

COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET H-BRIDGE
Product Summary

Device	BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
N-Channel	30V	0.12Ω @ V _{GS} = 10V	3.1A
P-Channel	-30V	0.21Ω @ V _{GS} = -10V	-2.3A

Description

This new generation of trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

Applications

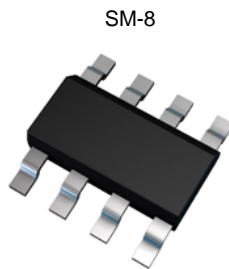
- Single Phase DC Fan Motor Drive

Features

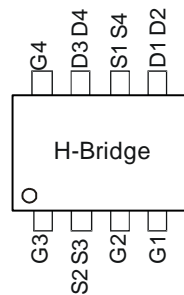
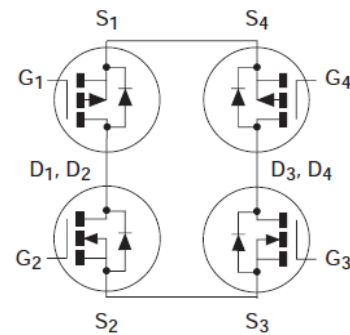
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Single SM-8 Surface Mount Package
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: SM-8 (8 LEAD SOT223)
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208(Ⓢ)
- Weight: 0.117 grams (Approximate)



Top View

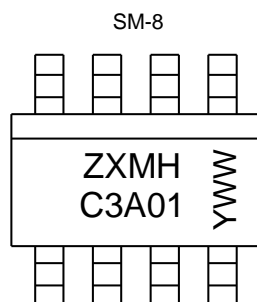

 Top View
Pin Configuration


Internal Schematic

Ordering Information (Note 4)

Part Number	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMHC3A01T8TA	7"	12mm	1,000 units

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


ZXMHC3A01 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 5= 2015)
 WW or $\bar{W}\bar{W}$ = Week Code (01~53)

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

Characteristic			Symbol	N-channel	P-channel	Units
Drain-Source Voltage			V_{DSS}	30	-30	V
Gate-Source Voltage			V_{GSS}	± 20	± 20	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 8)	Steady State	$T_A = +25^\circ\text{C}$ (Note 6 & 8)	I_D	3.1	-2.3	A
		$T_A = +70^\circ\text{C}$ (Note 6 & 8)		2.5	-1.8	
		$T_A = +25^\circ\text{C}$ (Note 5 & 8)		2.7	-2.0	
Continuous Source Current (body diode) (Note 6)			I_S	2.3	-2.2	A
Pulsed Drain Current (Note 7)			I_{DM}	14.3	-10.8	A
Pulsed Source Current (Note 7)			I_{SM}	14.5	-10.8	A

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 8)	$T_A = +25^\circ\text{C}$ (Note 5)	P_D	1.3	W
Linear Derating Factor			10.4	mW/ $^\circ\text{C}$
Total Power Dissipation (Note 8)	$T_A = +25^\circ\text{C}$ (Note 6)	P_D	1.7	W
Linear Derating Factor			13.6	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 8)	Steady State (Note 5)	$R_{\theta JA}$	96	$^\circ\text{C}/\text{W}$
	Steady State (Note 6)		73	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
5. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions..
 6. For a device surface mounted on FR4 PCB measured at $t \leq 10$ seconds.
 7. Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, $D = 0.02$, pulse width 300 μs - pulse width limited by maximum junction temperature. Refer to transient thermal Impedance graph.
 8. For device with one active die.

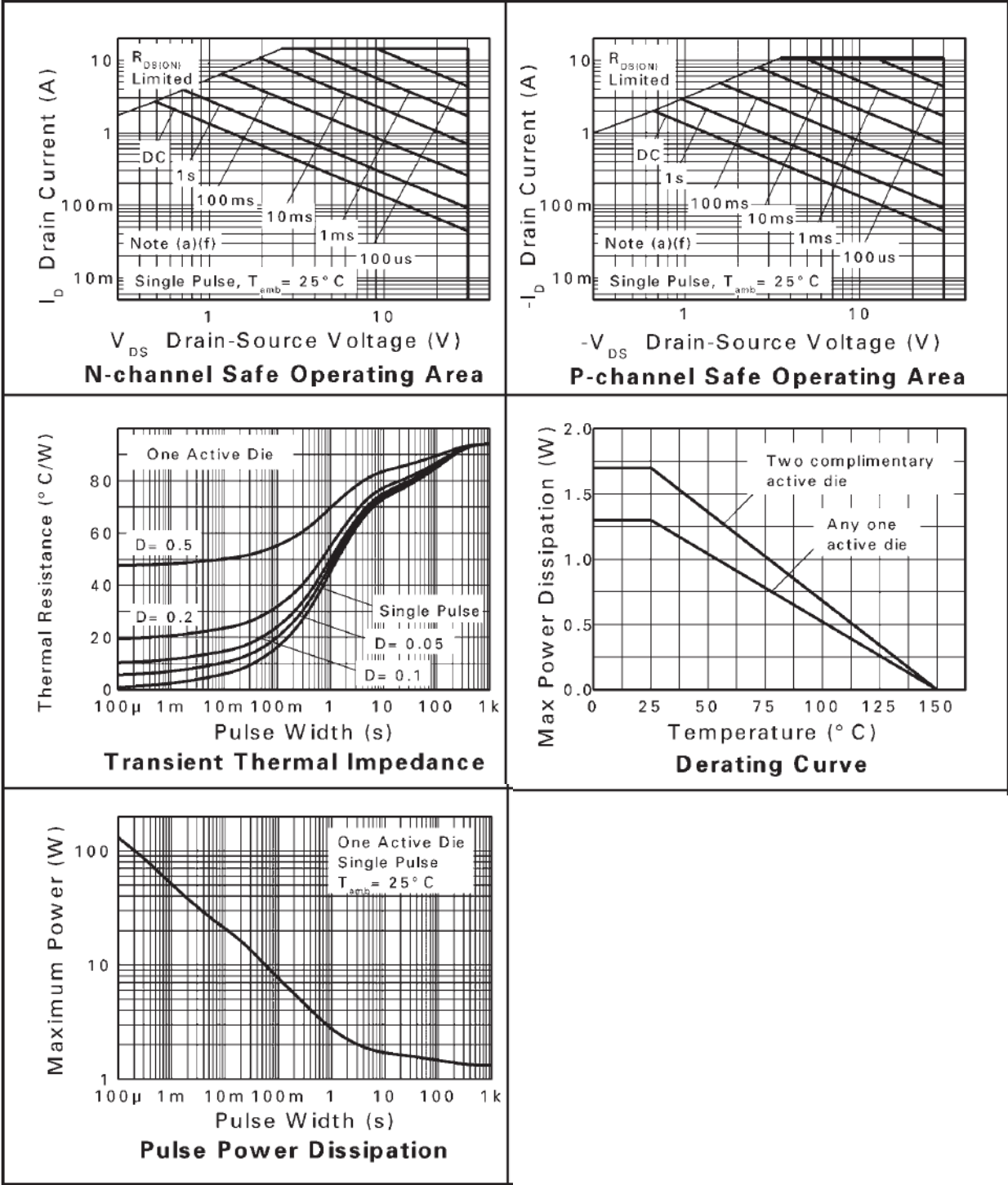
Electrical Characteristics N-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	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						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	3.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance (Note 9)	R _{DS(ON)}	—	—	0.12	Ω	V _{GS} = 10V, I _D = 2.5A
		—	—	0.18		V _{GS} = 4.5V, I _D = 2.0A
Forward Transfer Admittance (Notes 9 & 11)	g _{fs}	—	3.5	—	S	V _{DS} = 4.5V, I _D = 2.5A
Diode Forward Voltage (Note 9)	V _{SD}	—	—	0.95	V	V _{GS} = 0V, I _S = 1.7A
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C _{ISS}	—	190	—	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{OSS}	—	38	—		
Reverse Transfer Capacitance	C _{RSS}	—	20	—		
Total Gate Charge (Note 10)	Q _g	—	3.9	—	nC	V _{DS} = 15V, I _D = 2.5A, V _{GS} = 10V
Gate-Source Charge (Note 10)	Q _{gs}	—	0.6	—		
Gate-Drain Charge (Note 10)	Q _{gd}	—	0.9	—		
Turn-On Delay Time (Note 10)	t _{D(on)}	—	1.7	—	ns	V _{DD} = 15V, V _{GS} = 10V, I _D = 2.5A, R _G ≅ 6.0Ω,
Turn-On Rise Time (Note 10)	t _r	—	2.3	—		
Turn-Off Delay Time (Note 10)	t _{D(off)}	—	6.6	—		
Turn-Off Fall Time	t _f	—	2.9	—		
Reverse Recovery Time	t _{rr}	—	17.7	—	ns	I _S = 1.8A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{rr}	—	13	—	nC	

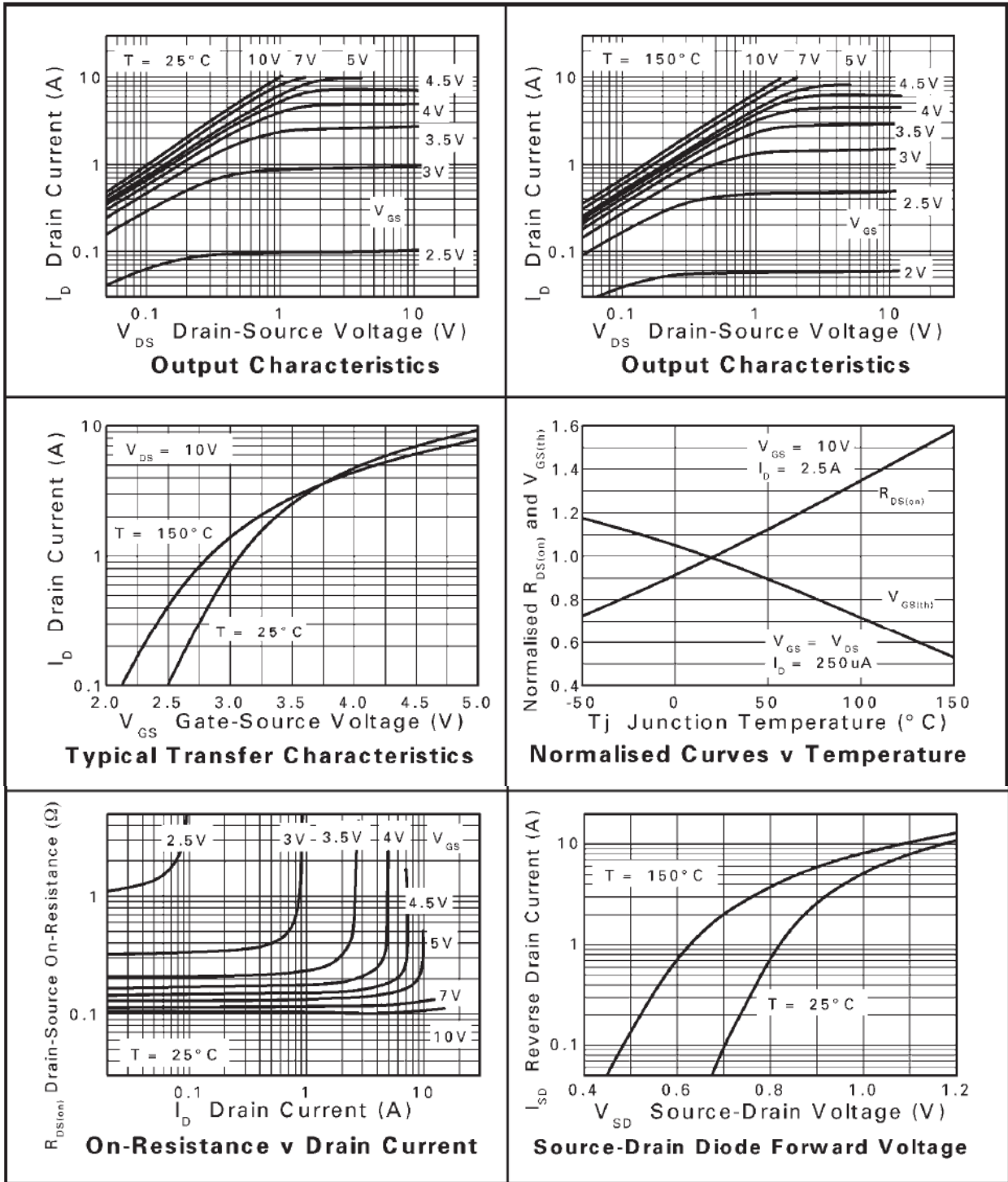
Electrical Characteristics P-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-30	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	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						
Gate Threshold Voltage	V _{GS(th)}	-1.0	—	-3.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance (Note 9)	R _{DS(ON)}	—	—	0.21	Ω	V _{GS} = -10V, I _D = -1.4A
		—	—	0.33		V _{GS} = -4.5V, I _D = -1.1A
Forward Transfer Admittance (Notes 9 & 11)	g _{fs}	—	2.5	—	S	V _{DS} = -15V, I _D = -1.4A
Diode Forward Voltage (Note 9)	V _{SD}	—	-0.85	-0.95	V	V _{GS} = 0V, I _S = -1.1A
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C _{ISS}	—	204	—	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{OSS}	—	39.8	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	25.8	—	pF	
Gate Charge (V _{GS} = -5.0V) (Note 10)	Q _g	—	2.6	—	nC	V _{DS} = -15V, I _D = -1.4A,
Total Gate Charge (V _{GS} = -10V) (Note 10)	Q _g	—	5.2	—	nC	
Gate-Source Charge (Note 10)	Q _{gs}	—	0.7	—	nC	
Gate-Drain Charge (Note 10)	Q _{gd}	—	0.9	—	nC	V _{DD} = -15V, V _{GS} = -10V, R _G ≅ 6.0Ω, I _D = -1.0A
Turn-On Delay Time (Note 10)	t _{D(on)}	—	1.2	—	ns	
Turn-On Rise Time (Note 10)	t _r	—	2.3	—	ns	
Turn-Off Delay Time (Note 10)	t _{D(off)}	—	12.1	—	ns	
Turn-Off Fall Time	t _f	—	7.5	—	ns	I _S = -0.95A, di/dt = 100A/μs
Reverse Recovery Time	t _{rr}	—	19	—	ns	
Reverse Recovery Charge	Q _{rr}	—	15	—	nC	

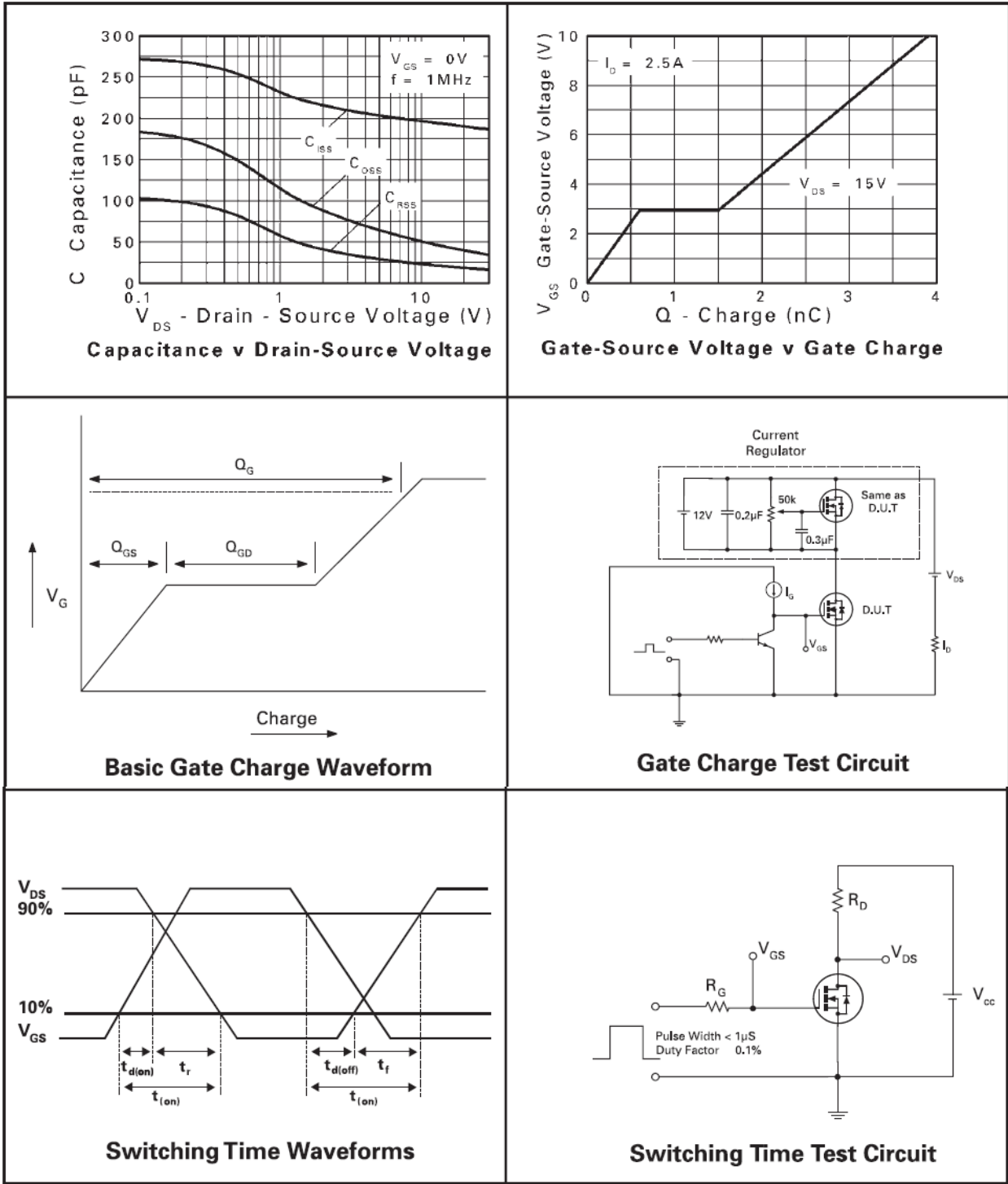
- Notes: 9. Measured under pulsed conditions. Width ≤ 300μs. Duty cycle ≤ 2%.
10. Switching characteristics are independent of operating junction temperature.
11. For design aid only, not subject to production testing.



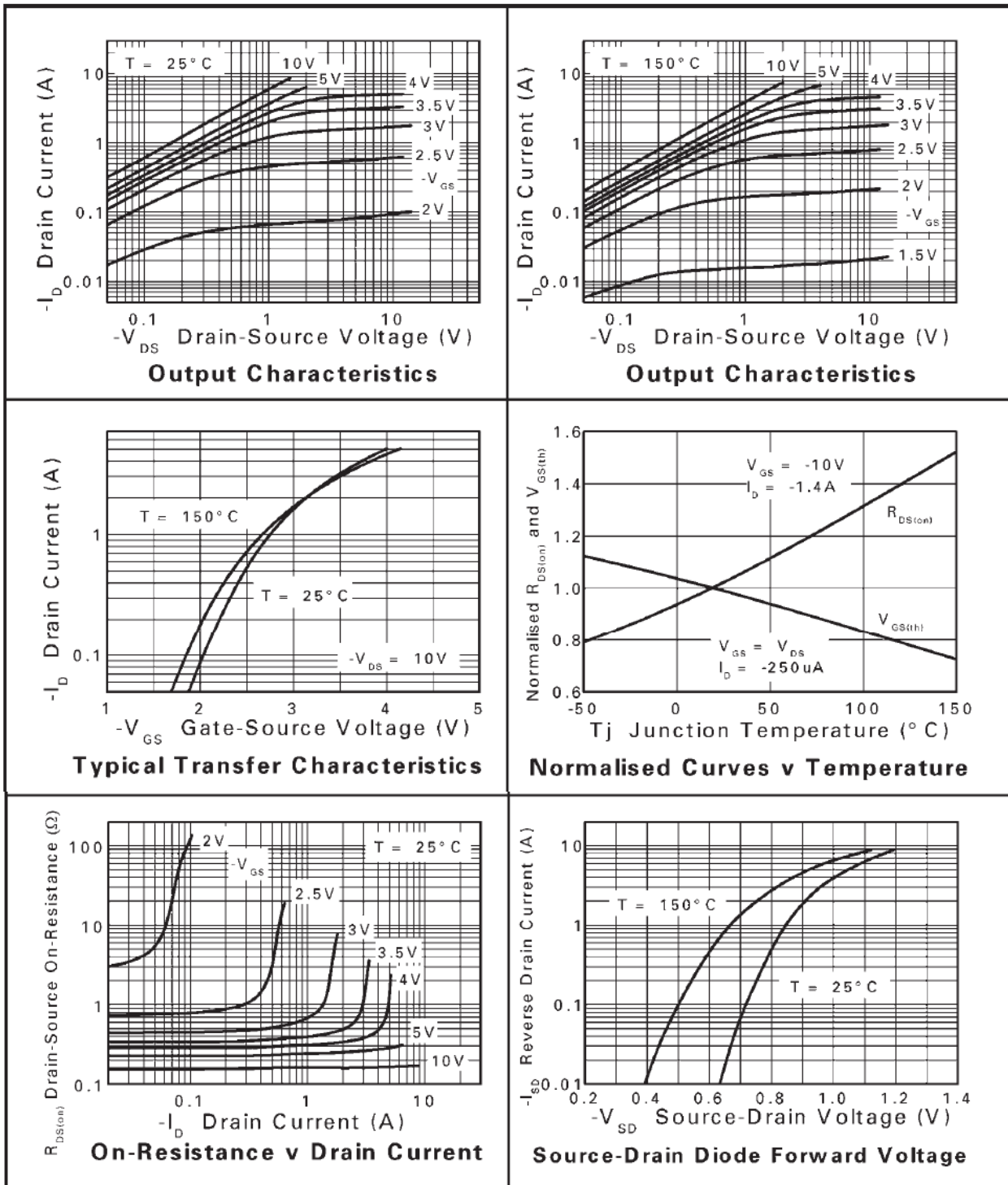
Typical Characteristics N-CHANNEL



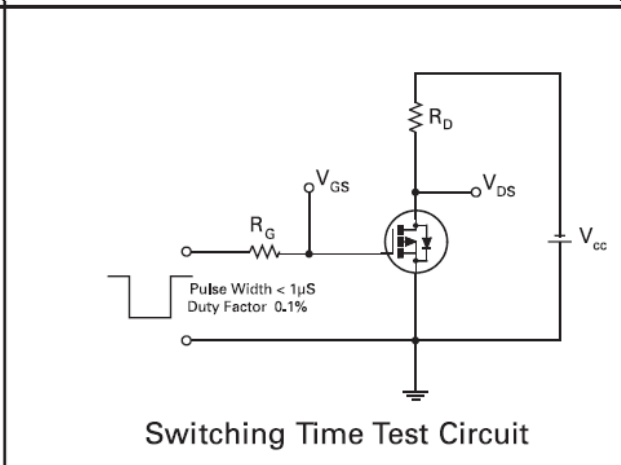
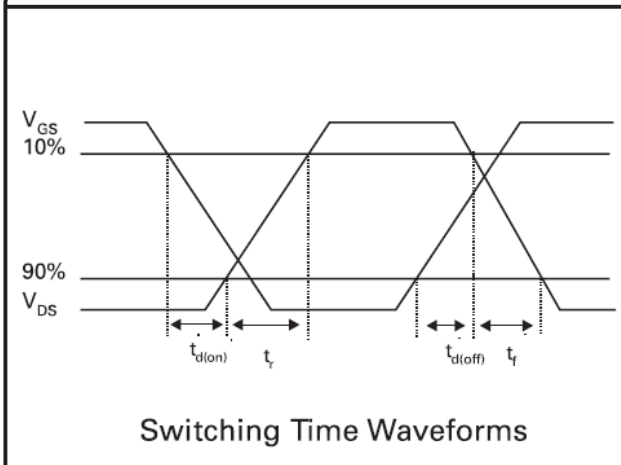
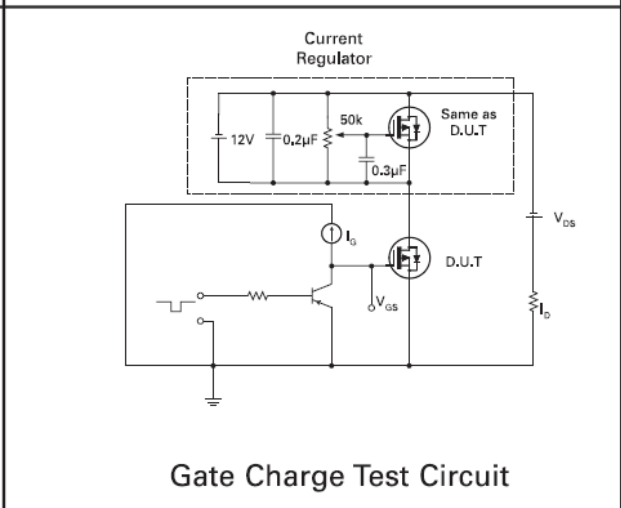
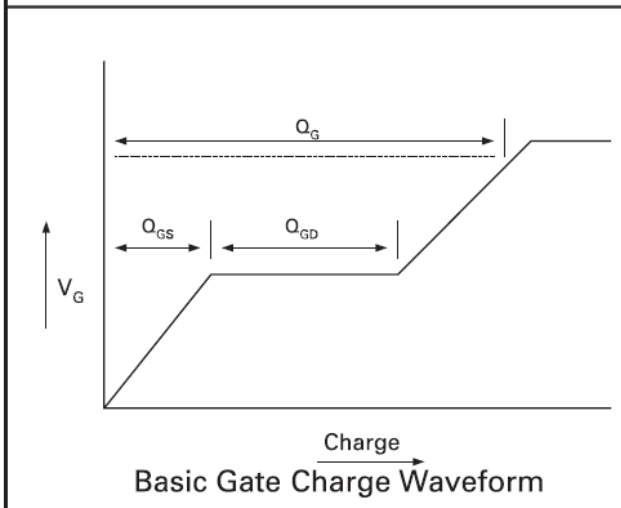
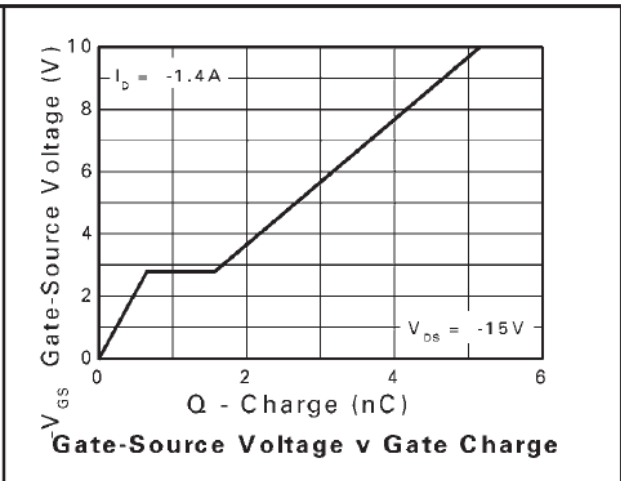
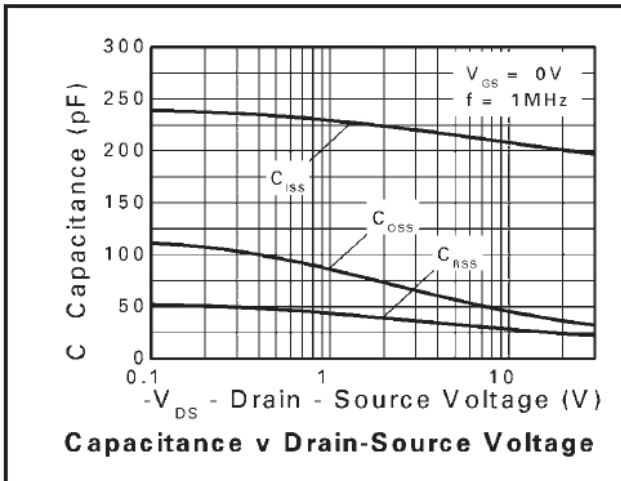
Typical Characteristics N-CHANNEL



Typical Characteristics P-CHANNEL

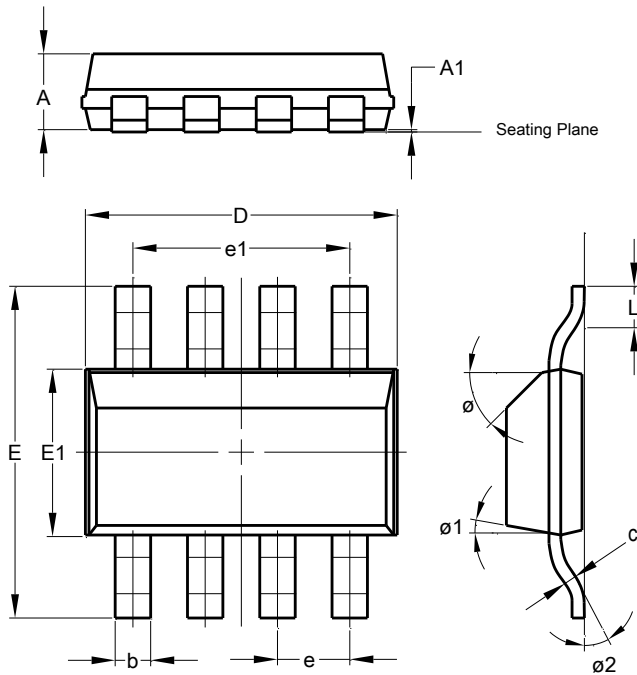


Typical Characteristics P-CHANNEL



Package Outline Dimensions

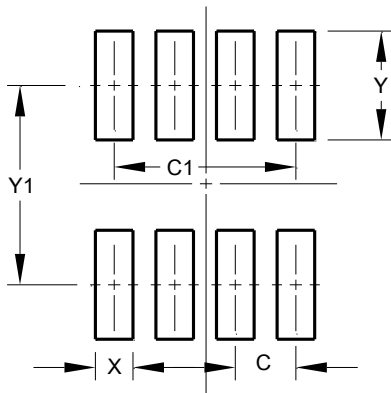
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SM-8			
Dim	Min	Max	Typ
A	--	1.70	1.60
A1	0.02	0.10	0.04
b	0.70	0.90	0.80
c	0.24	0.32	0.28
D	6.30	6.70	6.60
e	1.53 REF		
e1	4.59 REF		
E	6.70	7.30	7.00
E1	3.30	3.70	3.50
L	0.75	1.00	0.90
Ø	--	--	45°
Ø1	--	15°	--
Ø2	--	--	10°
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
C	1.52
C1	4.60
X	0.95
Y	2.80
Y1	6.80

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