

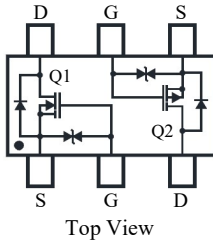


SMX02400KDTH

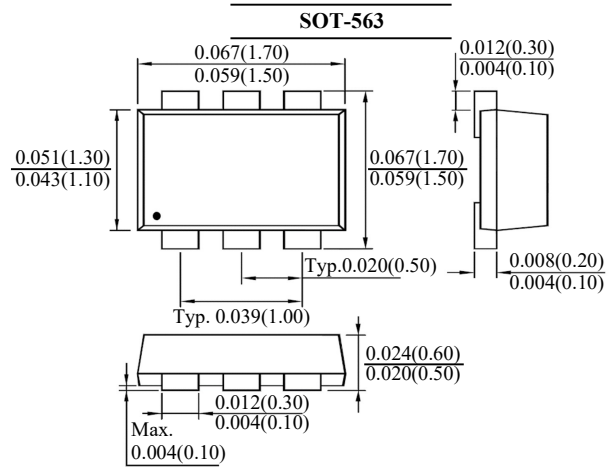
Complementary Pair Enhancement Mode MOSFET

FEATURES

- Fast switching speed
- ESD protected
- Suffix "H" indicates Halogen-free parts, ex. SMX02400KDTH



D	Drain
G	Gate
S	Source



Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Q1 Value	Q2 Value	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	± 10	± 10	V
Continuous Drain Current	I_D	0.54	-0.43	A
Peak Drain Current (Note 1)	I_{DM}	3	-2	A
Power Dissipation (Note 2)	P_D	250		mW
Thermal Resistance from Junction to Ambient (Note 2)	$R_{\theta JA}$	500		$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150		$^\circ\text{C}$

Note:

1. Pulse Test: Pulse Width $\leq 100\mu\text{s}$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad.



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Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)

N-Channel Q1

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Static						
Drain Source Breakdown Voltage	$I_D = 250\mu\text{A}$	$V_{(BR)DSS}$	20	-	-	V
Zero Gate Voltage Drain Current	$V_{DS} = 16\text{V}$	I_{DSS}	-	-	1	μA
Gate Source Leakage Current	$V_{GS} = \pm 8\text{V}$	I_{GSS}	-	-	± 10	μA
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	$V_{GS(th)}$	0.3	-	1.0	V
Static Drain Source On-Resistance	$V_{GS} = 4.5\text{V}, I_D = 0.54\text{A}$	$R_{DS(on)}$	-	-	0.55	Ω
	$V_{GS} = 2.5\text{V}, I_D = 0.50\text{A}$		-	-	0.70	
	$V_{GS} = 1.8\text{V}, I_D = 0.35\text{A}$		-	-	0.90	
Dynamic						
Forward Transconductance	$V_{DS} = 10\text{V}, I_D = 0.2\text{A}$	g_{fs}	200	-	-	mS
Total Gate Charge	$V_{DS} = 10\text{V}, V_{GS} = 2.5\text{V}, I_D = 1\text{A}$	Q_g	-	0.65	-	nC
			-	1.10	-	
Gate-Source Charge	$V_{DS} = 10\text{V}, V_{GS} = 4.5\text{V}, I_D = 1\text{A}$	Q_{gs}	-	0.30	-	
Gate-Drain Charge		Q_{gd}	-	0.20	-	
Input Capacitance	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	C_{iss}	-	72	-	pF
Output Capacitance		C_{oss}	-	14	-	
Reverse Transfer Capacitance		C_{rss}	-	12	-	
Turn-On Delay Time	$V_{DS} = 10\text{V}, V_{GS} = 4.5\text{V}, I_D = 0.5\text{A}, R_g = 10\Omega$	$t_{d(on)}$	-	12	-	ns
Turn-On Rise Time		t_r	-	6	-	
Turn-Off Delay Time		$t_{d(off)}$	-	13	-	
Turn-Off Fall Time		t_f	-	10	-	
Drain-Source Body Diode						
Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{V}, I_S = 0.5\text{A}$	V_{SD}	-	-	1.3	V
Continuous Source Current	-	I_S	-	-	0.54	A
Reverse Recovery Time	$I_S = 1\text{A}, di/dt = 100\text{A}/\mu\text{s}$	t_{rr}	-	5.2	-	ns
Reverse Recovery Charge		Q_{rr}	-	1.2	-	nC



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Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)

P-Channel Q2

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Static						
Drain Source Breakdown Voltage	$I_D = -250\mu\text{A}$	$V_{(BR)DSS}$	-20	-	-	V
Zero Gate Voltage Drain Current	$V_{DS} = -20\text{V}$	I_{DSS}	-	-	-1	μA
Gate Source Leakage Current	$V_{GS} = \pm 8\text{V}$	I_{GSS}	-	-	± 10	μA
Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	$V_{GS(th)}$	-0.3	-	-1.0	V
Static Drain Source On-Resistance	$V_{GS} = -4.5\text{V}$, $I_D = -0.43\text{A}$	$R_{DS(on)}$	-	-	0.9	Ω
	$V_{GS} = -2.5\text{V}$, $I_D = -0.30\text{A}$		-	-	1.4	
	$V_{GS} = -1.8\text{V}$, $I_D = -0.20\text{A}$		-	-	2.0	
Dynamic						
Forward Transconductance	$V_{DS} = -5\text{V}$, $I_D = -0.4\text{A}$	g_{fs}	-	1	-	S
Total Gate Charge	$V_{DS} = -10\text{V}$, $V_{GS} = -2.5\text{V}$, $I_D = -0.3\text{V}$	Q_g	-	0.60	-	nC
			-	1.10	-	
Gate-Source Charge	$V_{DS} = -10\text{V}$, $V_{GS} = -4.5\text{V}$, $I_D = -0.3\text{V}$	Q_{gs}	-	0.24	-	nC
Gate-Drain Charge		Q_{gd}	-	0.10	-	
Input Capacitance	$V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	C_{iss}	-	45	-	pF
Output Capacitance		C_{oss}	-	15	-	
Reverse Transfer Capacitance		C_{rss}	-	7	-	
Turn-On Delay Time		$t_{d(on)}$	-	57	-	
Turn-On Rise Time	$V_{DS} = -10\text{V}$, $V_{GS} = -4.5\text{V}$, $I_D = -1\text{A}$, $R_g = 3.3\Omega$	t_r	-	40	-	
Turn-Off Delay Time		$t_{d(off)}$	-	34	-	
Turn-Off Fall Time	t_f	-	16	-		
Drain-Source Body Diode						
Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{V}$, $I_S = -0.4\text{A}$	V_{SD}	-	-	-1.2	V
Continuous Source Current	-	I_S	-	-	-0.43	A
Reverse Recovery Time	$I_S = -1\text{A}$, $di/dt = 50\text{A}/\mu\text{s}$	t_{rr}	-	88	-	ns
Reverse Recovery Charge		Q_{rr}	-	16	-	nC



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RATINGS AND CHARACTERISTIC CURVES

N-Channel 01

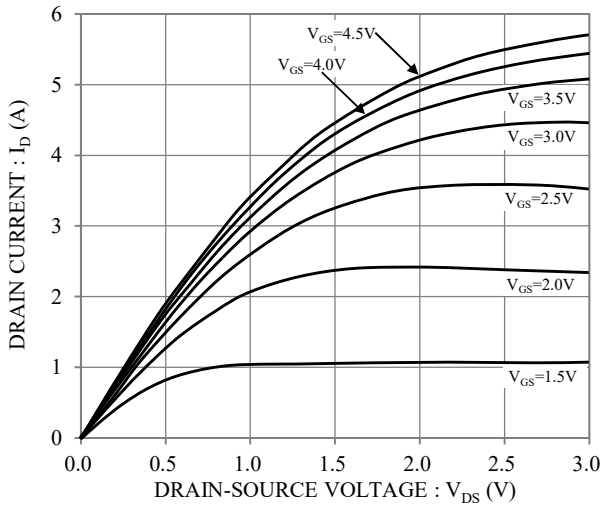


Fig.1 Typical Output Characteristics

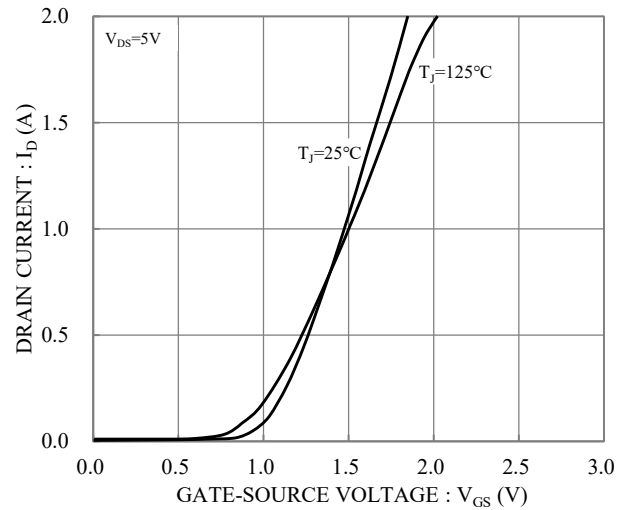


Fig.2 Typical Transfer Characteristics

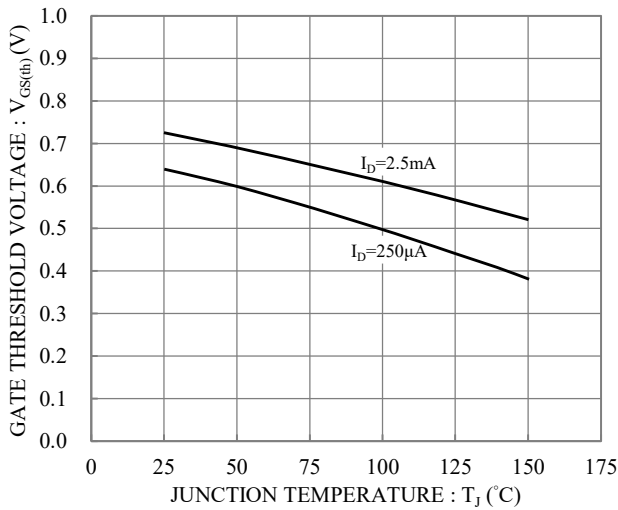


Fig.3 Gate Threshold Voltage vs. Junction Temperature

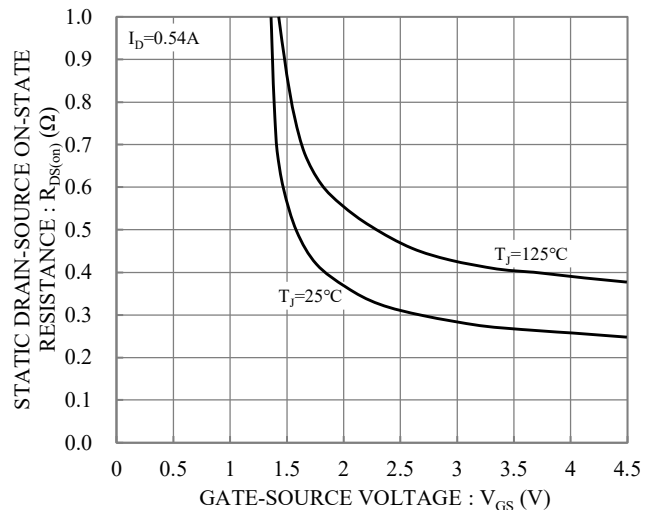


Fig.4 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

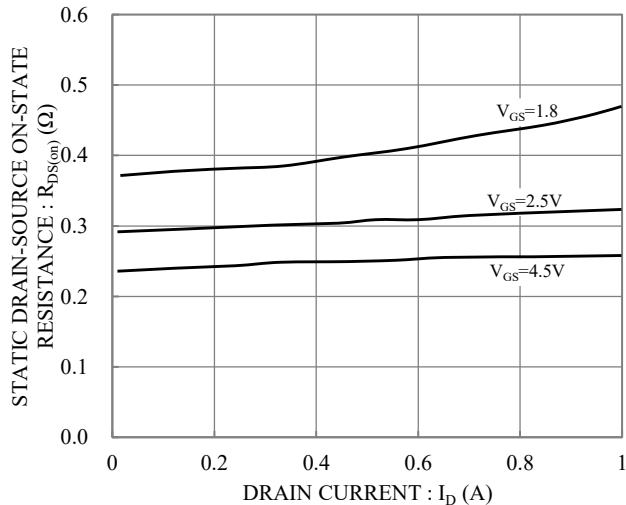


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

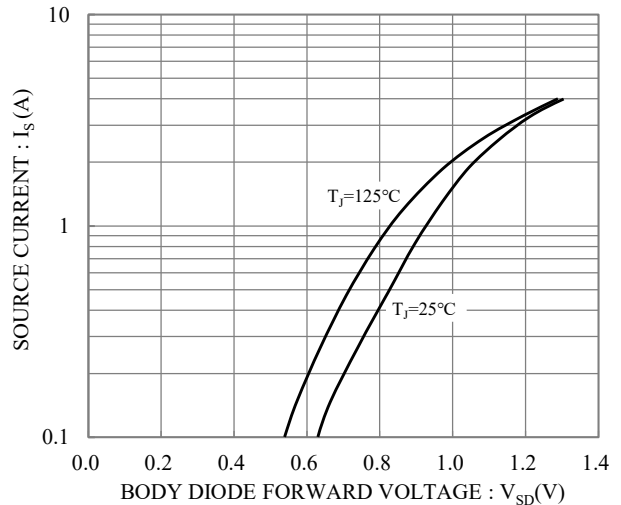


Fig.6 Body Diode Forward Voltage vs. Source Current



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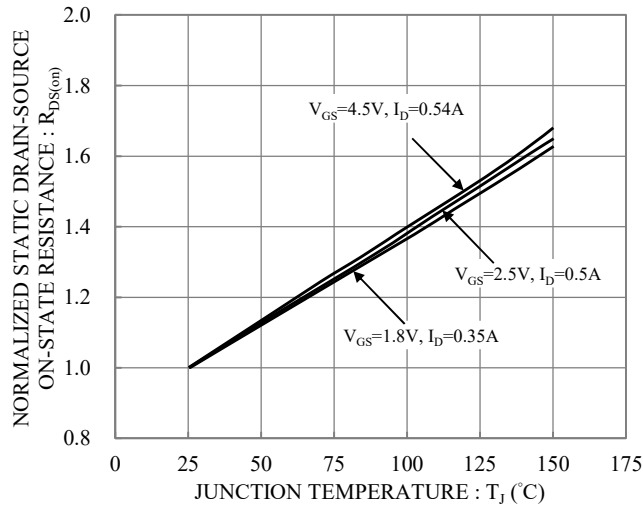


Fig.7 Drain-Source On-State Resistance vs. Junction Temperature

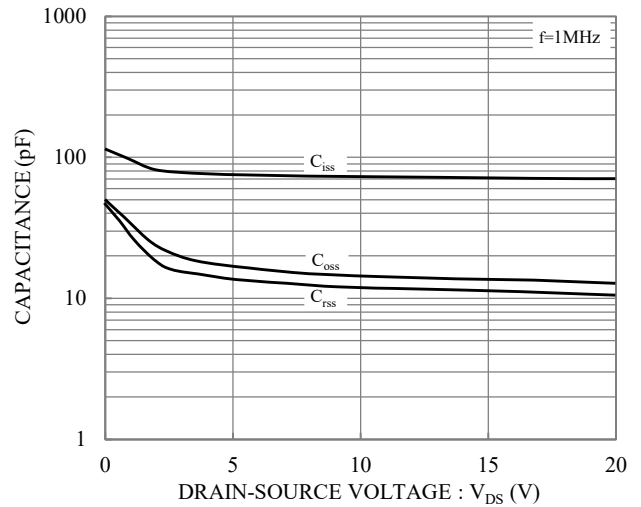


Fig.8 Capacitance vs. Drain-Source Voltage

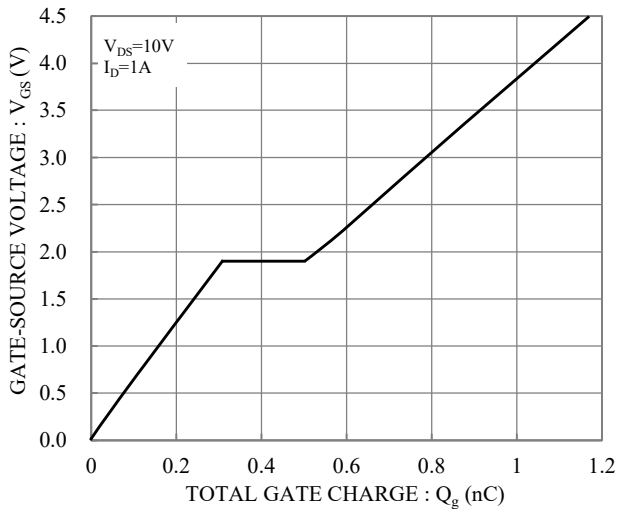


Fig.9 Gate Charge

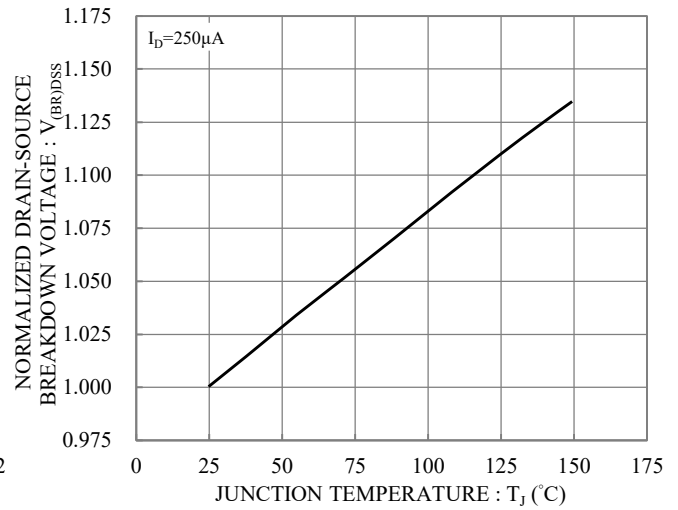


Fig.10 Breakdown Voltage vs. Junction Temperature

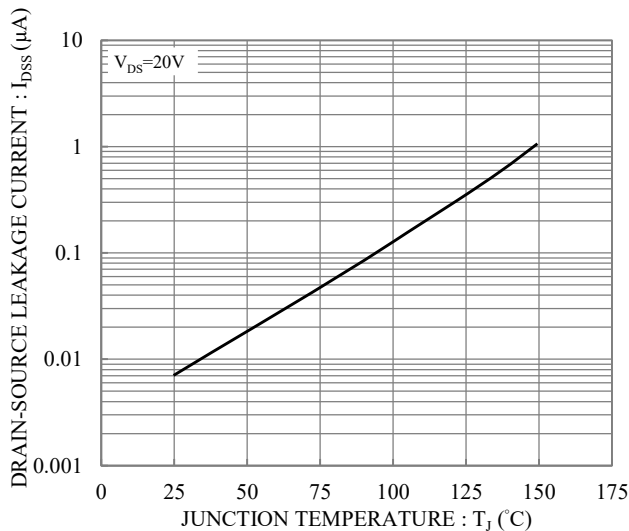


Fig.11 Breakdown Voltage vs. Junction Temperature



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RATINGS AND CHARACTERISTIC CURVES

P-Channel Q2

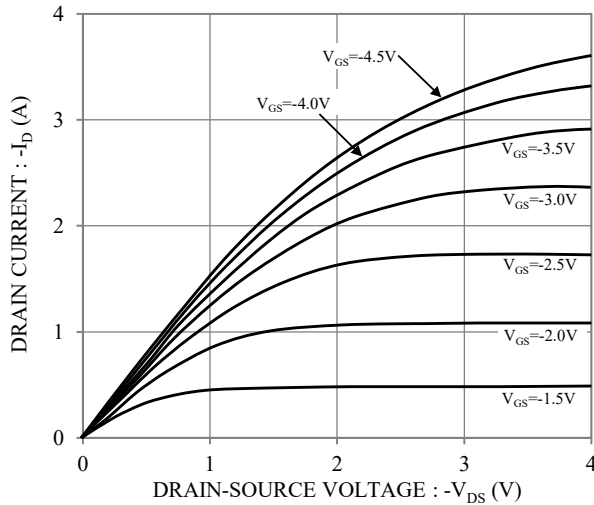


Fig.12 Typical Output Characteristics

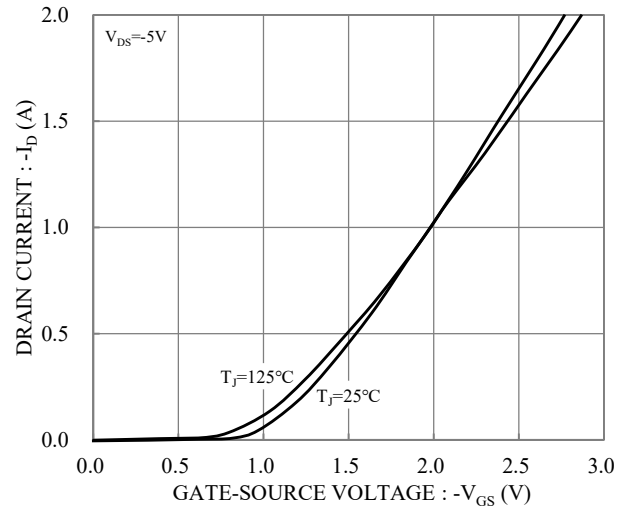


Fig.13 Typical Transfer Characteristics

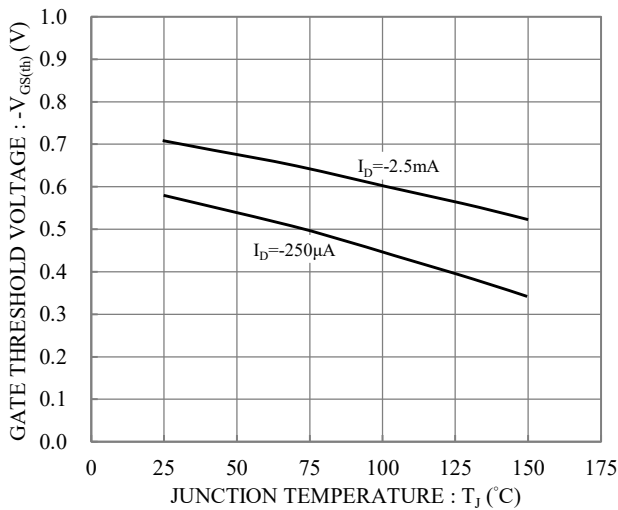


Fig.14 Gate Threshold Voltage vs. Junction Temperature

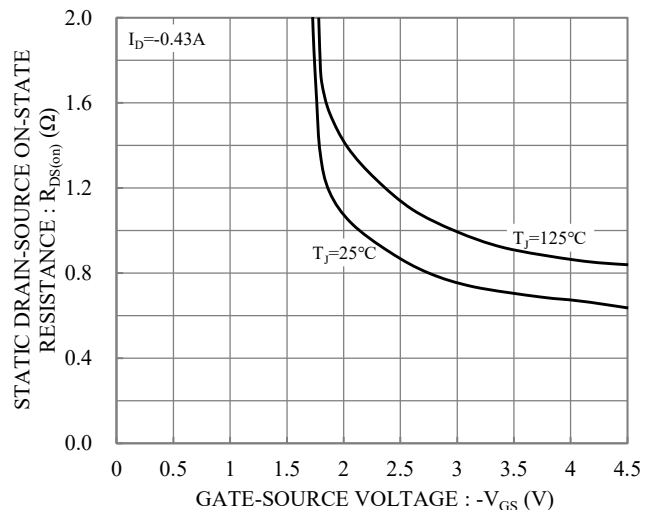


Fig.15 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

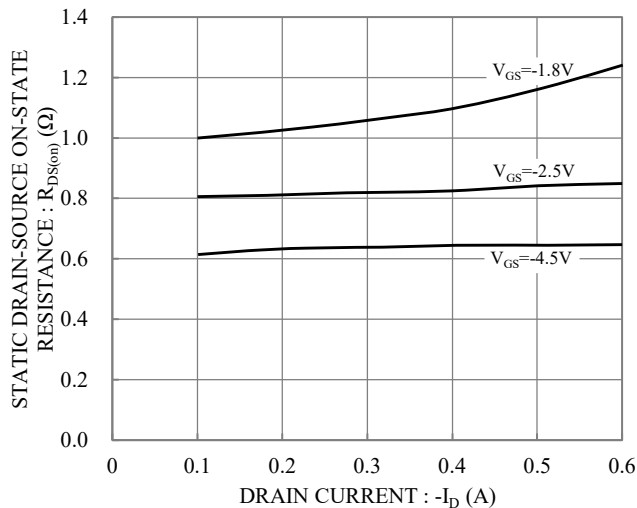


Fig.16 Static Drain-Source On-State Resistance vs. Drain Current

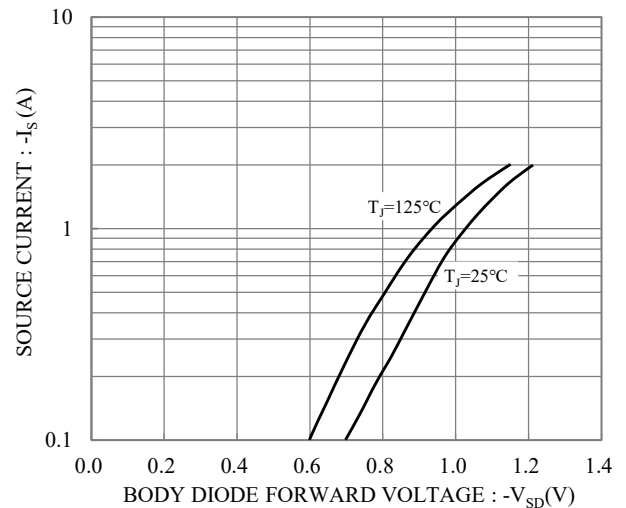


Fig.17 Body Diode Forward Voltage vs. Source Current



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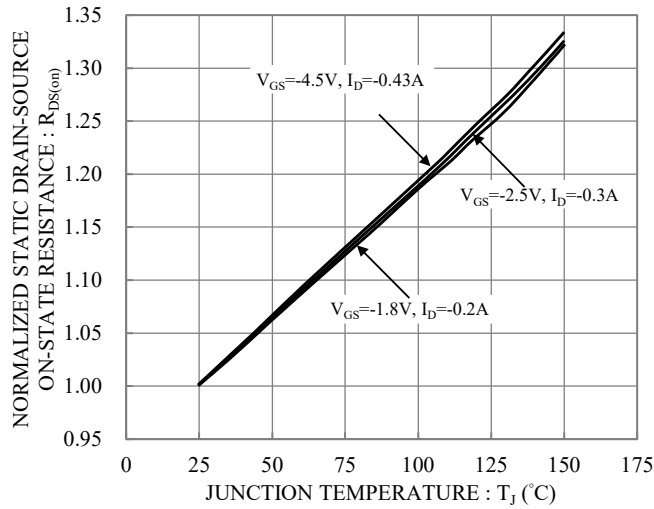


Fig.18 Drain-Source On-State Resistance vs. Junction Temperature

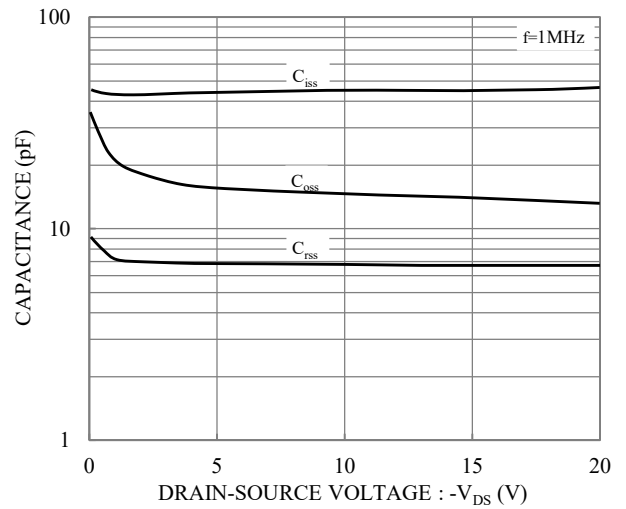


Fig.19 Capacitance vs. Drain-Source Voltage

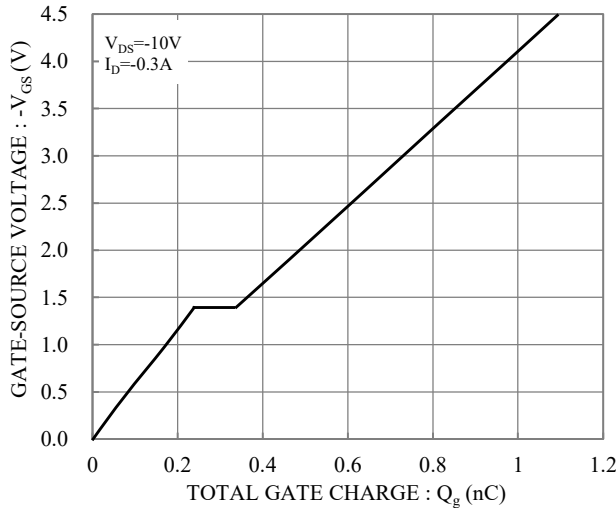


Fig.20 Gate Charge

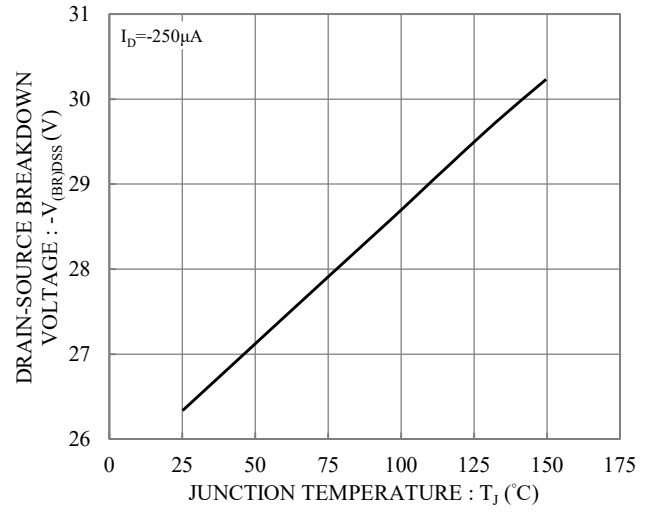


Fig.21 Breakdown Voltage vs. Junction Temperature

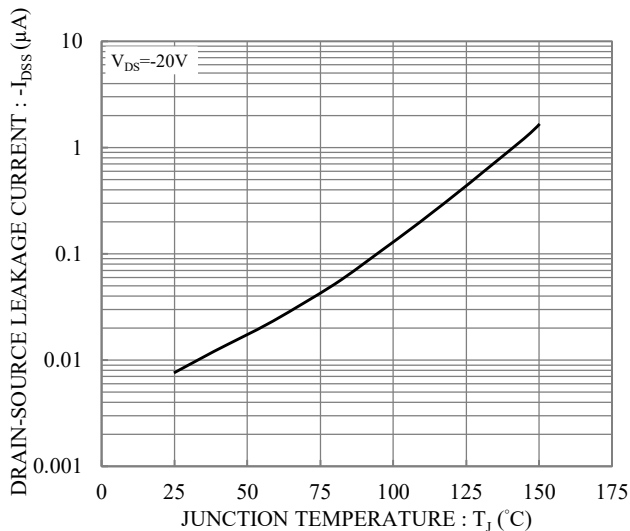


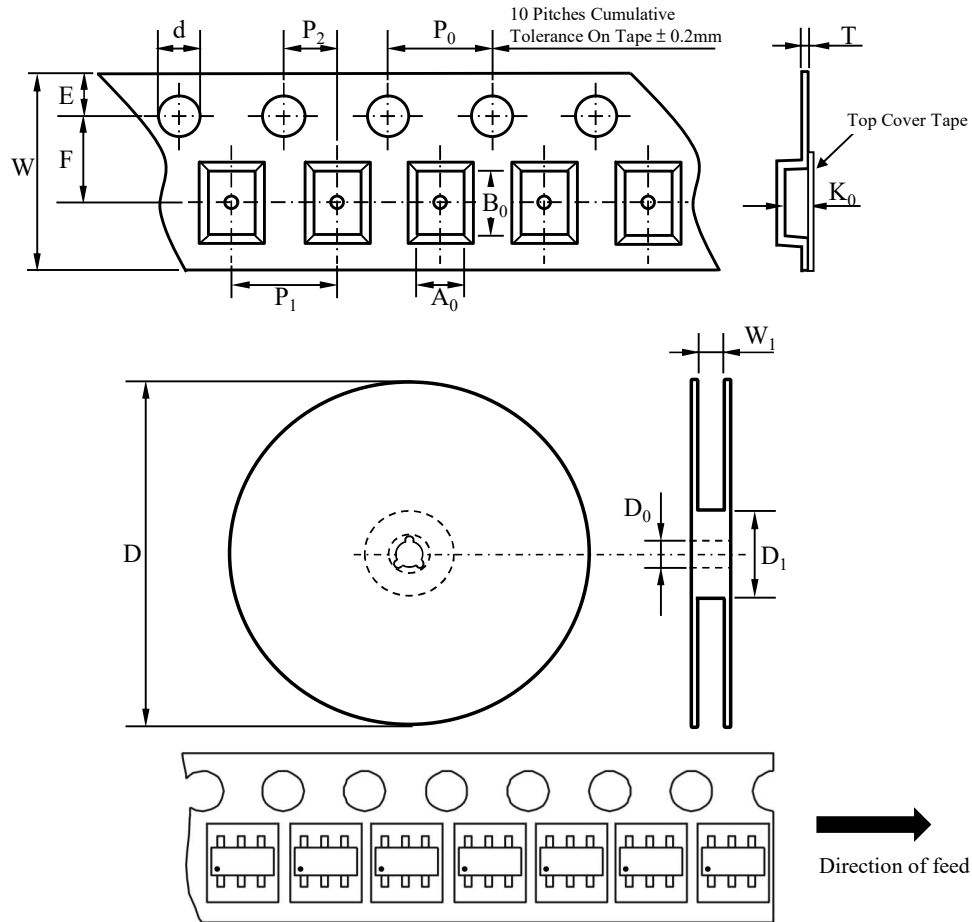
Fig.22 Breakdown Voltage vs. Junction Temperature



SMX02400KDTH

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TAPE & REEL SPECIFICATION



Item	Symbol	SOT-563
Carrier width	A_0	*
Carrier length	B_0	
Carrier depth	K_0	
Sprocket hole	d	1.50 ± 0.10
Reel outside diameter	D	178.00 ± 2.00
Feed hole width	D_0	13.00 ± 0.50
Reel inner diameter	D_1	MIN. 50.00
Sprocket hole position	E	1.75 ± 0.10
Punch hole position	F	3.50 ± 0.10
Sprocket hole pitch	P_0	4.00 ± 0.10
Punch hole pitch	P_1	4.00 ± 0.10
Embossment center	P_2	2.00 ± 0.10
Overall tape thickness	T	0.60 ± 0.05
Tape width	W	8.00 ± 0.30
Reel width	W_1	MAX. 14.50

Note *: A_0 , B_0 , and K_0 are determined by component size. The clearance between the components and the cavity must be within 0.05 mm min. to 0.5 mm max.

ORDER INFORMATION

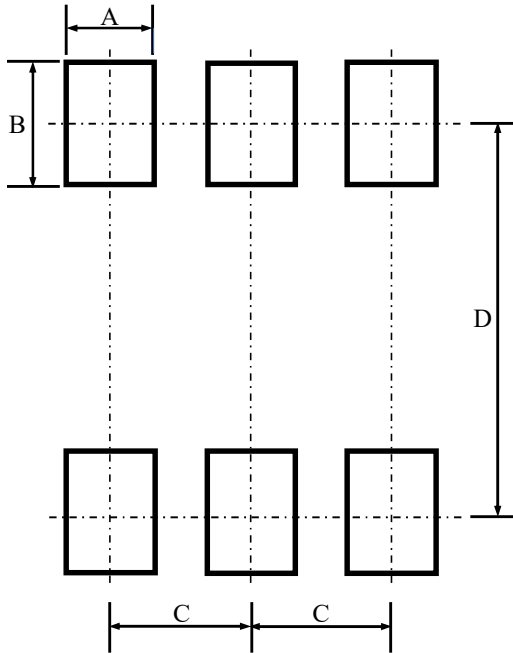
Part Number	Marking Code	Reel Size	Quantity
SMX02400KDTH	MB	7"	4,000



SMX02400KDTH

Complementary Pair Enhancement Mode MOSFET

SUGGESTED SOLDER PAD LAYOUT



Unit :mm

PACKAGE	A	B	C	D
SOT-563	0.30	0.85	0.50	1.45