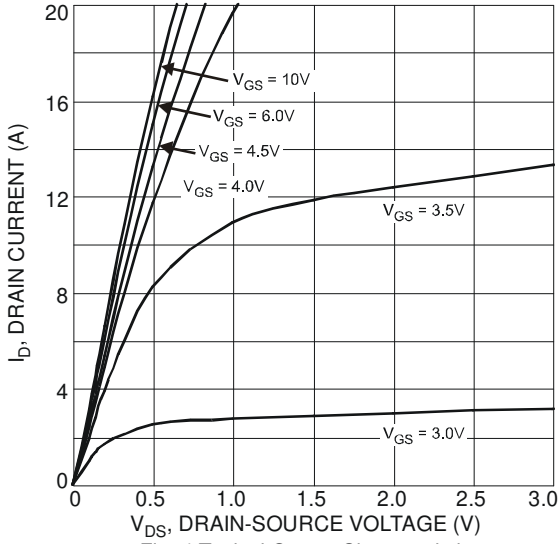


Fig. 3 Transient Thermal Resistance

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	100	nA	$V_{DS} = 60V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	30	44	m Ω	$V_{GS} = 10V, I_D = 4.3A$
		—	35	60		$V_{GS} = 4.5V, I_D = 4A$
Forward Transfer Admittance	$ Y_{FS} $	—	4.5	—	S	$V_{DS} = 10V, I_D = 4.3A$
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	$V_{GS} = 0V, I_S = 1A$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{ISS}	—	1,287	—	pF	$V_{DS} = 25V, V_{GS} = 0V$ $f = 1.0MHz$
Output Capacitance	C_{OSS}	—	57	—		
Reverse Transfer Capacitance	C_{RSS}	—	44	—		
Gate Resistance	R_G	—	1.2	—	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$
Total Gate Charge ($V_{GS} = 10V$)	Q_G	—	22.4	—	nC	$V_{DS} = 30V, I_D = 4.3A$
Total Gate Charge ($V_{GS} = 4.5V$)	Q_G	—	10.4	—		
Gate-Source Charge	Q_{GS}	—	4.9	—		
Gate-Drain Charge	Q_{GD}	—	3.0	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.6	—	ns	$V_{GS} = 10V, V_{DD} = 30V, R_G = 6\Omega,$ $I_D = 4.3A$
Turn-On Rise Time	t_R	—	8.1	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	20.1	—		
Turn-Off Fall Time	t_F	—	4.0	—		
Body Diode Reverse Recovery Time	t_{RR}	—	18	—	ns	$I_S = 4.3A, dI/dt = 100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{RR}	—	11.9	—	nC	$I_S = 4.3A, dI/dt = 100A/\mu s$

Notes: 9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.



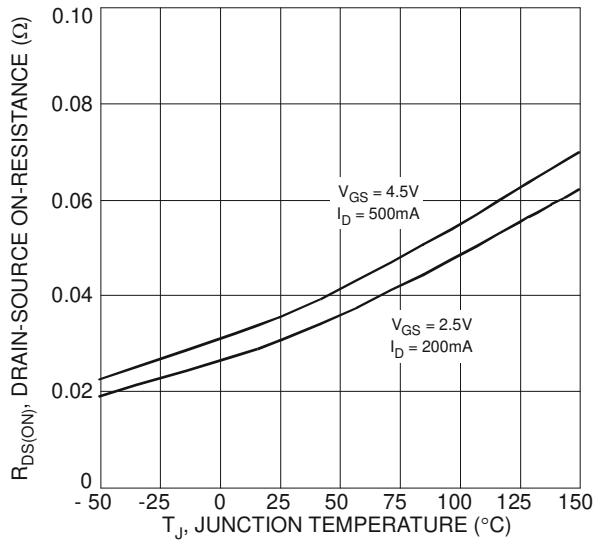


Fig. 10 On-Resistance Variation with Temperature

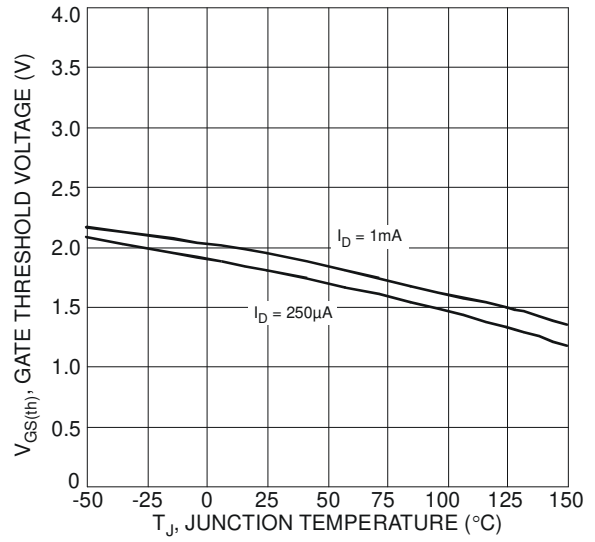


Fig. 11 Gate Threshold Variation vs. Ambient Temperature

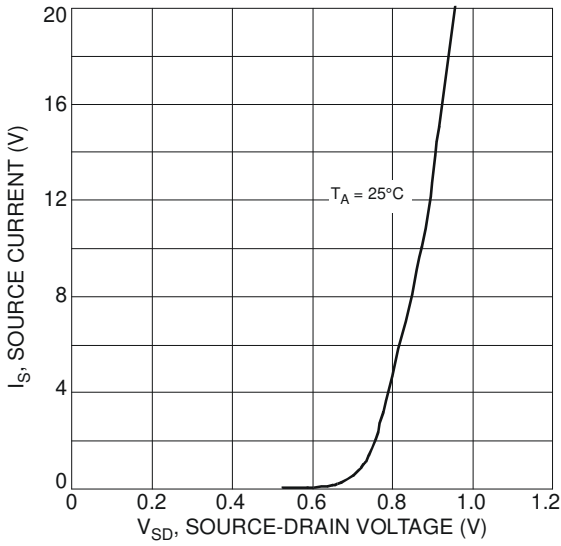


Fig. 12 Diode Forward Voltage vs. Current

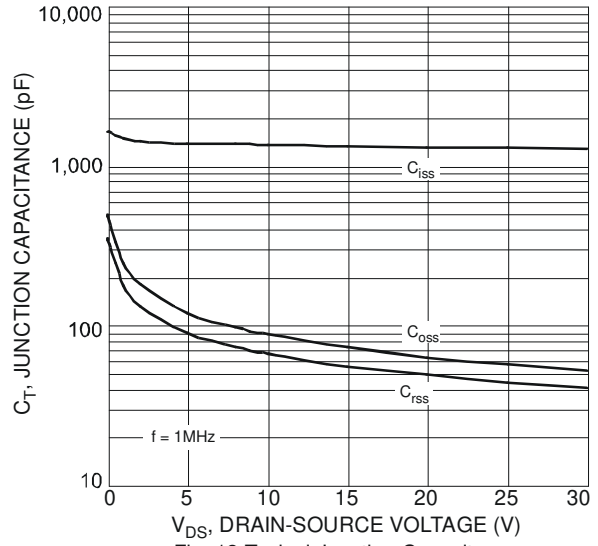


Fig. 13 Typical Junction Capacitance

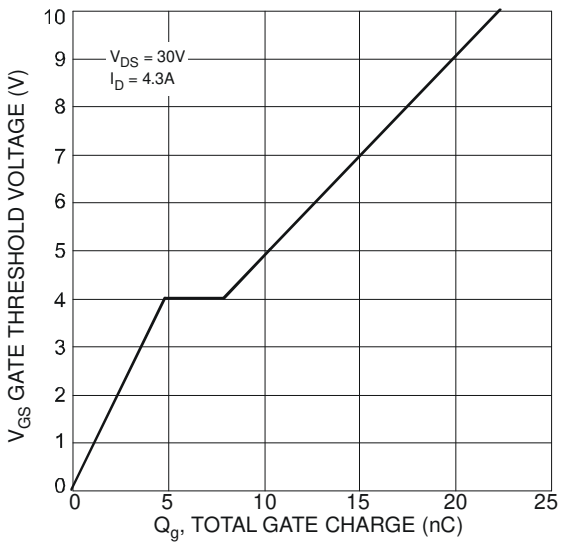
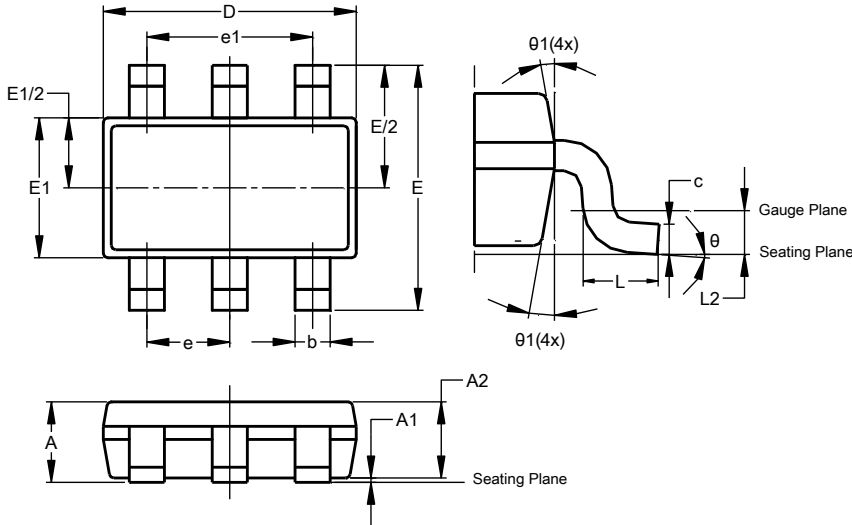


Fig. 14 Gate Charge

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

TSOT26

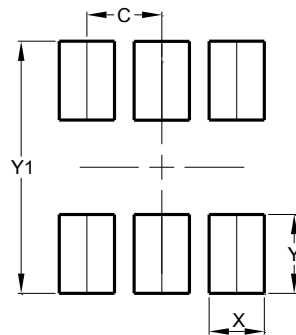


TSOT26			
Dim	Min	Max	Typ
A	–	1.00	–
A1	0.010	0.100	–
A2	0.840	0.900	–
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	–
c	0.120	0.200	–
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	–
L2	0.250 BSC		
θ	0°	8°	4°
$\theta 1$	4°	12°	–
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

TSOT26



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

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