

ZXMC3A18DN8

COMPLEMENTARY 30V ENHANCEMENT MODE MOSFET

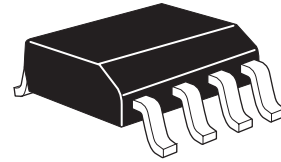
SUMMARY

N-Channel = $V_{(BR)DSS} = 30V$; $R_{DS(on)} = 0.025\Omega$; $I_D = 7.6A$

P-Channel = $V_{(BR)DSS} = -30V$; $R_{DS(on)} = 0.035\Omega$; $I_D = -6.3A$

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.



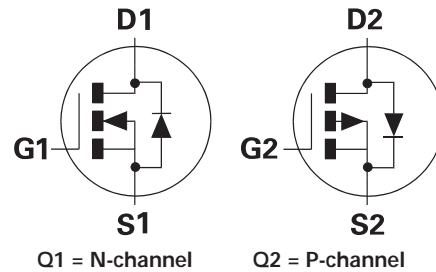
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FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package

APPLICATIONS

- Motor Drive
- LCD backlighting

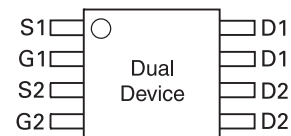


ORDERING INFORMATION

DEVICE	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZXMC3A18DN8TA	7"	12mm	500 units
ZXMC3A18DN8TC	13"	12mm	2500 units

DEVICE MARKING

- ZXMC
3A18



Top View

ZXMC3A18DN8

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DSS}	30	-30 V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($V_{GS} = 10V$; $T_A = 25^\circ C$) ^{(b)(d)} ($V_{GS} = 10V$; $T_A = 70^\circ C$) ^{(b)(d)} ($V_{GS} = 10V$; $T_A = 25^\circ C$) ^{(a)(d)}	I_D	7.6 6.1 5.8	-6.3 -5.0 -4.8 A
Pulsed Drain Current ^(c)	I_{DM}	37	-30 A
Continuous Source Current (Body Diode) ^(b)	I_S	3.6	3.2 A
Pulsed Source Current (Body Diode) ^(c)	I_{SM}	37	30 A
Power Dissipation at $T_A = 25^\circ C$ ^{(a)(d)}	P_D	1.25	W
Linear Derating Factor		10	mW/ $^\circ C$
Power Dissipation at $T_A = 25^\circ C$ ^{(a)(e)}	P_D	1.8	W
Linear Derating Factor		14	mW/ $^\circ C$
Power Dissipation at $T_A = 25^\circ C$ ^{(b)(d)}	P_D	2.1	W
Linear Derating Factor		17	mW/ $^\circ C$
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ C$

THERMAL RESISTANCE

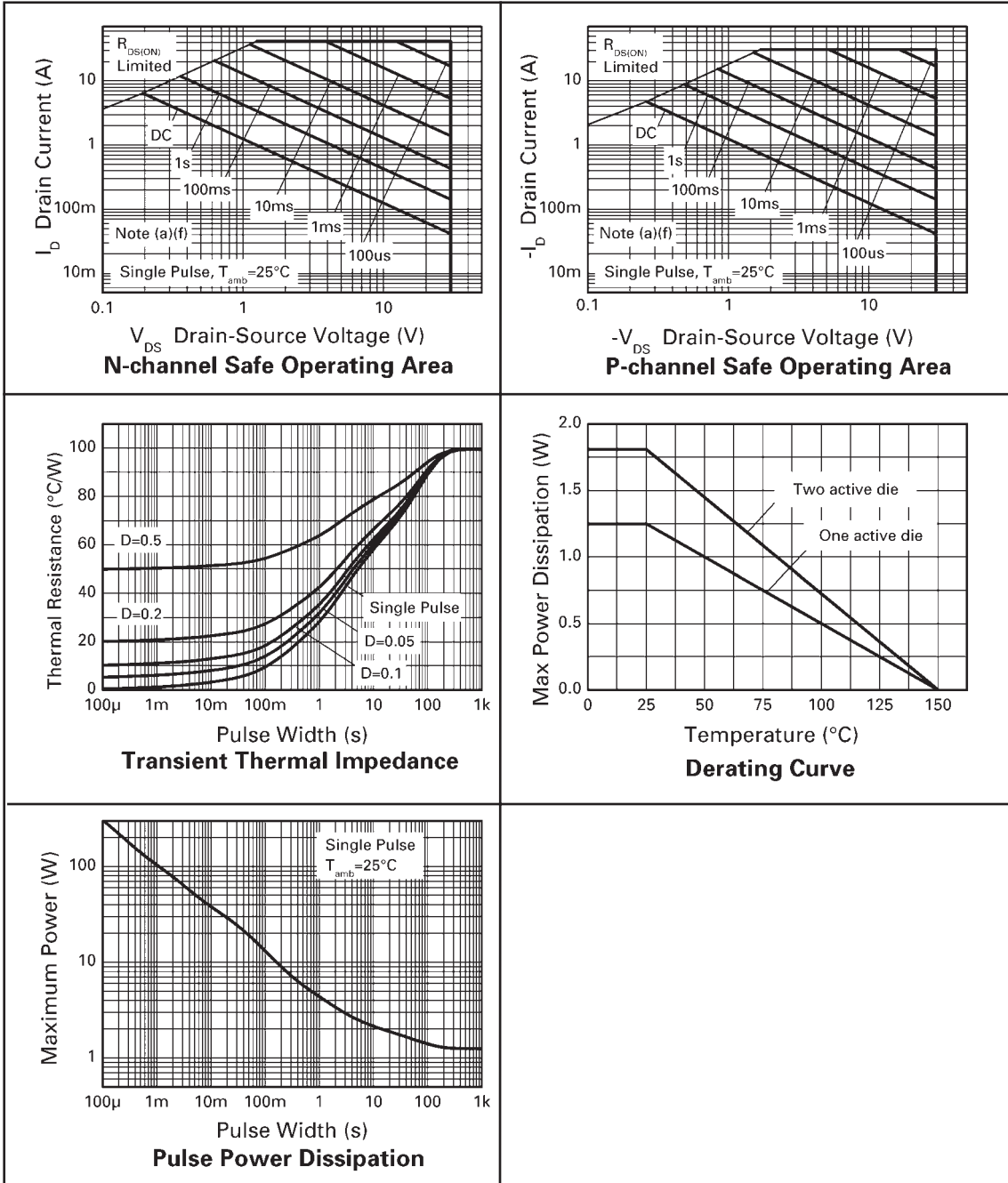
PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient ^{(a)(d)}	$R_{\theta JA}$	100	$^\circ C/W$
Junction to Ambient ^{(a)(e)}	$R_{\theta JA}$	70	$^\circ C/W$
Junction to Ambient ^{(b)(d)}	$R_{\theta JA}$	60	$^\circ C/W$

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 $t \leq 10$ sec.
 (c) Repetitive rating - pulse width limited by maximum junction temperature. Pulse width 300 μs , $d \leq 0.02$. Refer to Transient Thermal Impedance graph.
 (d) For device with one active die.
 (e) For device with two active die running at equal power.

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CHARACTERISTICS



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N-Channel

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

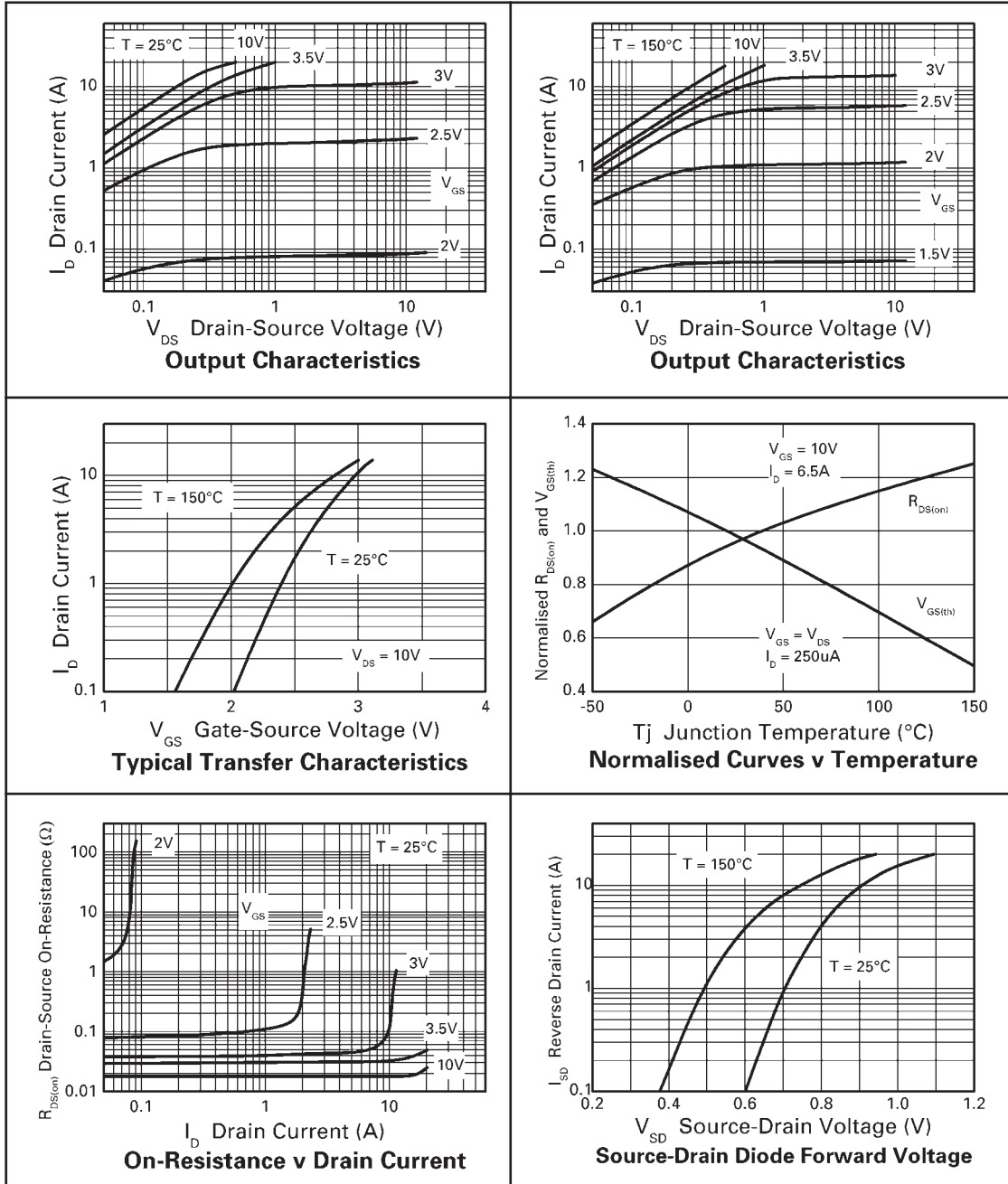
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30			V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			0.5	μA	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.0			V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance ⁽¹⁾	$R_{DS(on)}$			0.025	Ω	$V_{GS} = 10\text{V}$, $I_D = 5.8\text{A}$
				0.030	Ω	$V_{GS} = 4.5\text{V}$, $I_D = 5.3\text{A}$
Forward Transconductance ^{(1) (3)}	g_{fs}		17.5		S	$V_{DS} = 15\text{V}$, $I_D = 5.8\text{A}$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		1800		pF	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}		289		pF	
Reverse Transfer Capacitance	C_{rss}		178		pF	
SWITCHING ^{(2) (3)}						
Turn-On-Delay Time	$t_{d(on)}$		5.5		ns	$V_{DD} = 15\text{V}$, $I_D = 6\text{A}$ $R_G \cong 6.0\Omega$, $V_{GS} = 10\text{V}$
Rise Time	t_r		8.7		ns	
Turn-Off Delay Time	$t_{d(off)}$		33		ns	
Fall Time	t_f		8.5		ns	
Gate Charge	Q_g		19.4		nC	$V_{DS} = 15\text{V}$, $V_{GS} = 5\text{V}$ $I_D = 3.5\text{A}$
Total Gate Charge	Q_g		36		nC	$V_{DS} = 15\text{V}$, $V_{GS} = 10\text{V}$ $I_D = 3.5\text{A}$
Gate-Source Charge	Q_{gs}		5.5		nC	
Gate-Drain Charge	Q_{gd}		7.0		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage ⁽¹⁾	V_{SD}			0.95	V	$T_J = 25^{\circ}\text{C}$, $I_S = 6\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time ⁽³⁾	t_{rr}		20.5		ns	$T_J = 25^{\circ}\text{C}$, $I_F = 6\text{A}$,
Reverse Recovery Charge ⁽³⁾	Q_{rr}		41.5		nC	$di/dt = 100\text{A}/\mu\text{s}$

NOTES

- (1) Measured under pulsed conditions. Pulse width $\leq 300\text{ms}$; Duty cycle $\leq 2\%$.
(2) Switching characteristics are independent of operating junction temperature.
(3) For design aid only, not subject to production testing.

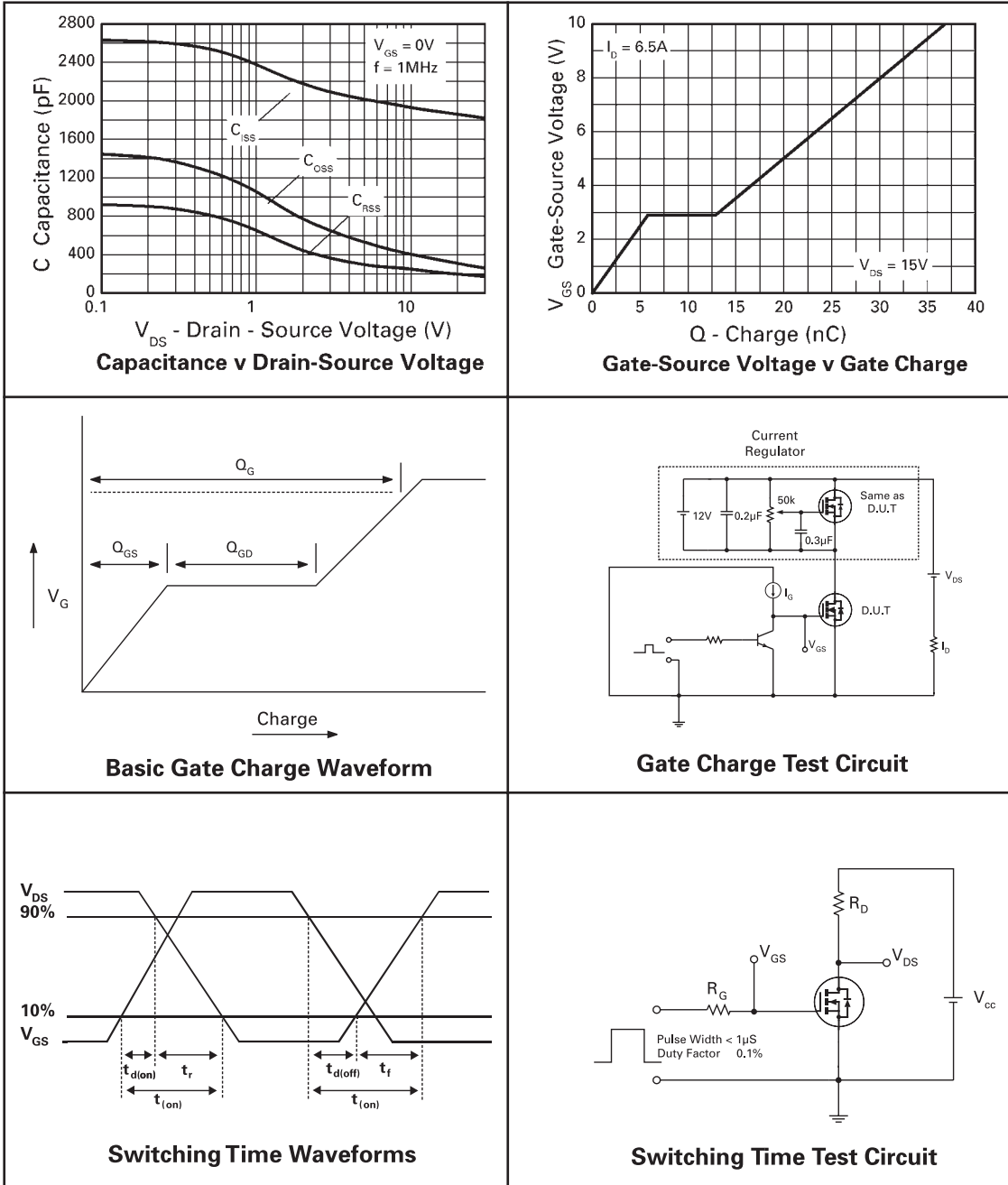
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TYPICAL CHARACTERISTICS



ZXMC3A18DN8

TYPICAL CHARACTERISTICS



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P-Channel

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

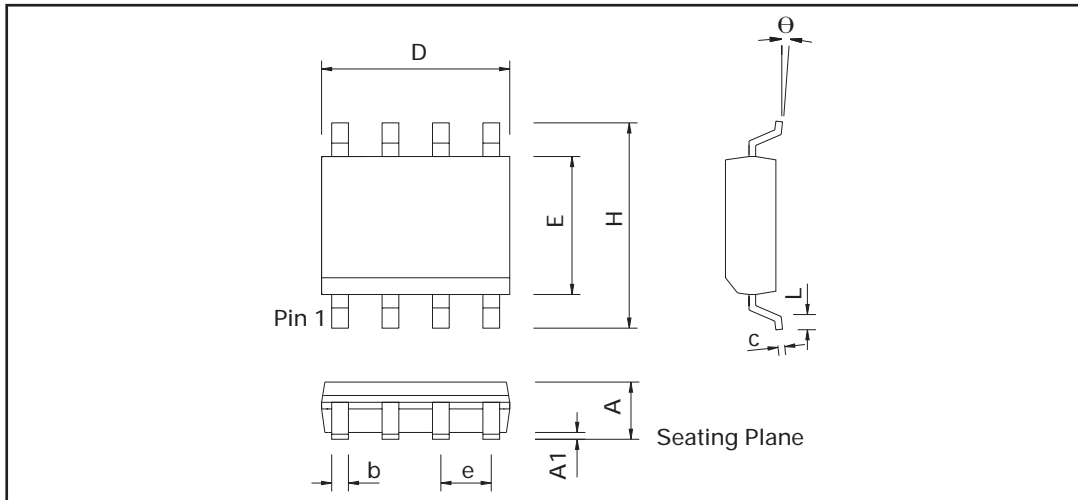
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-30			V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}			-1.0	μA	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}			100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	-1.0			V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-State Resistance ⁽¹⁾	$R_{DS(on)}$			0.035	Ω	$V_{GS} = -10\text{V}$, $I_D = -4.8\text{A}$
				0.050	Ω	$V_{GS} = -4.5\text{V}$, $I_D = -4.0\text{A}$
Forward Transconductance ^{(1) (3)}	g_{fs}		8.6		S	$V_{DS} = -15\text{V}$, $I_D = -4.8\text{A}$
DYNAMIC ⁽³⁾						
Input Capacitance	C_{iss}		1603		pF	$V_{DS} = -15\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}		434		pF	
Reverse Transfer Capacitance	C_{rss}		388		pF	
SWITCHING ^{(2) (3)}						
Turn-On-Delay Time	$t_{d(on)}$		4.8		ns	$V_{DD} = -15\text{V}$, $I_D = -1\text{A}$ $R_G \cong 6.0\Omega$, $V_{GS} = 10\text{V}$
Rise Time	t_r		9.5		ns	
Turn-Off Delay Time	$t_{d(off)}$		60		ns	
Fall Time	t_f		38		ns	
Gate Charge	Q_g		25		nC	
Total Gate Charge	Q_g		45		nC	$V_{DS} = -15\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -4.8\text{A}$
Gate-Source Charge	Q_{gs}		5.1		nC	
Gate-Drain Charge	Q_{gd}		11.5		nC	
SOURCE-DRAIN DIODE						
Diode Forward Voltage ⁽¹⁾	V_{SD}		0.82	-0.95	V	$T_J = 25^{\circ}\text{C}$, $I_S = -3.7$, $V_{GS} = 0\text{V}$
Reverse Recovery Time ⁽³⁾	t_{rr}		32.5		ns	$T_J = 25^{\circ}\text{C}$, $I_F = -2.2$,
Reverse Recovery Charge ⁽³⁾	Q_{rr}		18.4		nC	$di/dt = 100\text{A}/\mu\text{s}$

NOTES

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- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

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PACKAGE OUTLINE



Controlling dimensions are in millimetres. Approximate conversions are given in inches

PACKAGE DIMENSIONS

DIM	Millimetres		Inches		DIM	Millimetres		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.35	1.75	0.053	0.069	e	1.27BSC		0.050BSC	
A1	0.10	0.25	0.004	0.010	b	0.33	0.51	0.013	0.020
D	4.80	5.00	0.189	0.197	c	0.19	0.25	0.008	0.010
H	5.80	6.20	0.228	0.244	θ	0°	8°	0°	8°
E	3.80	4.00	0.150	0.157	h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050	-	-	-	-	-

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