N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
30V	28mΩ @ V_{GS} = 10V	5.8A
	42mΩ @ V_{GS} = 4.5V	4.8A
	82mΩ @ V_{GS} = 3V	2.0A

Description

This 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.

Applications

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

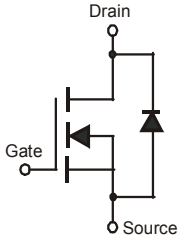
Features and Benefits

- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

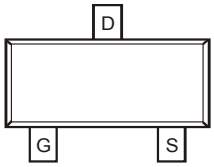
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (approximate)

Top View



Internal Schematic



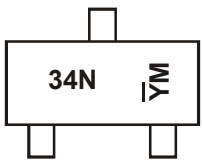
Top View

Ordering Information (Note 4 & 5)

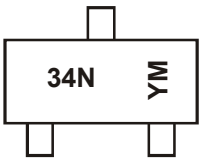
Part Number	Compliance	Case	Packaging
DMN3404L-7	Standard	SOT23	3000/Tape & Reel
DMN3404LQ-7	Automotive	SOT23	3000/Tape & Reel

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.htmlfor 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. Automotive and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to Diodes website at http://www.diodes.com/products/packages.html.

Marking Information



Chengdu A/T Site



Shanghai A/T Site

34N = Product Type Marking Code
YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
$\overline{Y}\overline{M}$ = Date Code Marking for CAT (Chengdu Assembly/ Test site)
Y or $\overline{Y}$ = Year (ex: A = 2013)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

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			Symbol	Value	Units
Drain-Source Voltage (Note 6 & 7)			**V_{DSS}**	**30**	**V**
Gate-Source Voltage			**V_{GSS}**	**±20**	**V**
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = -40°C T_A = +25°C T_A = +85°C	I_D	4.6 4.2 3.0	A
Continuous Drain Current (Note 7) V_{GS} = 10V	Steady State	T_A = -40°C T_A = +25°C T_A = +85°C	I_D	6.2 5.8 4.0	A
Continuous Drain Current (Note 7) V_{GS} = 4.5V	Steady State	T_A = -40°C T_A = +25°C T_A = +85°C	I_D	5.2 4.8 3.2	A
Continuous Drain Current (Note 7) V_{GS} = 3V	Steady State	T_A = -40°C T_A = +25°C T_A = +85°C	I_D	2.2 2.0 1.0	A
Pulsed Drain Current			I_{DM}	30	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P_D	0.72	W
Thermal Resistance, Junction to Ambient @T_A = +25°C	$R_{\theta JA}$	173	°C/W
Power Dissipation (Note 7)	P_D	1.4	W
Thermal Resistance, Junction to Ambient @T_A = +25°C	$R_{\theta JA}$	90	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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 thermal bias to bottom layer 1inch square copper plate.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1.0	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	1.5	2.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance T_J = -40°C **(Note 9)**	$R_{DS(ON)}$	—	23	27	—	V_{GS} = 4.5V, I_D = 4.8A
		—	57	74	—	V_{GS}=3V, I_D =2A
Static Drain-Source On-Resistance T_J = +25°C	$R_{DS(ON)}$	—	24	28	mΩ	V_{GS} = 10V, I_D = 5.8A
		—	33	42		V_{GS} = 4.5V, I_D = 4.8A
		—	63	82		V_{GS}=3V, I_D =2A
Static Drain-Source On-Resistance T_J = +85°C **(Note 9)**	$R_{DS(ON)}$	—	71	95	mΩ	V_{GS}=3V, I_D =2A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	10	—	S	V_{DS} = 5V, I_D = 5.8A
Diode Forward Voltage	V_{SD}	—	0.75	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	498	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	52	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	45	—	pF	
Gate Resistance	R_g	—	1.75	2.8	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 3V)	Q_g	—	3.8	5.3	nC	V_{GS} = 3V, V_{DS} = 15V, I_D = 1A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	5.3	7.5	nC	V_{GS} = 10V/4.5V, V_{DS} = 15V, I_D = 5.8A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	11.3	16	nC	
Gate-Source Charge	Q_{gs}	—	1.4	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.1	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	3.41	10	ns	V_{DD} = 15V, V_{GS} = 10V, R_L = 2.6Ω, R_G = 3Ω
Turn-On Rise Time	t_r	—	6.18	13	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	13.92	28	ns	
Turn-Off Fall Time	t_f	—	2.84	10	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design and 25°C data. Not subject to production testing
10. Guaranteed by design. Not subject to production testing.

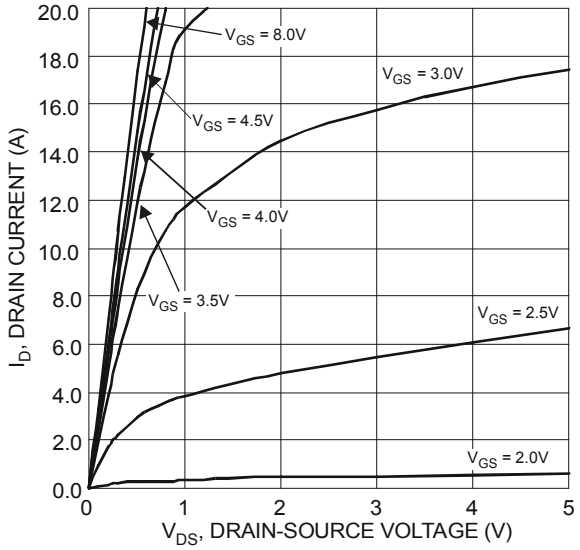


Figure 1 Typical Output Characteristics

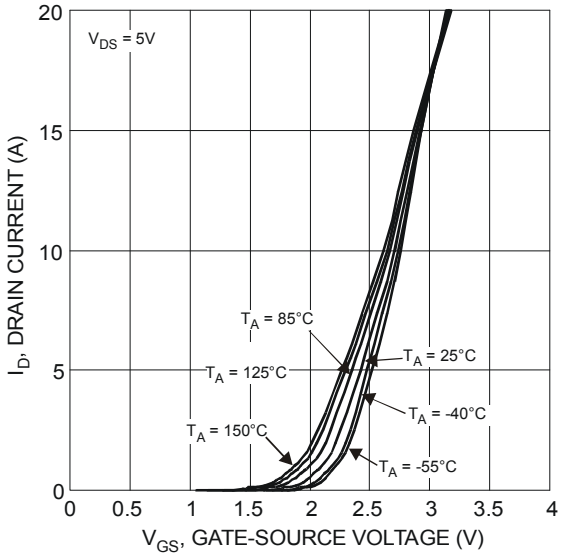


Figure 2 Typical Transfer Characteristics

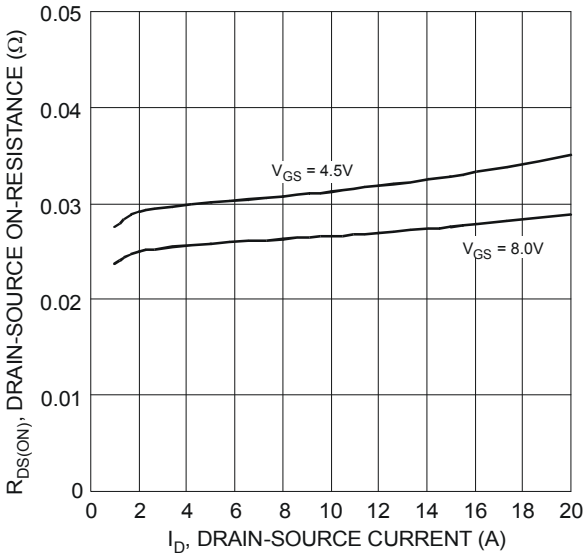


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

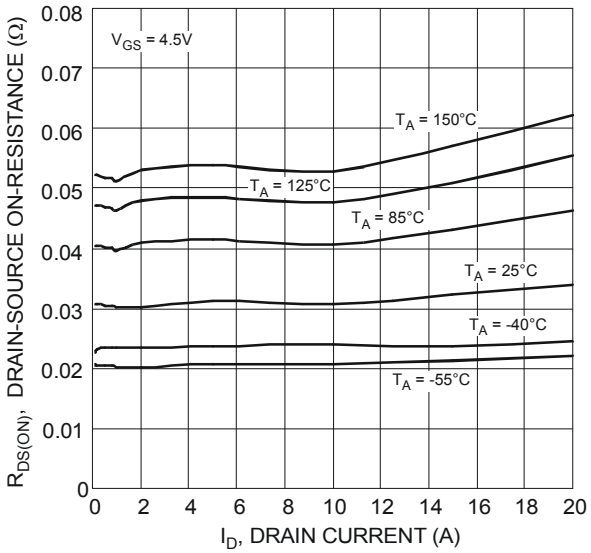


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

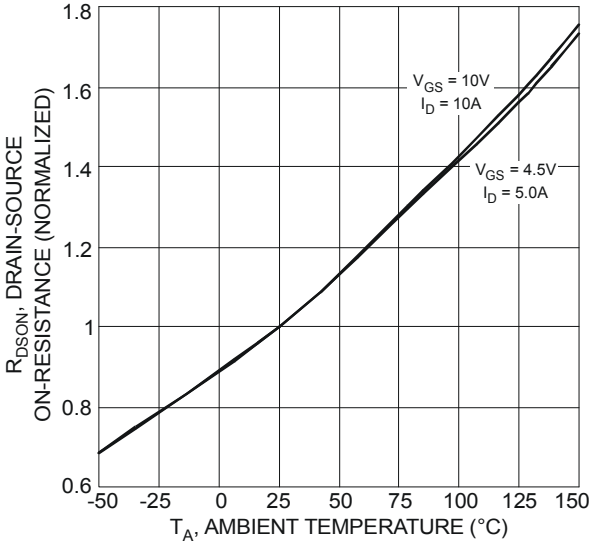


Figure 5 On-Resistance Variation with Temperature

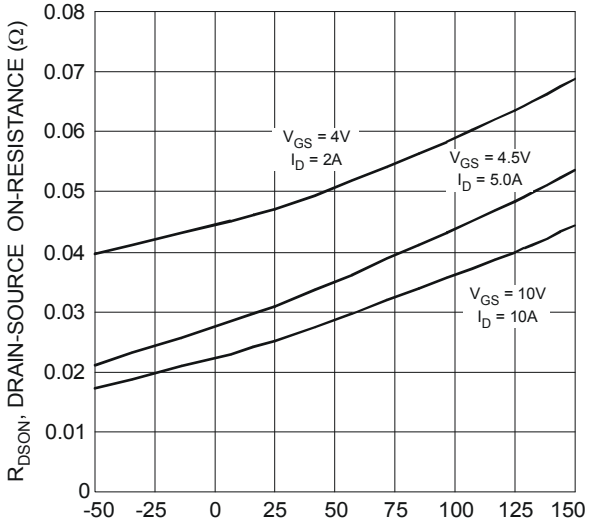


Figure 6 On-Resistance Variation with Temperature

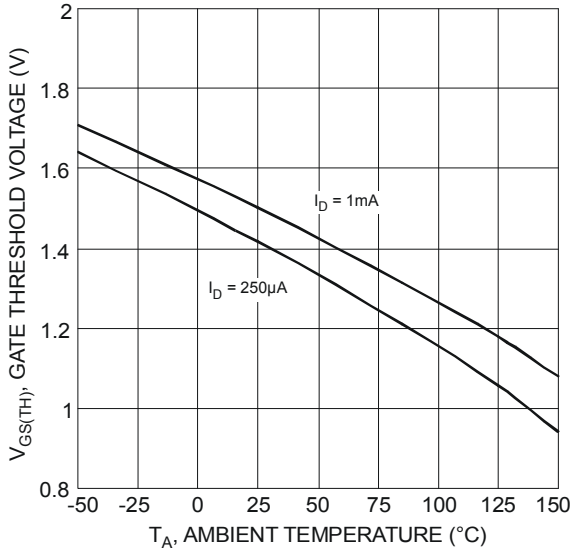


Figure 7 Gate Threshold Variation vs. Ambient Temperature

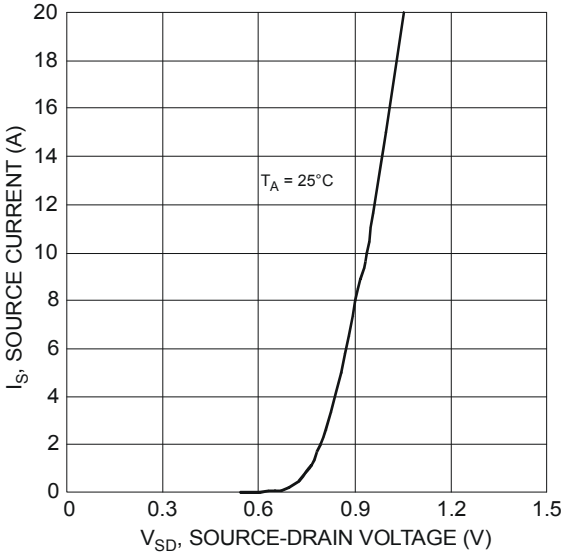


Figure 8 Diode Forward Voltage vs. Current

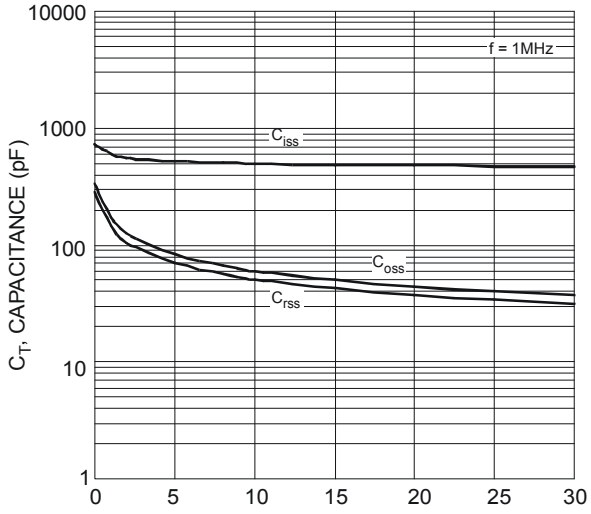


Figure 9 Typical Total Capacitance

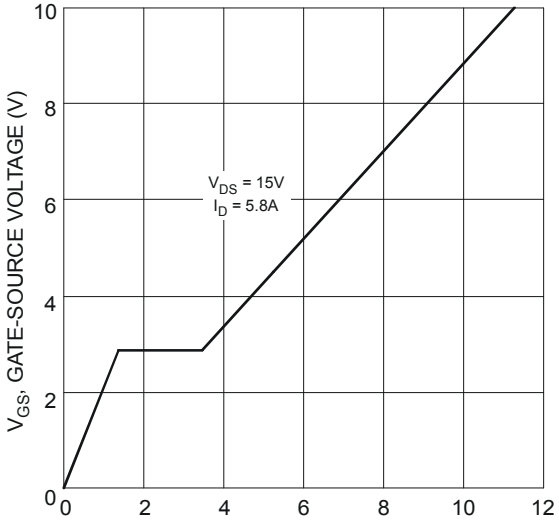


Figure 10 Gate-Charge Characteristics

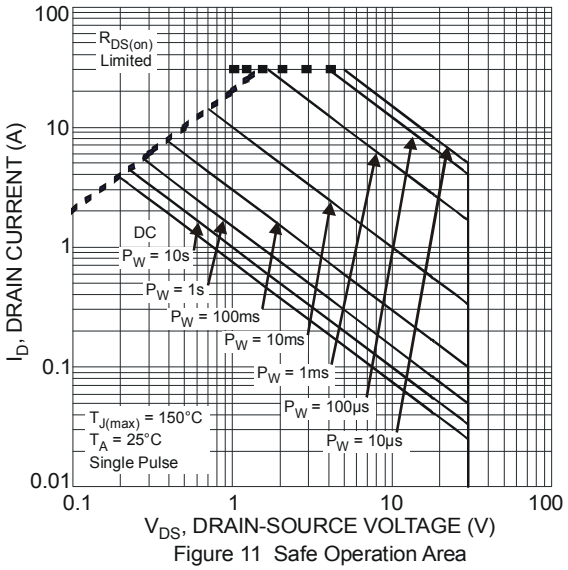


Figure 11 Safe Operation Area

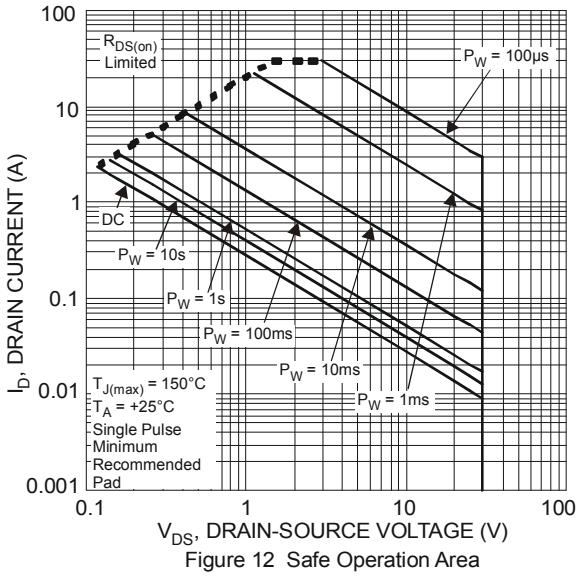


Figure 12 Safe Operation Area

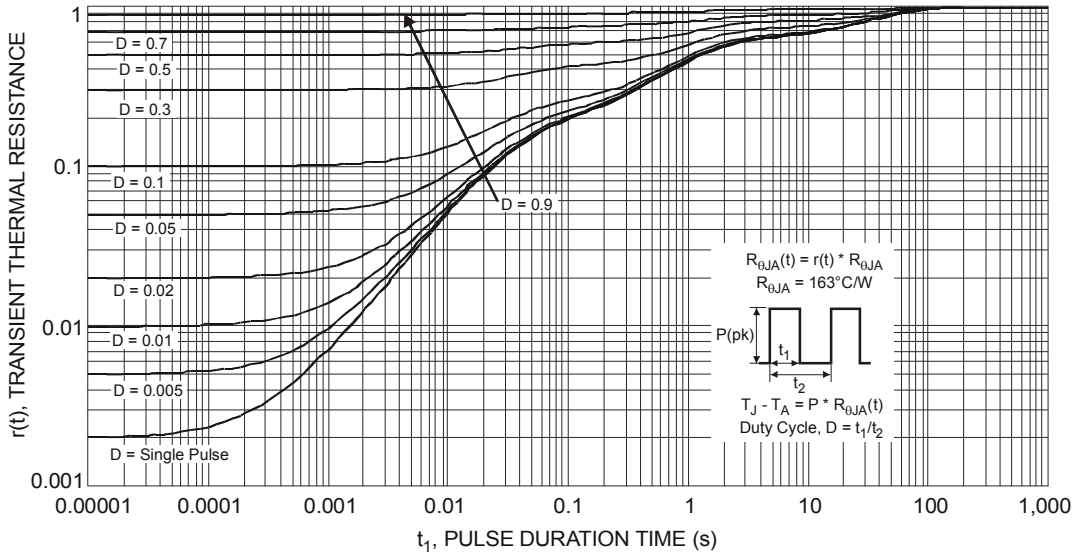
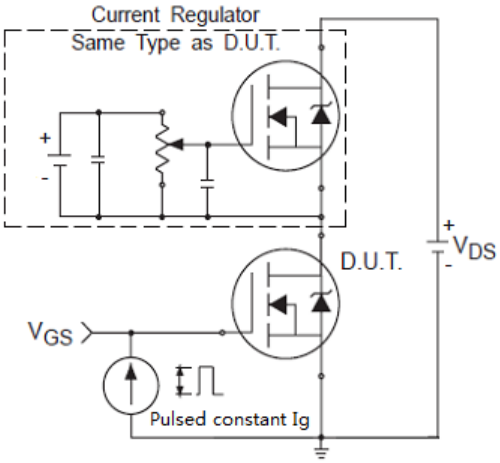
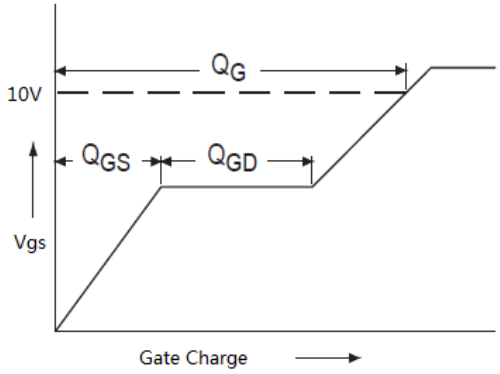


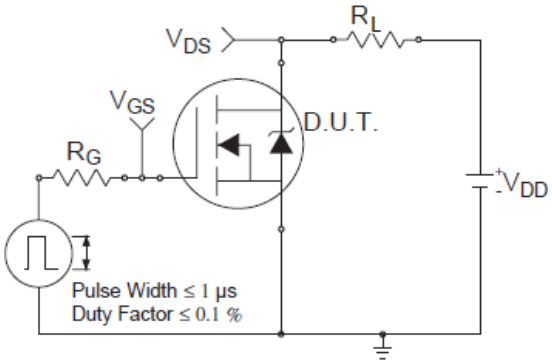
Figure 13 Transient Thermal Response

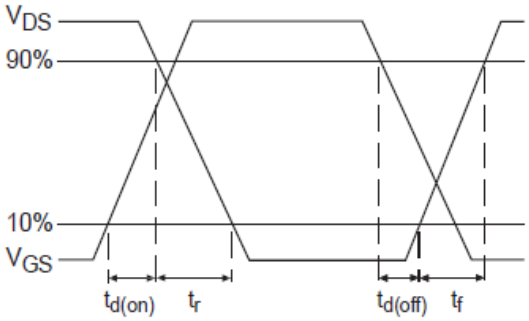
Gate Charge Test Circuit and Waveform





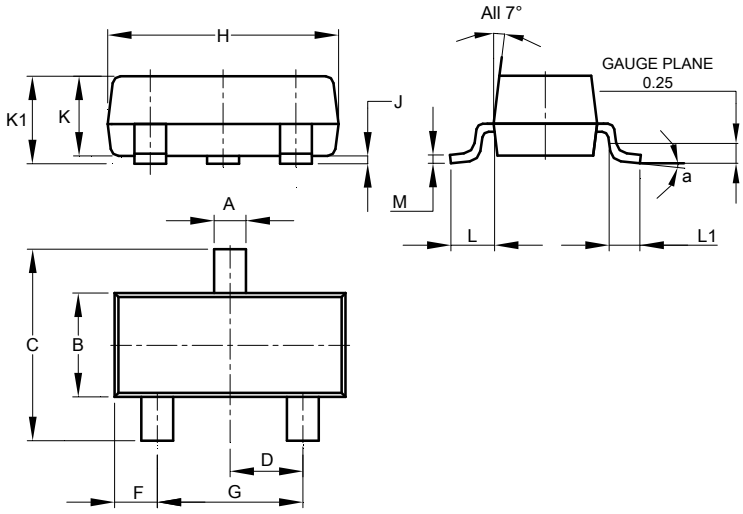
Switching Test Circuit and Waveform





Package Outline Dimensions

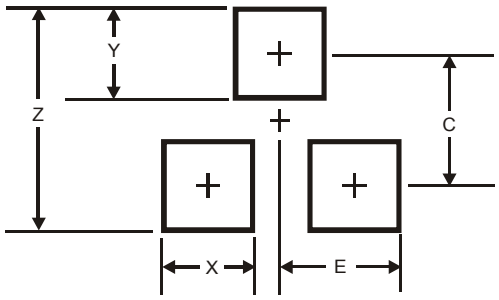
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
α	8°		
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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