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## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	$I_D$ $T_A = +25^\circ\text{C}$
60V	44m $\Omega$ @ $V_{GS} = 10\text{V}$	5.0A
	60m $\Omega$ @ $V_{GS} = 4.5\text{V}$	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)**

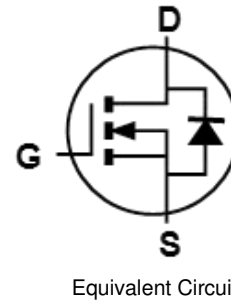
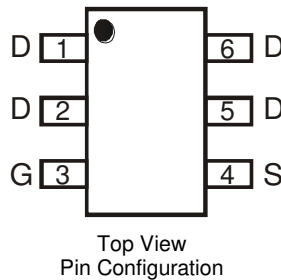
## Description and Applications

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)

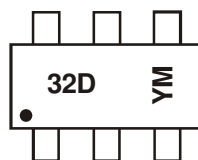


## Ordering Information (Note 5)

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](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/](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			$V_{GSS}$	$\pm 20$	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 $\mu\text{s}$ 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  $T_J = +25^\circ\text{C}$ .



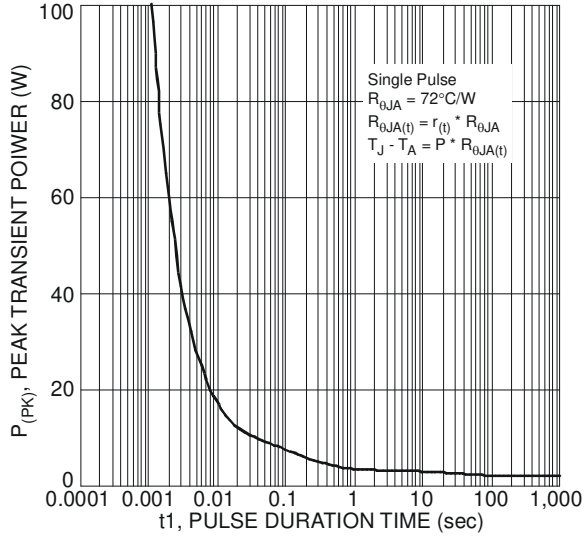


Fig. 1 Single Pulse Maximum Power Dissipation

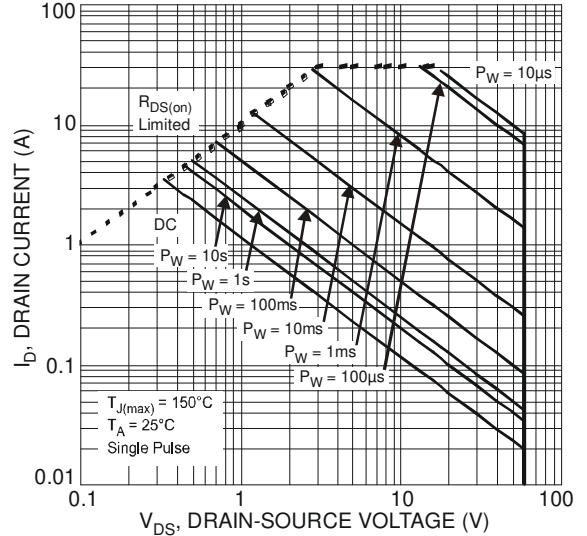


Fig. 2 SOA, Safe Operation Area

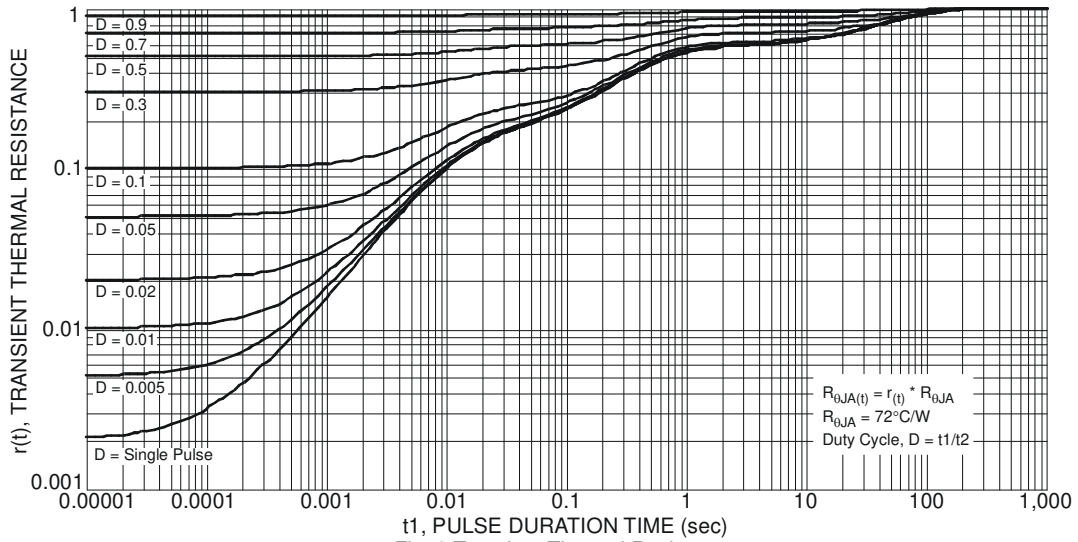


Fig. 3 Transient Thermal Resistance

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (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	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS</b> (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 $\Omega$	$V_{GS} = 10V, I_D = 4.3A$
		—	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	$V_{GS} = 0V, I_S = 1A$
<b>DYNAMIC CHARACTERISTICS</b> (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	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$
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.

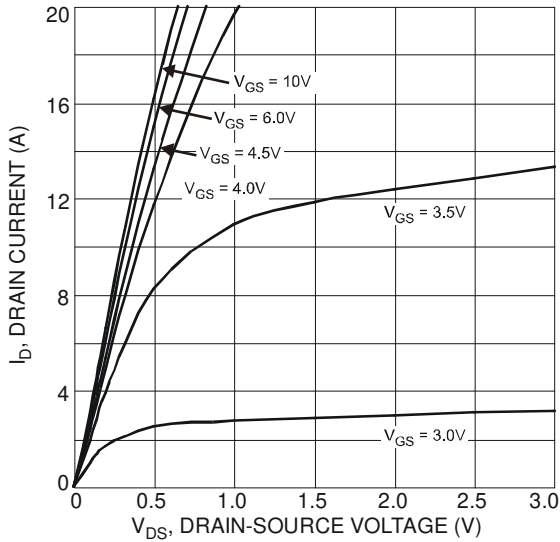


Fig. 4 Typical Output Characteristic

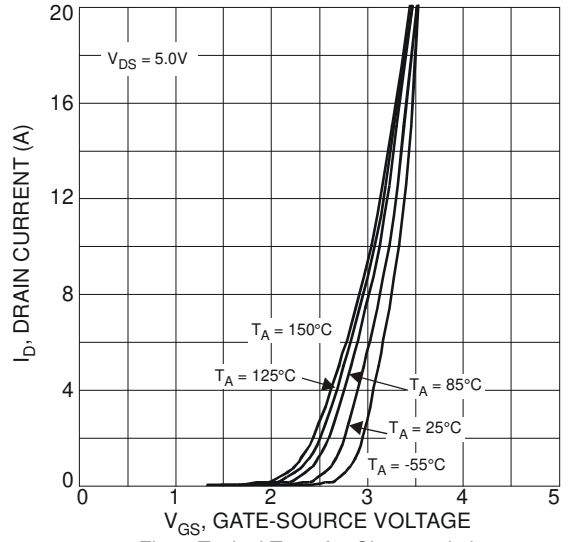


Fig. 5 Typical Transfer Characteristics

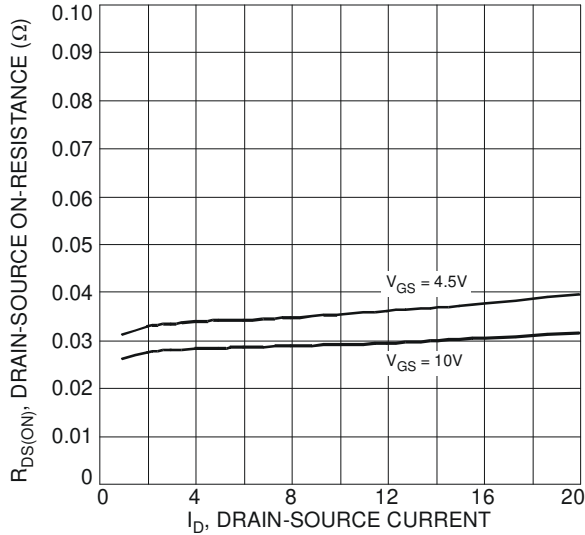


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

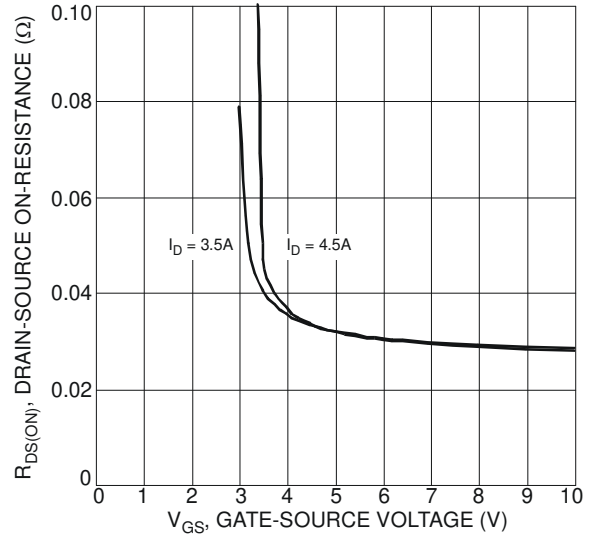


Fig. 7 Typical On-Resistance vs. Drain Current and Gate Voltage

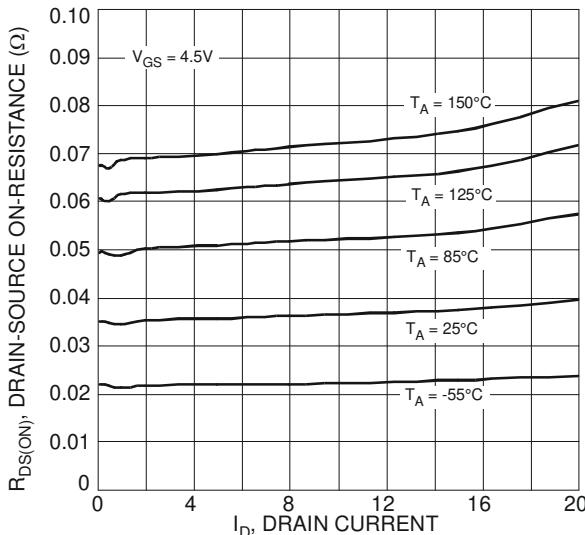


Fig. 8 Typical On-Resistance vs. Drain Current and Temperature

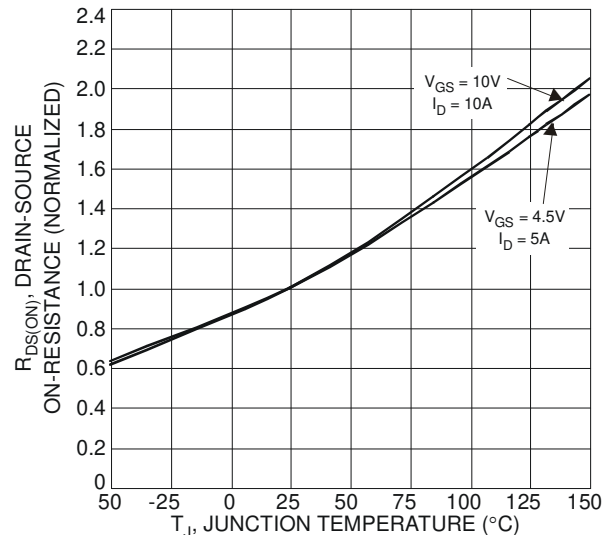


Fig. 9 On-Resistance Variation with Temperature

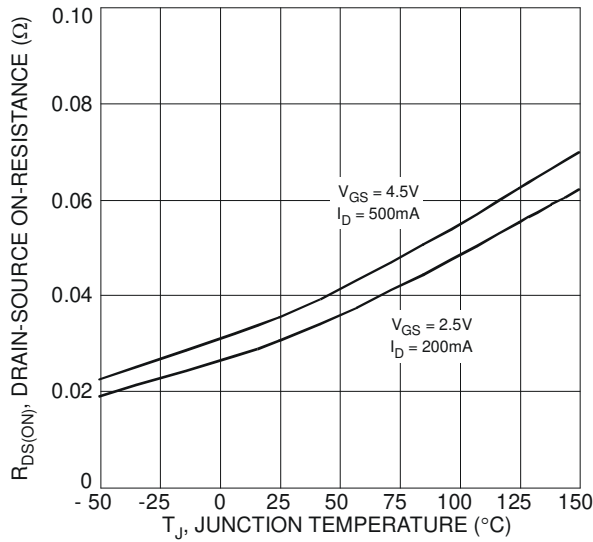


Fig. 10 On-Resistance Variation with Temperature

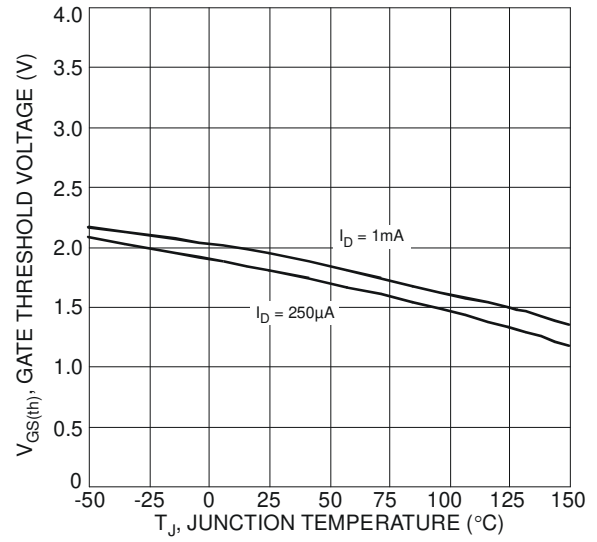


Fig. 11 Gate Threshold Variation vs. Ambient Temperature

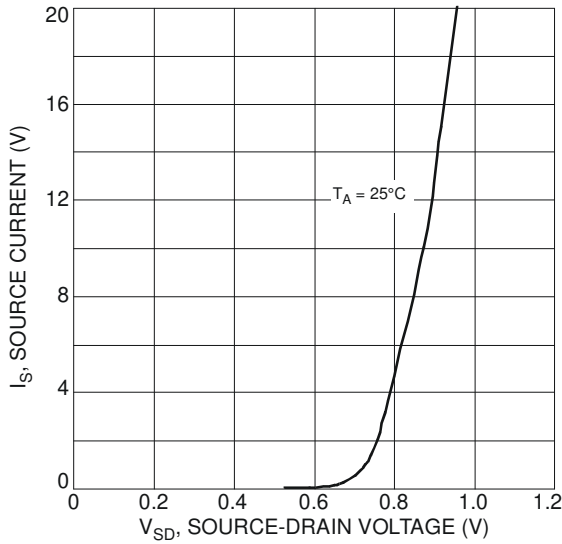


Fig. 12 Diode Forward Voltage vs. Current

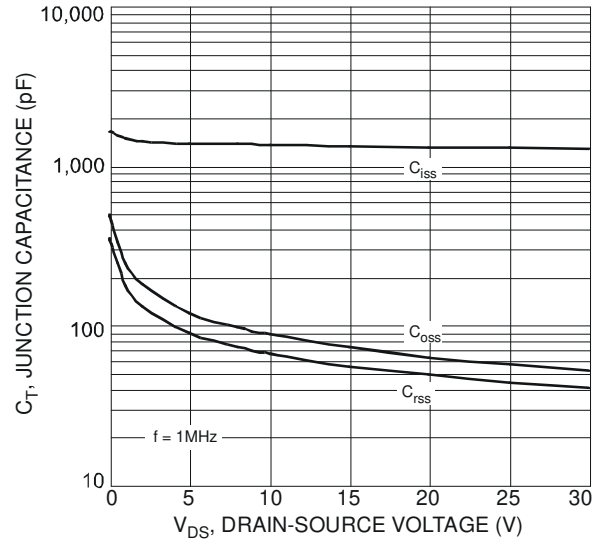


Fig. 13 Typical Junction Capacitance

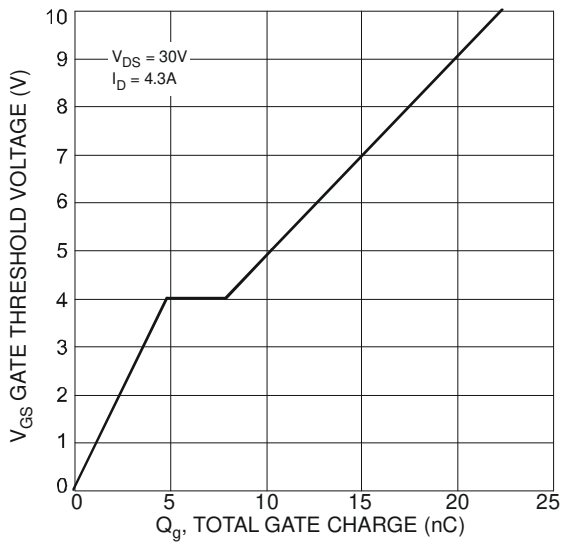
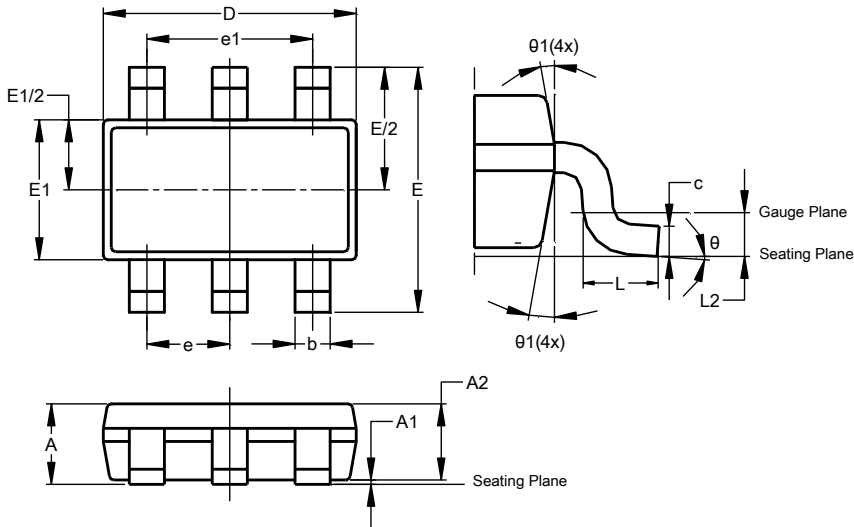


Fig. 14 Gate Charge

**Package Outline Dimensions**

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

**TSOT26**

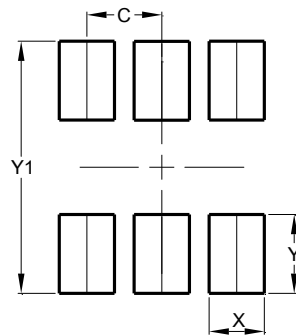


TSOT26			
Dim	Min	Max	Typ
A	–	1.00	–
A1	0.010	0.100	–
A2	0.840	0.900	–
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	–
c	0.120	0.200	–
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	–
L2	0.250 BSC		
theta	0°	8°	4°
theta1	4°	12°	–
<b>All Dimensions in mm</b>			

**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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