

Product Summary

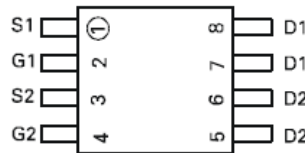
Device	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	20V	0.13Ω	2.4A
P-Channel	-20V	0.27Ω	-1.7A

Description

This new generation of high density MOSFETs from Diodes Incorporated 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.



MSOP8



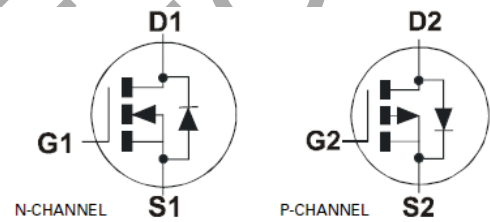
Top View

Features

- Low On-resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SOIC Package

Applications

- DC - DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control



Ordering Information

Part Number	Device Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
ZXMD63C02XTA	ZXM63C02	7	12mm Embossed	1000 Units
ZXMD63C02XTC	ZXM63C02	13	12mm Embossed	4000 Units

Maximum Ratings

PARAMETER	SYMBOL	N-CHANNEL	P-CHANNEL	UNIT
Drain-Source Voltage	V_{DSS}	20	-20	V
Gate- Source Voltage	V_{GS}	± 12		V
Continuous Drain Current ($V_{GS}=4.5V$; $T_A=25^\circ C$)(b)(d) ($V_{GS}=4.5V$; $T_A=70^\circ C$)(b)(d)	I_D	2.4	-1.7	A
		1.9	-1.35	
Pulsed Drain Current (c)(d)	I_{DM}	19	-9.6	A
Continuous Source Current (Body Diode)(b)(d)	I_S	1.5	-1.4	A
Pulsed Source Current (Body Diode)(c)(d)	I_{SM}	19	-9.6	A
Power Dissipation at $T_A=25^\circ C$ (a)(d) Linear Derating Factor	P_D	0.87 6.9		W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (a)(e) Linear Derating Factor	P_D	1.04 8.3		W mW/ $^\circ C$
Power Dissipation at $T_A=25^\circ C$ (b)(d) Linear Derating Factor	P_D	1.25 10		W mW/ $^\circ C$
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150		$^\circ C$

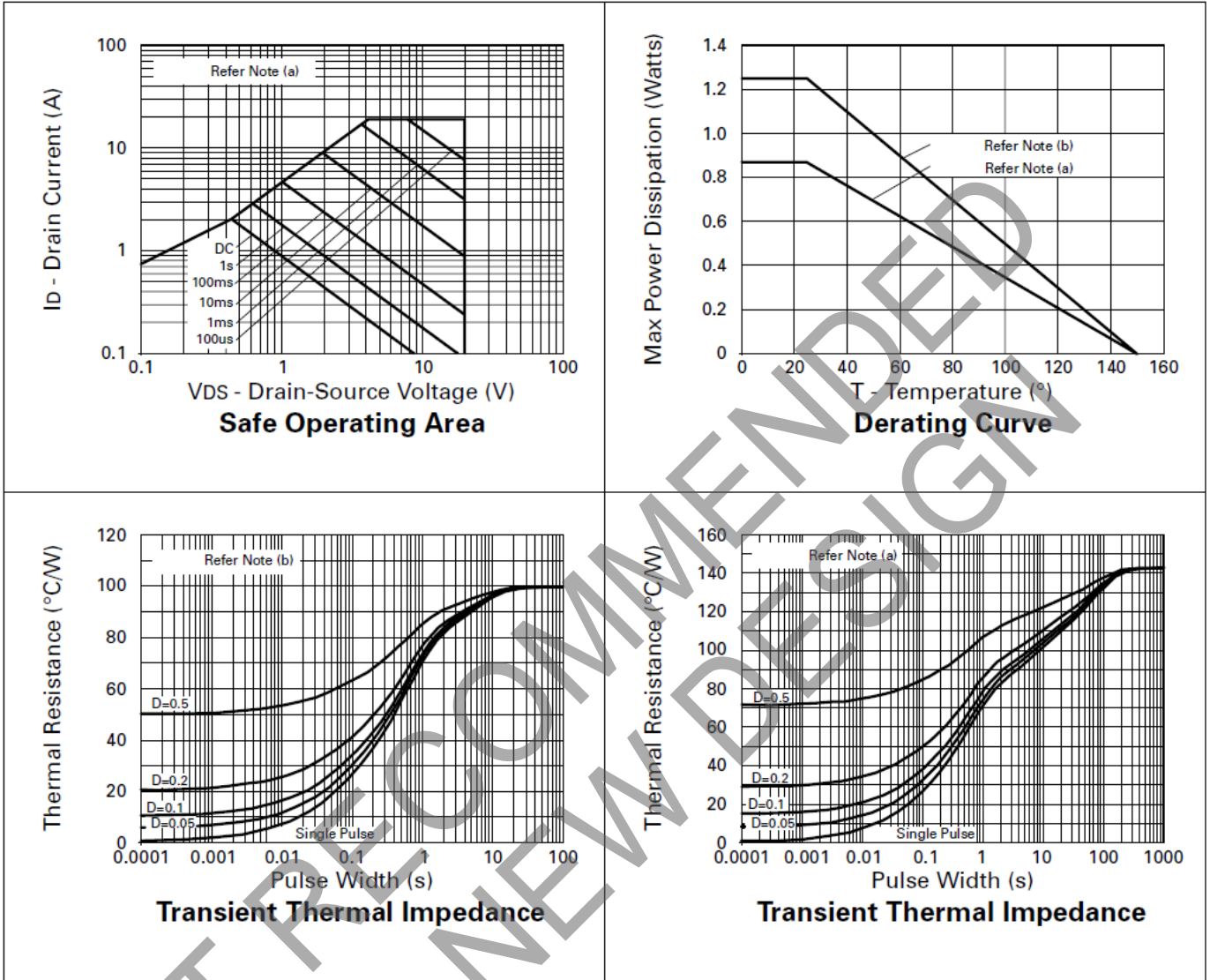
Thermal Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)(d)	$R_{\theta JA}$	143	$^\circ C/W$
Junction to Ambient (b)(d)	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient (a)(e)	$R_{\theta JA}$	120	$^\circ C/W$

NOTES

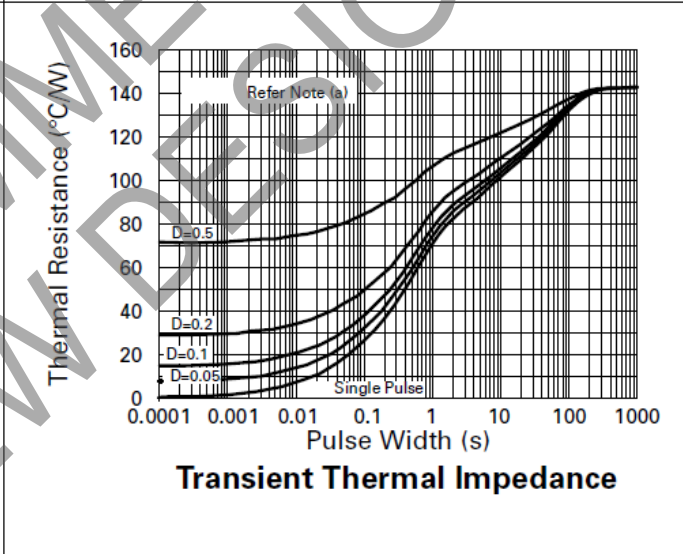
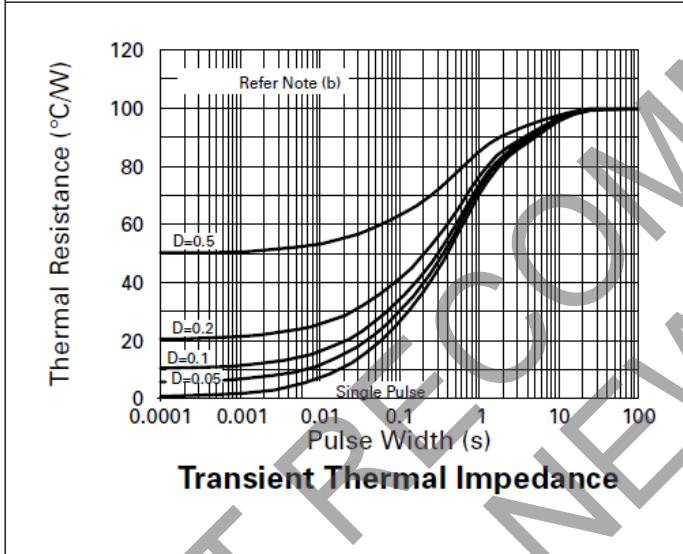
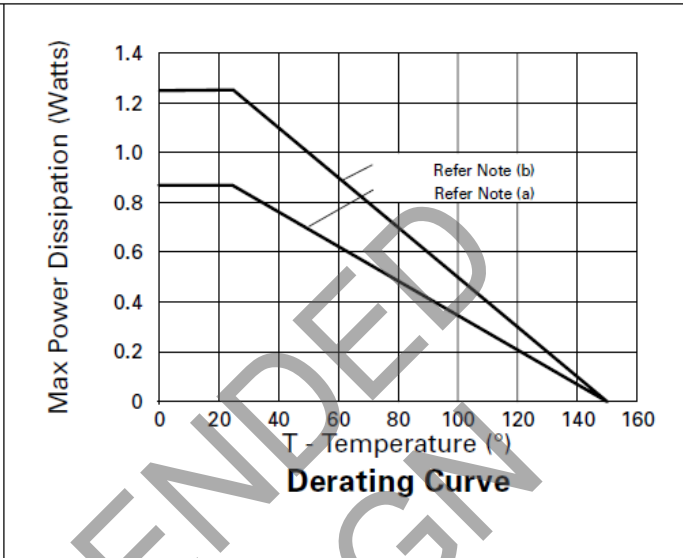
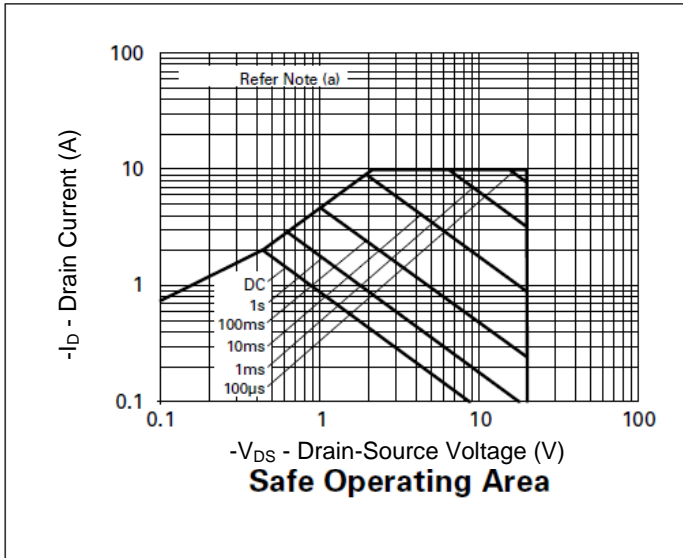
- (a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
- (b) For a device surface mounted on FR4 PCB measured at $t \leq 10$ secs.
- (c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
- (d) For device with one active die.
- (e) For device with two active die running at equal power.

N-Channel Characteristics



NOT FOR NEW DESIGN

P-Channel Characteristics



NOT RECOMMENDED FOR NEW DESIGN

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

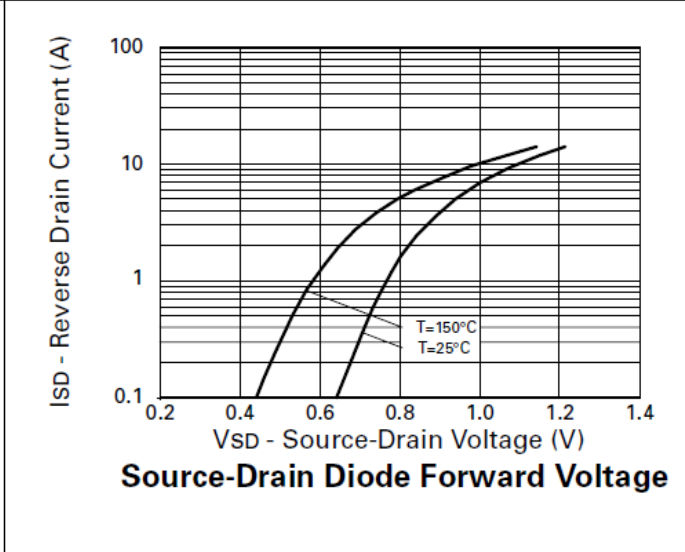
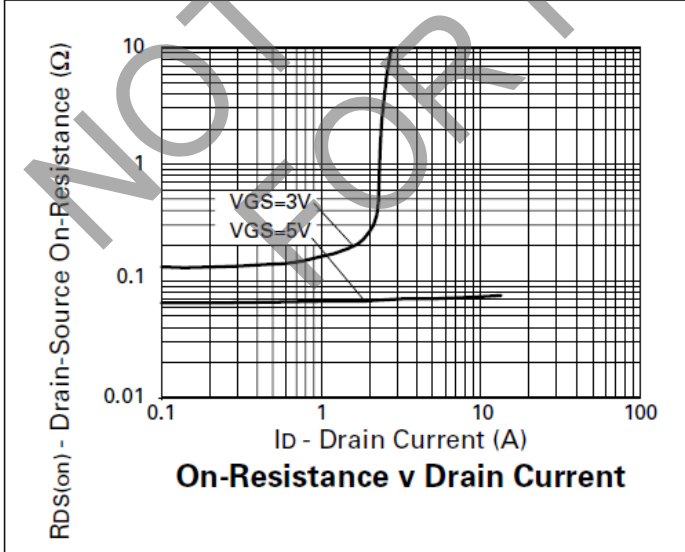
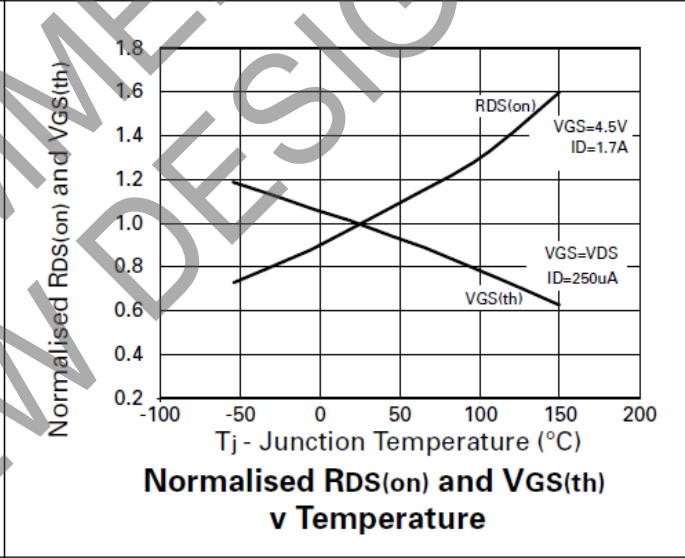
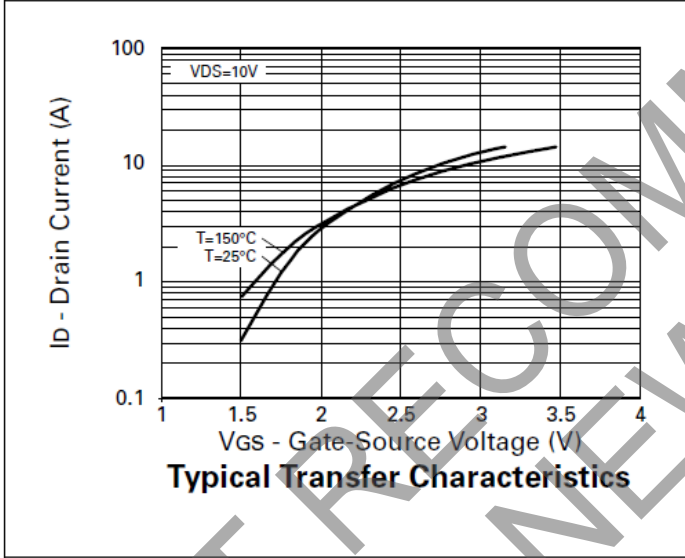
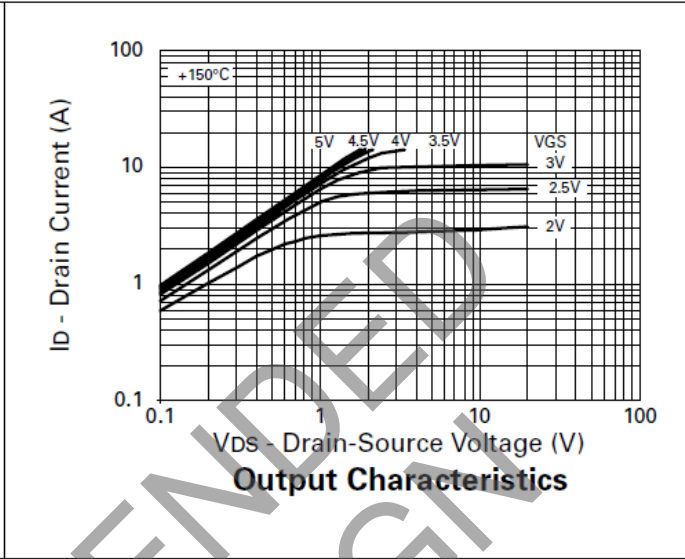
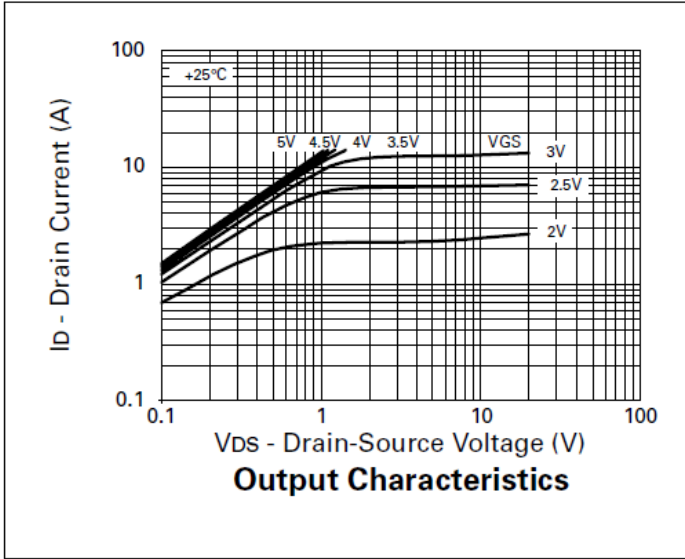
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	20			V	I _D =250μA, V _{GS} =0V
Zero Gate Voltage Drain Current	I _{DSS}			1	μA	V _{DS} =20V, V _{GS} =0V
Gate-Body Leakage	I _{GSS}			100	nA	V _{GS} =±12V, V _{DS} =0V
Gate-Source Threshold Voltage	V _{GS(th)}	0.7			V	I _D =250μA, V _{DS} =V _{GS}
Static Drain-Source On-State Resistance (1)	R _{DS(on)}			0.130 0.150	Ω	V _{GS} =4.5V, I _D =1.7A V _{GS} =2.7V, I _D =0.85A
Forward Transconductance (3)	g _{fs}	2.6			S	V _{DS} =10V, I _D =0.85A
DYNAMIC (3)						
Input Capacitance	C _{iss}		350		pF	V _{DS} =15V, V _{GS} =0V, f=1MHz
Output Capacitance	C _{oss}		120		pF	
Reverse Transfer Capacitance	C _{rss}		50		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	t _{d(on)}		3.4		ns	V _{DD} =10V, I _D =1.7A R _G =6.0Ω, R _D =5.7Ω (Refer to test circuit)
Rise Time	t _r		8.1		ns	
Turn-Off Delay Time	t _{d(off)}		13.5		ns	
Fall Time	t _f		9.1		ns	
Total Gate Charge	Q _g			6	nC	
Gate-Source Charge	Q _{gs}			0.65	nC	V _{DS} =16V, V _{GS} =4.5V, I _D =1.7A (Refer to test circuit)
Gate Drain Charge	Q _{gd}			2.5	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V _{SD}			0.95	V	T _J =25°C, I _S =1.7A, V _{GS} =0V
Reverse Recovery Time (3)	t _{rr}		15.0		ns	T _J =25°C, I _F =1.7A, di/dt= 100A/μs
Reverse Recovery Charge(3)	Q _{rr}		5.9		nC	

(1) Measured under pulsed conditions. Width=300μs. Duty cycle ≤2% .

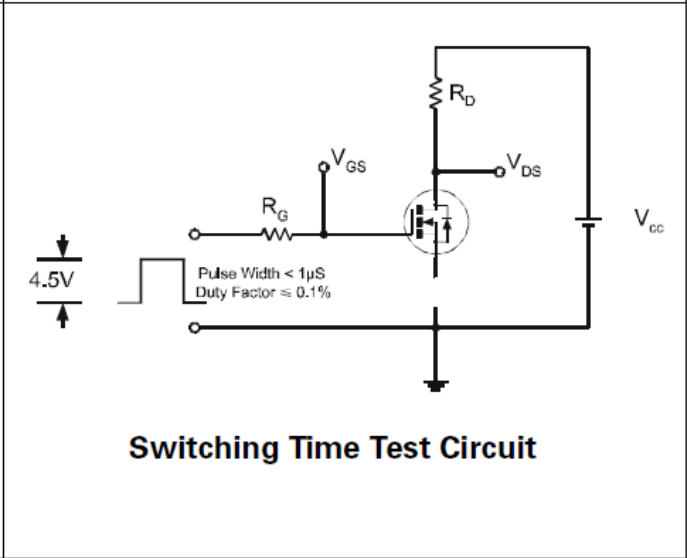
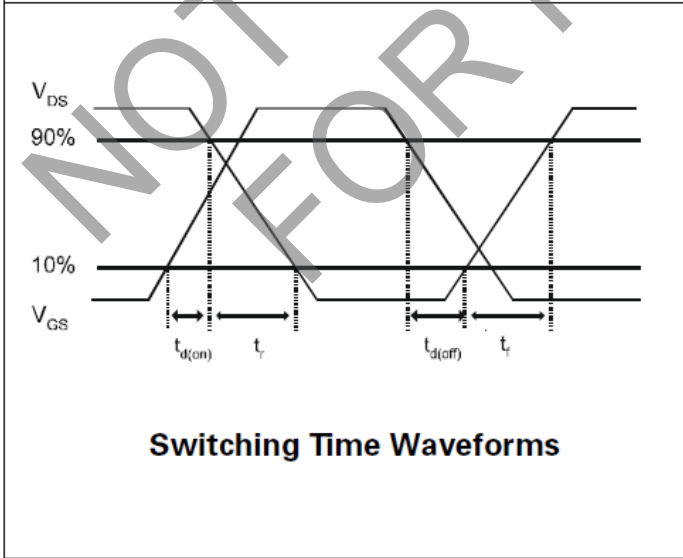
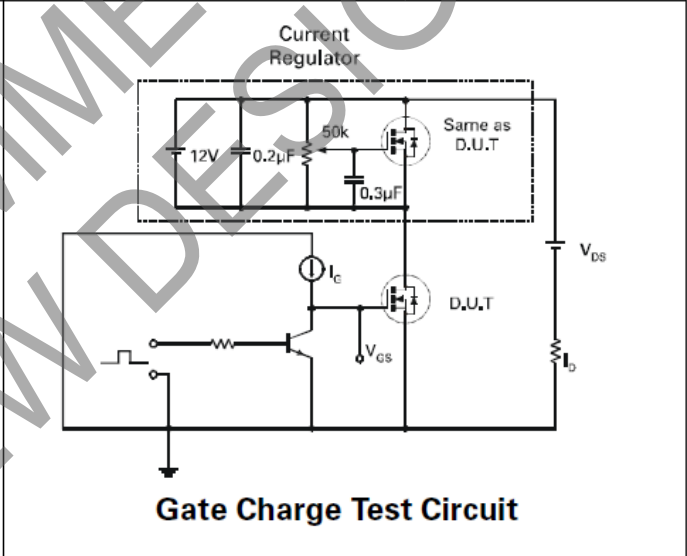
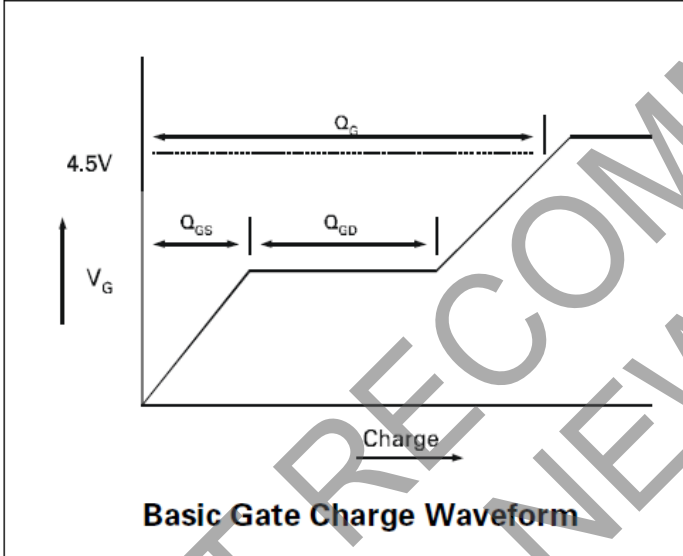
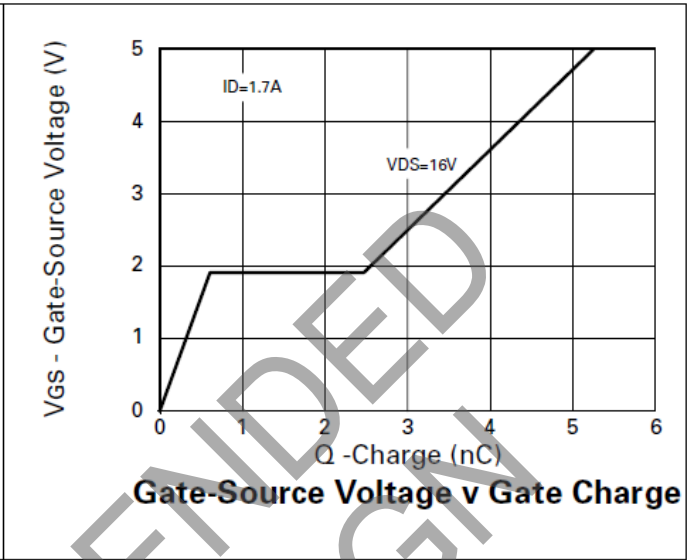
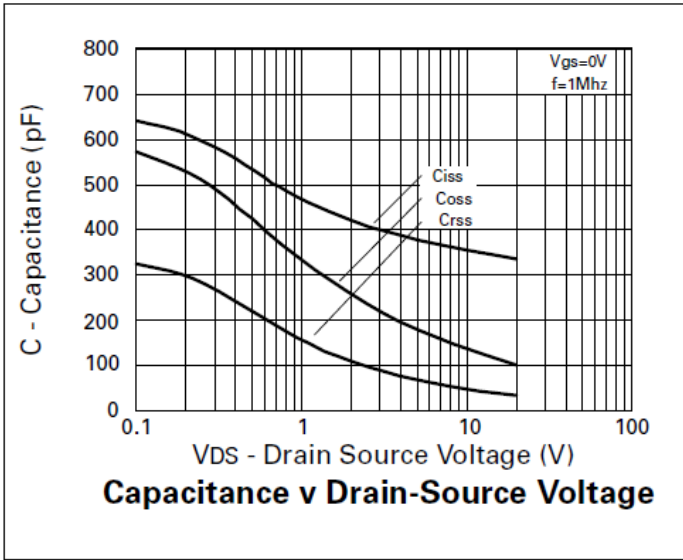
(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

N-Channel Typical Characteristics



N-Channel Characteristics



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

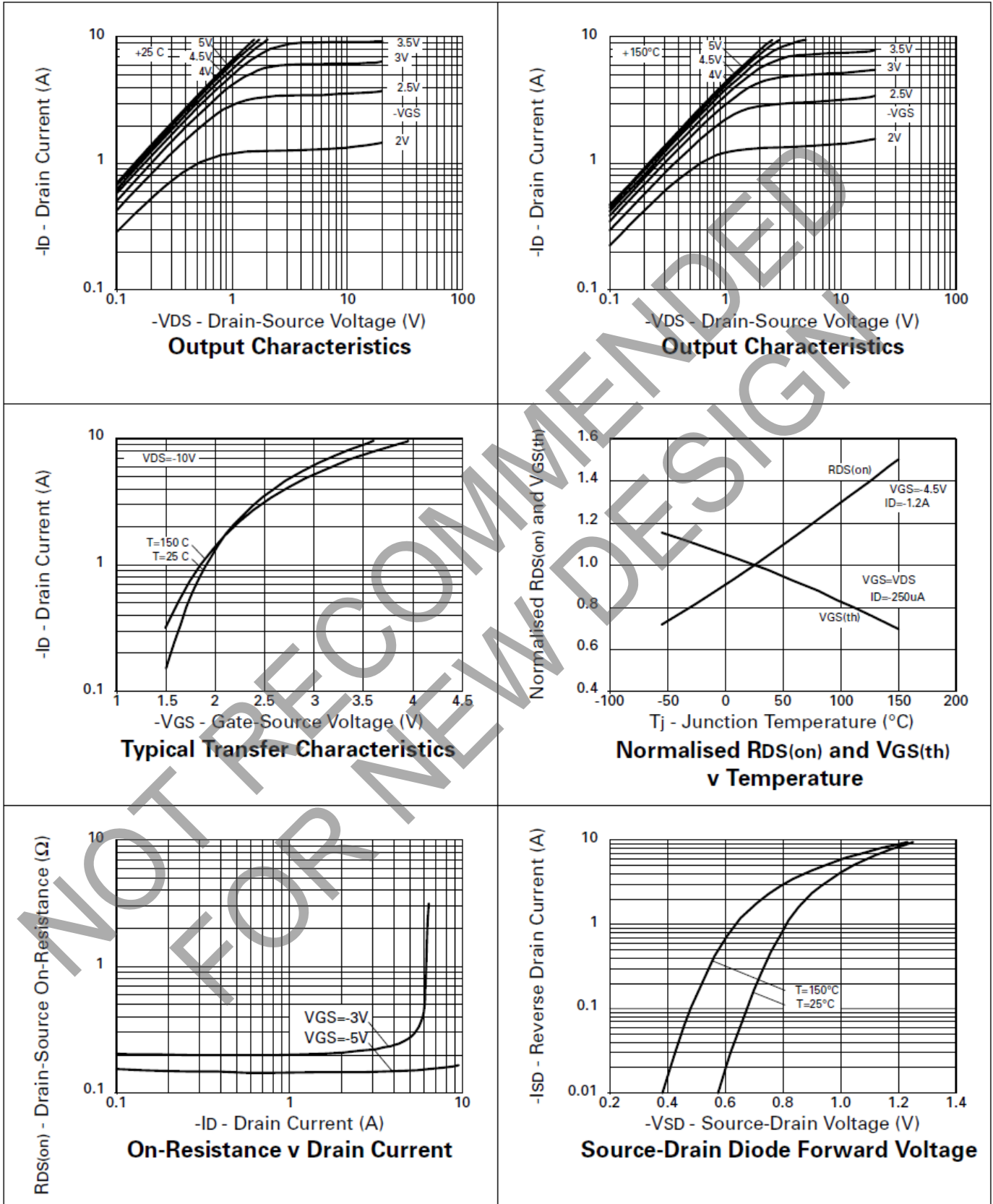
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
STATIC						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	-20			V	I _D =-250μA, V _{GS} =0V
Zero Gate Voltage Drain Current	I _{DSS}			-1	μA	V _{DS} =-20V, V _{GS} =0V
Gate-Body Leakage	I _{GSS}			±100	nA	V _{GS} =±12V, V _{DS} =0V
Gate-Source Threshold Voltage	V _{GS(th)}	-0.7			V	I _D =-250μA, V _{DS} =V _{GS}
Static Drain-Source On-State Resistance (1)	R _{DS(on)}			0.27 0.40	Ω Ω	V _{GS} =-4.5V, I _D =-1.2A V _{GS} =-2.7V, I _D =-0.6A
Forward Transconductance (3)	g _{fs}	1.3			S	V _{DS} =-10V, I _D =-0.6A
DYNAMIC (3)						
Input Capacitance	C _{iss}		290		pF	V _{DS} =-15V, V _{GS} =0V, f=1MHz
Output Capacitance	C _{oss}		120		pF	
Reverse Transfer Capacitance	C _{rss}		50		pF	
SWITCHING(2) (3)						
Turn-On Delay Time	t _{d(on)}		3.4		ns	V _{DD} =-10V, I _D =-1.2A R _G =6.0Ω, R _D =8.3Ω (Refer to test circuit)
Rise Time	t _r		9.6		ns	
Turn-Off Delay Time	t _{d(off)}		16.4		ns	
Fall Time	t _f		20.4		ns	
Total Gate Charge	Q _g			5.25	nC	V _{DS} =-16V, V _{GS} =-4.5V, I _D =-1.2A (Refer to test circuit)
Gate-Source Charge	Q _{gs}			1.0	nC	
Gate Drain Charge	Q _{gd}			2.25	nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage (1)	V _{SD}			-0.95	V	T _j =25°C, I _S =-1.2A, V _{GS} =0V
Reverse Recovery Time (3)	t _{rr}		21.7		ns	T _j =25°C, I _F =-1.2A, di/dt= 100A/μs
Reverse Recovery Charge(3)	Q _{rr}		9.6		nC	

(1) Measured under pulsed conditions. Width=300μs. Duty cycle ≤2% .

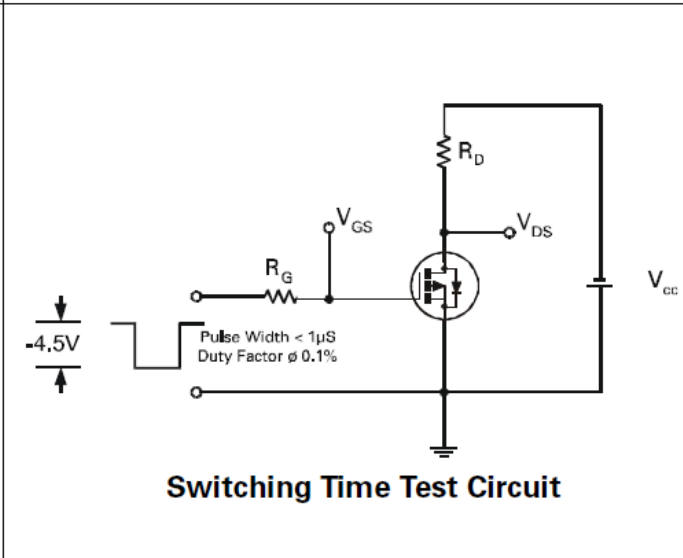
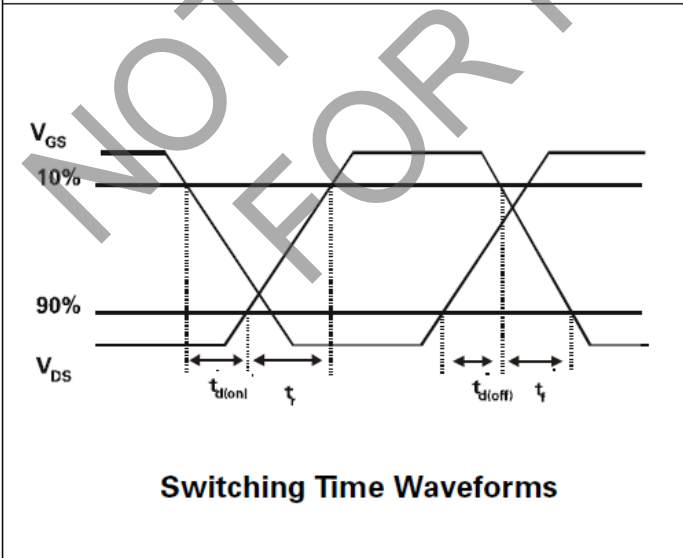
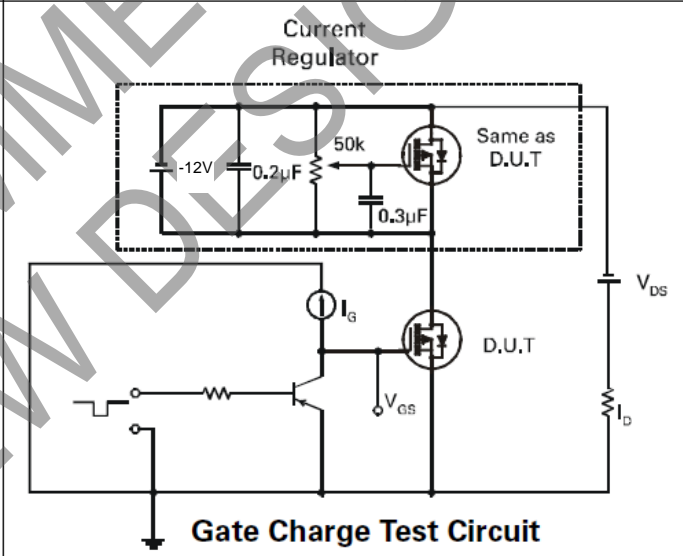
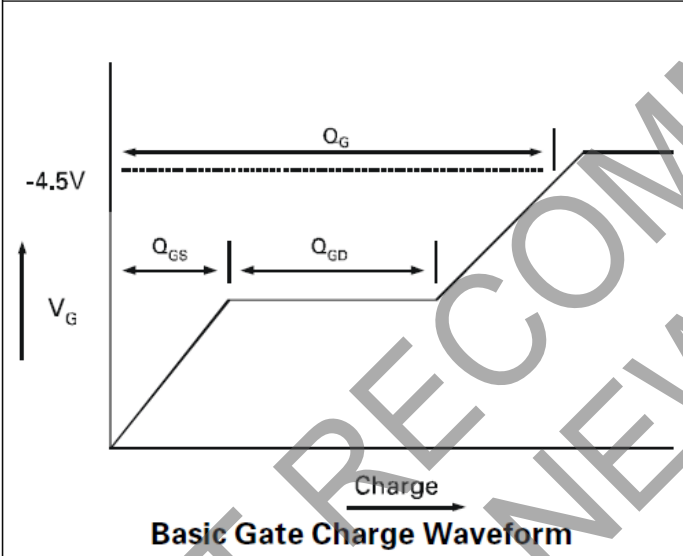
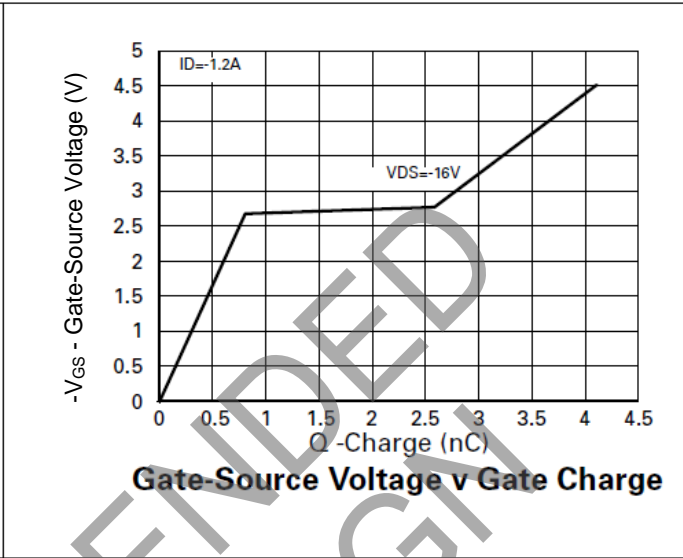
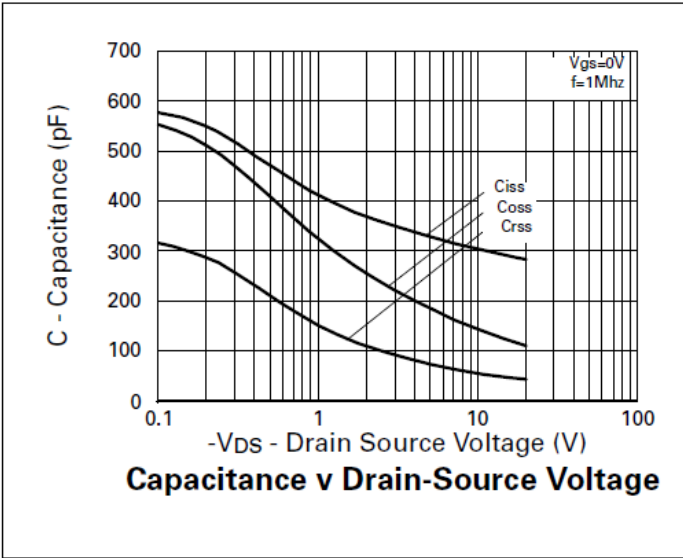
(2) Switching characteristics are independent of operating junction temperature.

(3) For design aid only, not subject to production testing.

P-Channel Characteristics



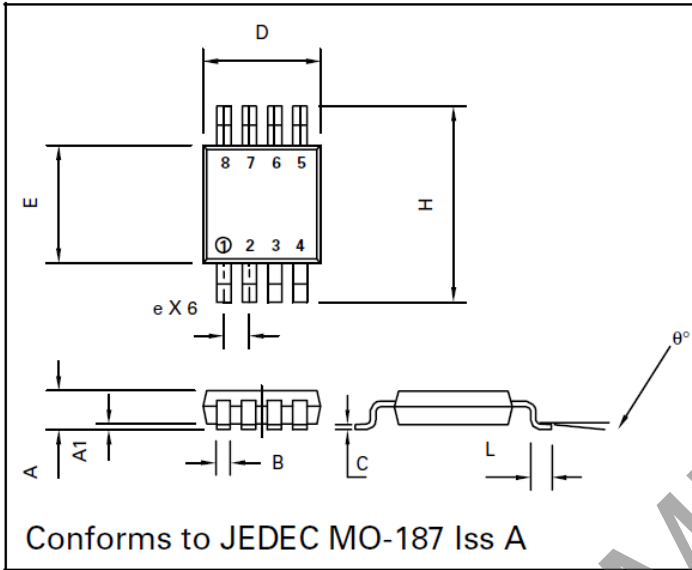
P-Channel Typical Characteristics (Cont.)



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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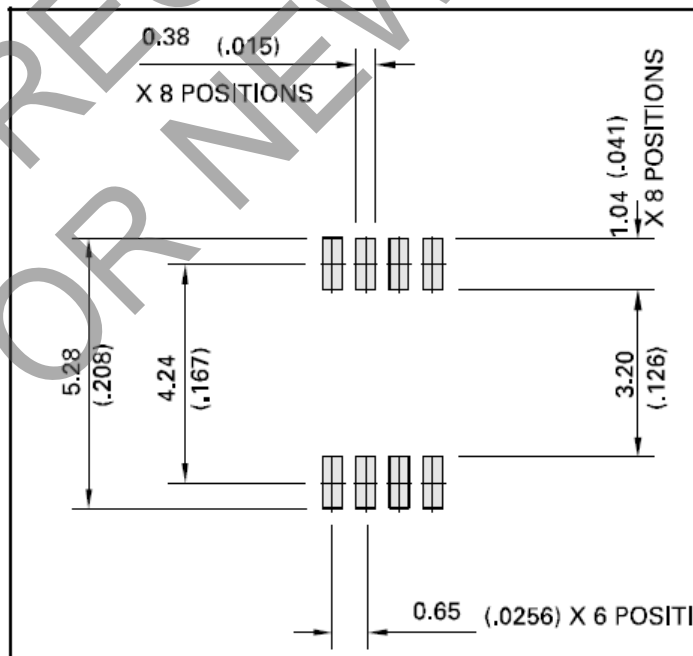


DIM	Millimetres		Inches	
	MIN	MAX	MIN	MAX
A		1.10		0.043
A1	0.05	0.15	0.002	0.006
B	0.25	0.40	0.010	0.016
C	0.13	0.23	0.005	0.009
D	2.90	3.10	0.114	0.122
e	0.65	BSC	0.0256	BSC
E	2.90	3.10	0.114	0.122
H	4.90	BSC	0.193	BSC
L	0.40	0.70	0.016	0.028
q°	0°	6°	0°	6°

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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