45V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)\ max}$	I_D $T_A = 25°C$
45V	46mΩ @ V_{GS} = 10V	4.8A
	62mΩ @ V_{GS} = 4.5V	4.1A

Features and Benefits

- 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**

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.

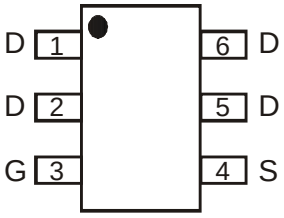
- DC-DC Converters
- Power management functions
- Backlighting

Mechanical Data

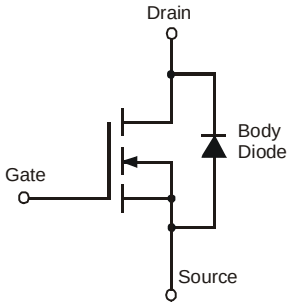
- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208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

TSOT26

Top View



Top View
Pin Configuration



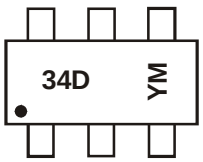
Equivalent Circuit

Ordering Information (Note 3)

Part Number	Case	Packaging
DMN4060SVT-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



34D = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: Z = 2012)
M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

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°C unless otherwise specified

Characteristic S			ymbol	Value	Units
Drain-Source Voltage			V_{DSS}	45 V	
Gate-Source Voltage			V_{GSS}	±20 V	
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	4.8 3.8	A
	t<10s	T_A = 25°C T_A = 70°C	I_D	6.1 4.8	A
Continuous Drain Current (Note 5) V_{GS} = 5V	Steady State	T_A = 25°C T_A = 70°C	I_D	4.1 3.2	A
	t<10s	T_A = 25°C T_A = 70°C	I_D	5.2 4.1	A
Maximum Body Diode Forward Current (Note 5)			I_S	2.1 A	
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	30 A	
Avalanche Current (Note 6) L = 0.1mH			I_{AR}	14.2 A	
Avalanche Energy (Note 6) L = 0.1mH			E_{AR}	10 mJ	

Thermal Characteristics @T_A = 25°C unless otherwise specified

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

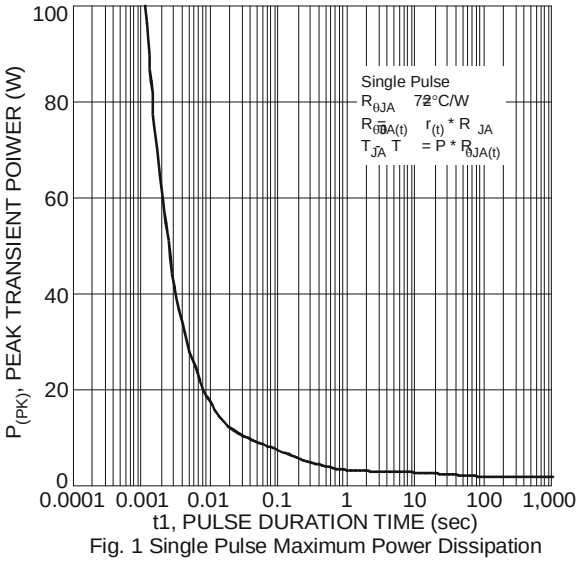


Fig. 1 Single Pulse Maximum Power Dissipation

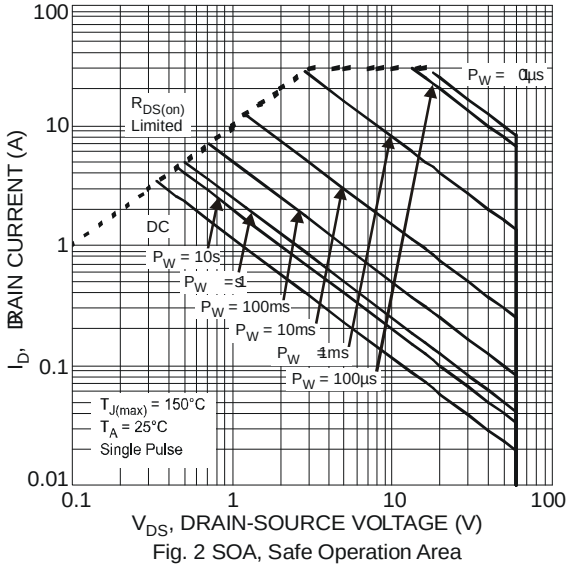


Fig. 2 SOA, Safe Operation Area

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic S	ymbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	45	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	100 nA		V_{DS} = 45V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1	—	3 V		V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	37 46		mΩ	V_{GS} = 10V, I_D = 4.3A
		—	52 62			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 8)						
Input Capacitance	C_{iss}	—	1287	—	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 = 6Ω, 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/μs
Body Diode Reverse Recovery Charge	Q_{rr}	—	11.9	—	nC	I_S = 4.3A, dI/dt = 100A/μs

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 T_J = 25°C
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

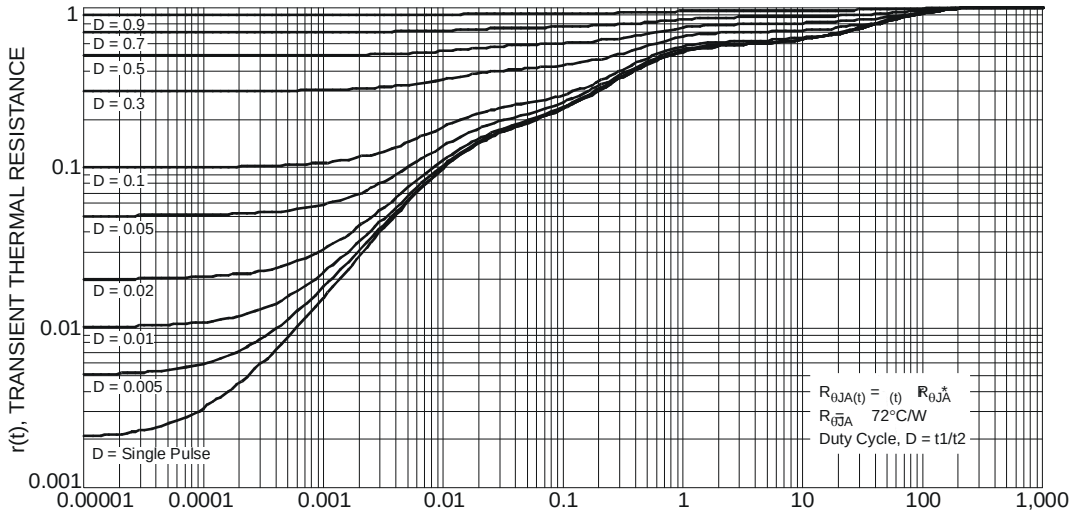


Fig. 3 Transient Thermal Resistance

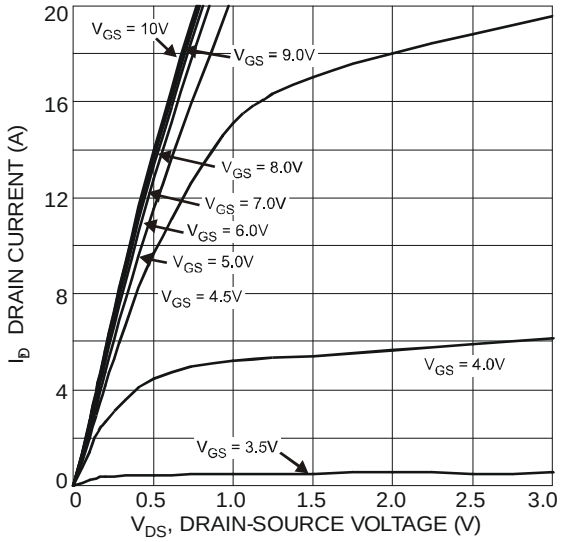


Fig. 4 Typical Output Characteristic

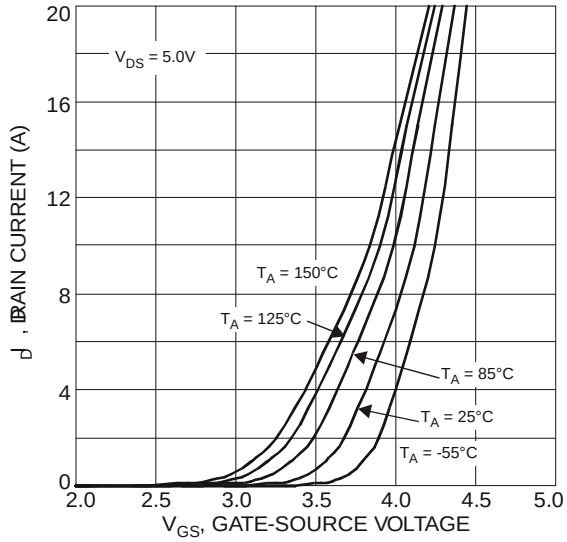


Fig. 5 Typical Transfer Characteristics

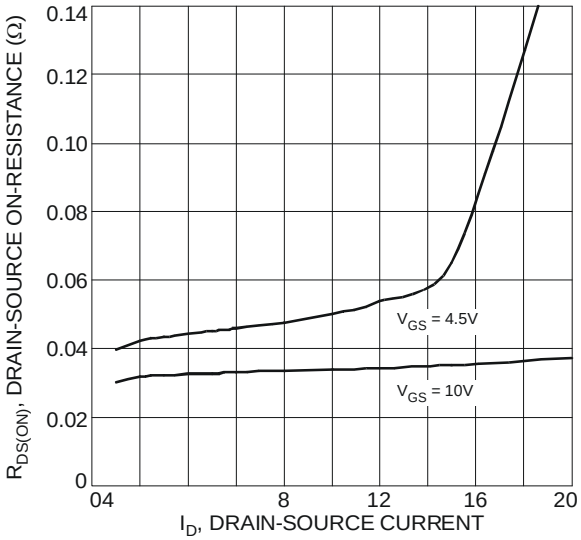


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

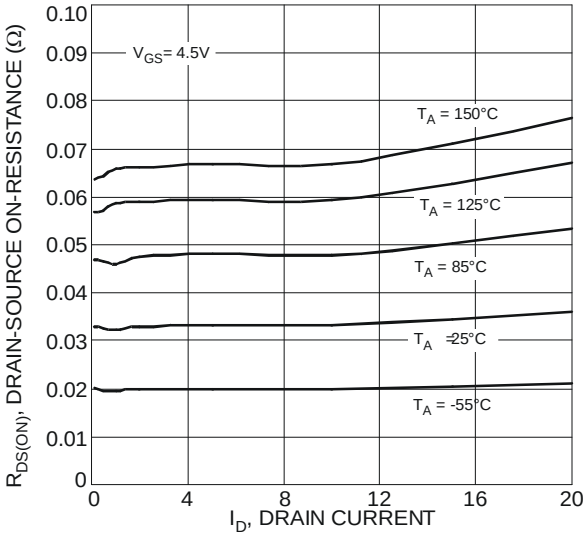


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

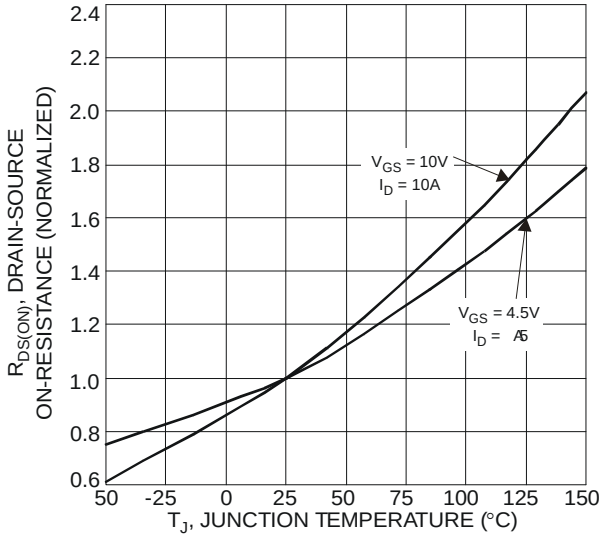


Fig. 8 On-Resistance Variation with Temperature

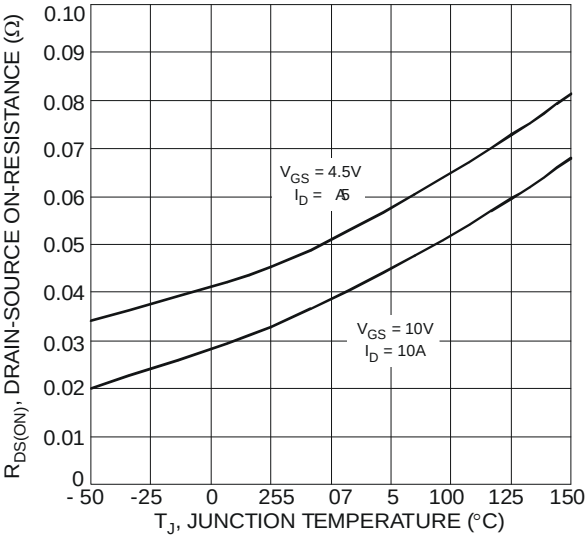


Fig. 9 On-Resistance Variation with Temperature

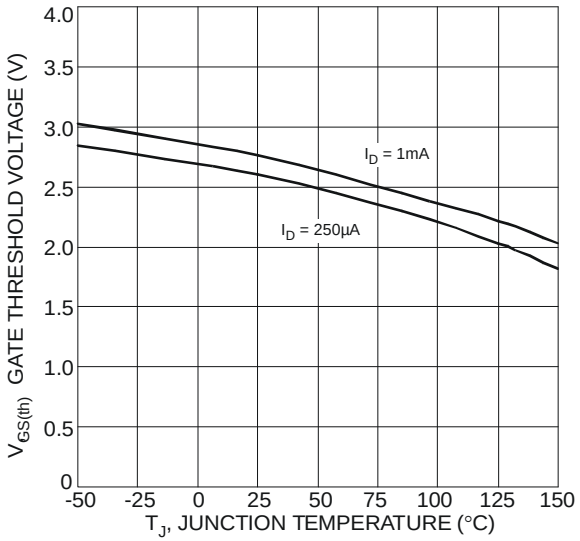


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

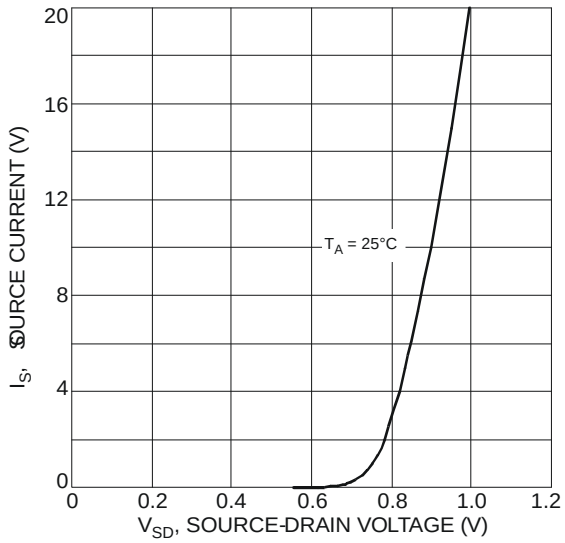


Fig. 11 Diode Forward Voltage vs. Current

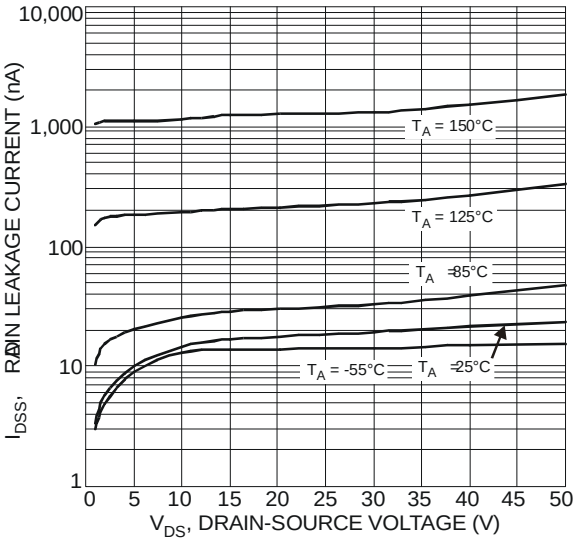


Fig. 12 Typical Drain-Source Leakage Current vs. Voltage

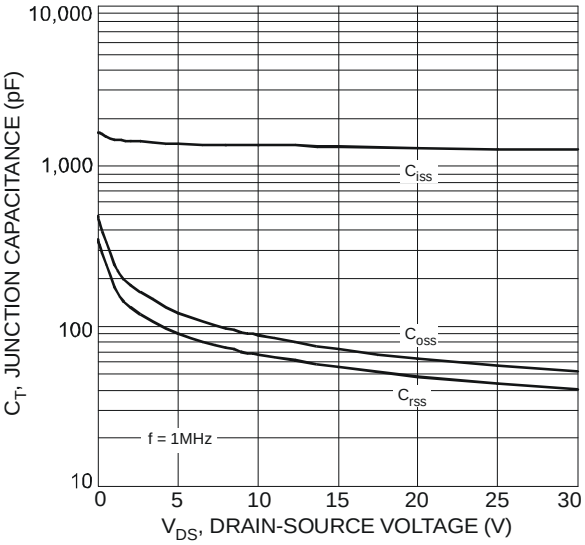


Fig. 13 Typical Junction Capacitance

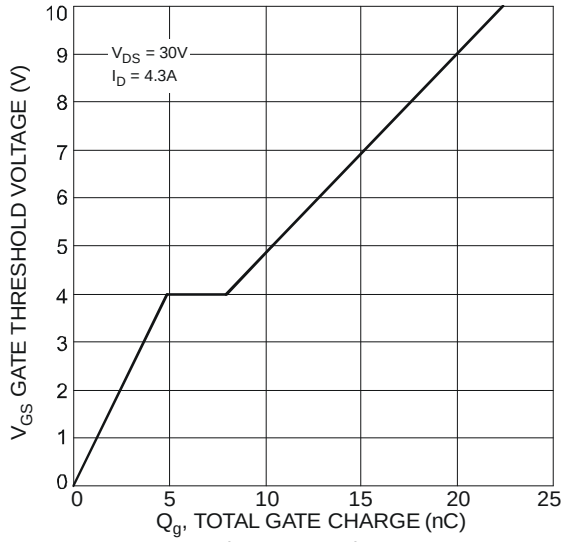
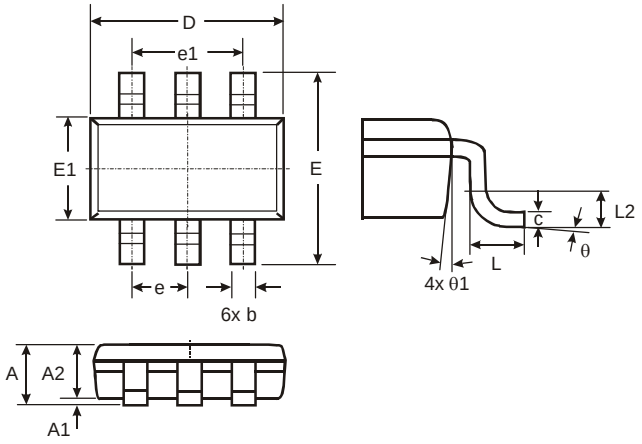


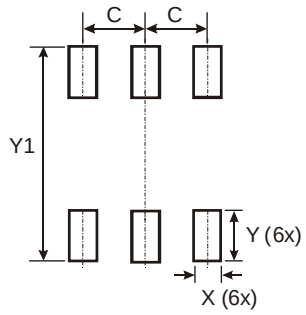
Fig. 14 Gate Charge

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
θ	0°	8°	4°
θ1	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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