

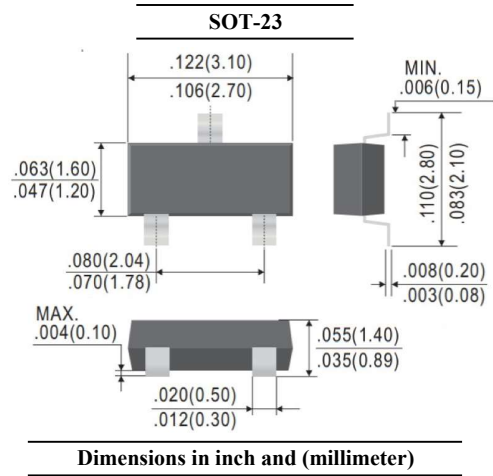
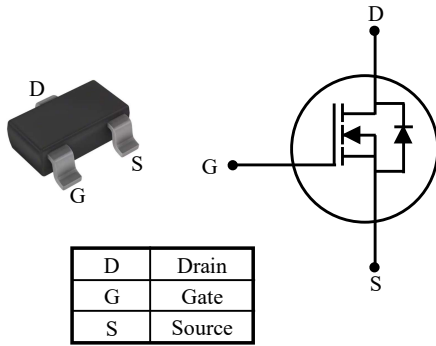


# SM2306TDSH

## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- Suffix "H" indicates Halogen-free parts, ex.SM2306TDSH



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current	$I_D$	5	A
Pulsed Drain Current (Note 1)	$I_{DM}$	20	A
Power Dissipation (Note 2)	$P_D$	1.38	W
Thermal Resistance from Junction to Ambient (Note 2)	$R_{\theta JA}$	90	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 150	$^\circ\text{C}$

Note :

1. Pulse Width  $\leq 100\mu\text{s}$ , Duty Cycle  $\leq 2\%$ , Repetitive rating, pulse width limited by junction temperature  $T_{J(\text{MAX})} = 150^\circ\text{C}$ .
2. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air,  $t \leq 10\text{s}$



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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain Source Breakdown Voltage	$I_D=250\mu\text{A}$	$V_{(BR)DSS}$	30	-	-	V
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	$V_{GS(th)}$	0.5	-	1.2	V
Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$	$I_{DSS}$	-	-	1	$\mu\text{A}$
Gate-Body Leakage Current	$V_{GS}=\pm 12\text{V}$	$I_{GSS}$	-	-	$\pm 0.1$	$\mu\text{A}$
Drain-Source On-State Resistance	$V_{GS}=10\text{V}, I_D=5\text{A}$	$R_{DS(on)}$	-	-	40	m $\Omega$
	$V_{GS}=4.5\text{V}, I_D=5\text{A}$		-	-	45	
	$V_{GS}=2.5\text{V}, I_D=2.6\text{A}$		-	-	50	
Forward Transconductance	$V_{DS}=5\text{V}, I_D=5\text{A}$	$g_{FS}$	-	7.4	-	S
<b>Dynamic</b>						
Gate Resistance	$V_{DS}=0\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	$R_g$	-	1	-	$\Omega$
Total Gate Charge	$V_{DS}=15\text{V}, V_{GS}=4.5\text{V}, I_D=5\text{A}$	$Q_g$	-	5.0	-	nC
			-	10.2	-	
Gate-Source Charge	$V_{DS}=15\text{V}, V_{GS}=10\text{V}, I_D=5\text{A}$	$Q_{gs}$	-	1.1	-	
Gate-Drain Charge		$Q_{gd}$	-	1.9	-	
Input Capacitance	$V_{DS}=15\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	$C_{iss}$	-	357	-	pF
Output Capacitance		$C_{oss}$	-	58	-	
Reverse Transfer Capacitance		$C_{rss}$	-	37	-	
Turn-On Delay Time	$V_{DS}=15\text{V}, I_D=5\text{A},$ $V_{GS}=10\text{V}, R_g=1\Omega$	$t_{d(on)}$	-	8.0	-	ns
Turn-On Rise Time		$t_r$	-	19.0	-	
Turn-Off Delay Time		$t_{d(off)}$	-	8.0	-	
Turn-Off Fall Time		$t_f$	-	6.5	-	
<b>Drain-Source Body Diode</b>						
Drain-Source Diode Forward Voltage	$I_S=1.2\text{A}$	$V_{SD}$	-	-	1.2	V
Diode Continuous Forward Current	-	$I_S$	-	-	5	A
Reverse Recovery Time	$I_S=5\text{A}, di/dt=100\text{A}/\mu\text{s}$	$t_{rr}$	-	5.6	-	ns
Reverse Recovery Charge		$Q_{rr}$	-	1.4	-	nC



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### RATINGS AND CHARACTERISTIC CURVES

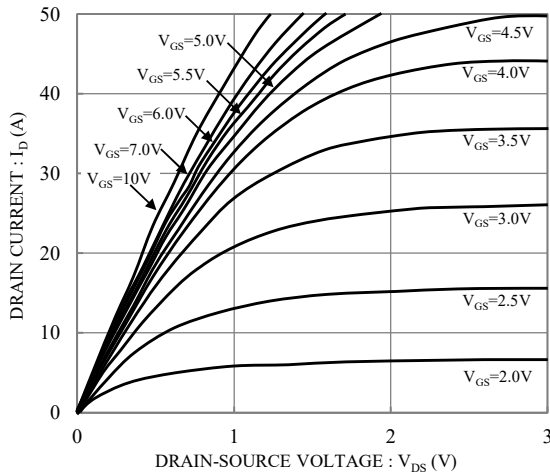


Fig.1 Typical Output Characteristics

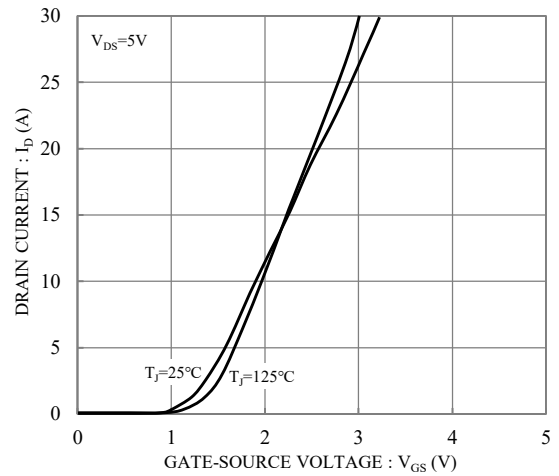


Fig.2 Typical Transfer Characteristics

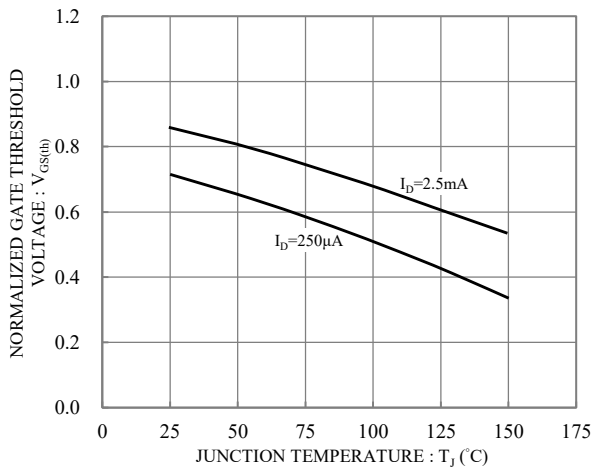


Fig.3 Gate Threshold Voltage vs. Junction Temperature

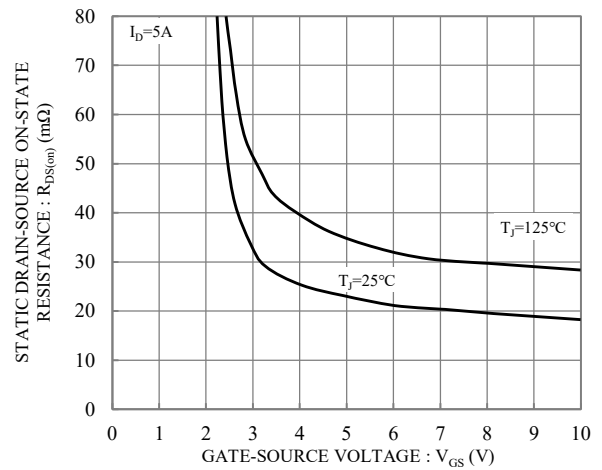


Fig.4 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

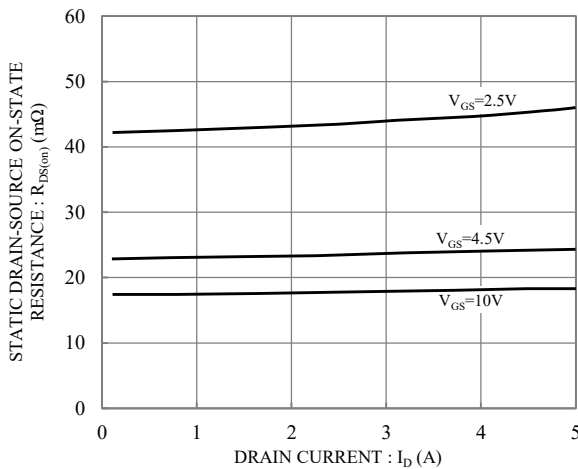


Fig.5 Static Drain-Source On-State Resistance vs. Drain current

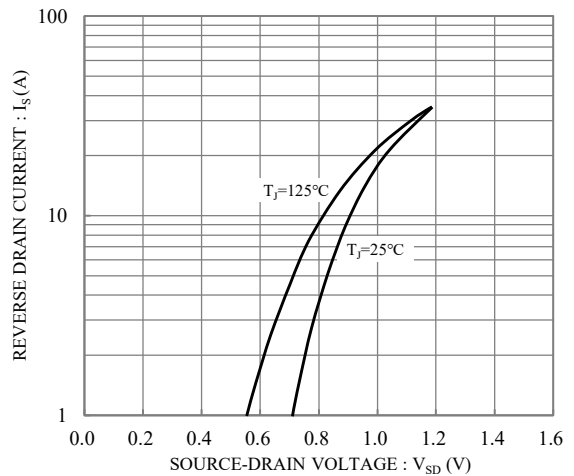
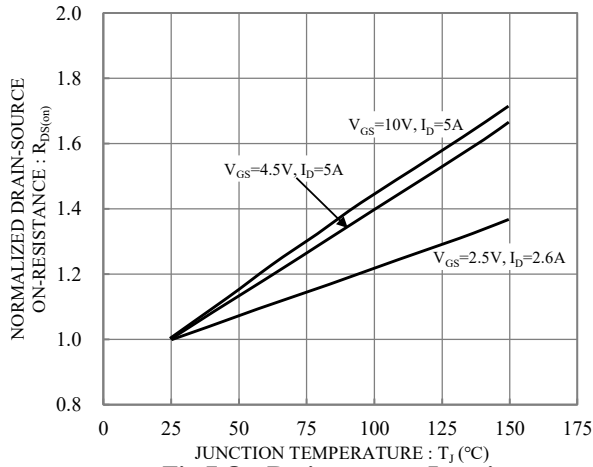


Fig.6 Typical Forward Characteristic

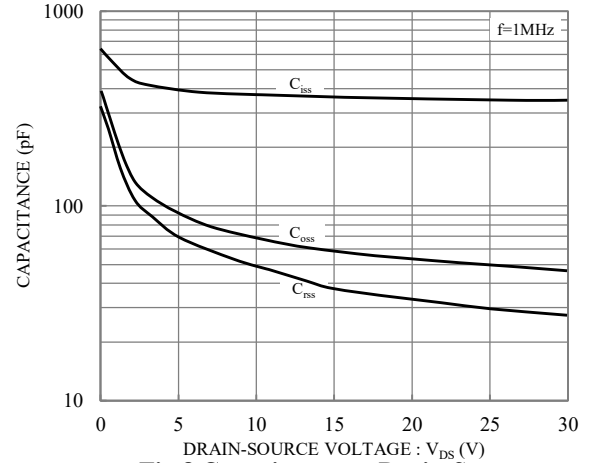


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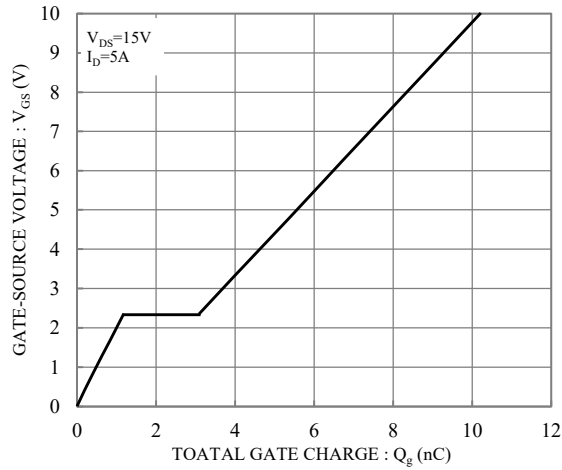
## N-Channel Enhancement Mode Field Effect Transistor



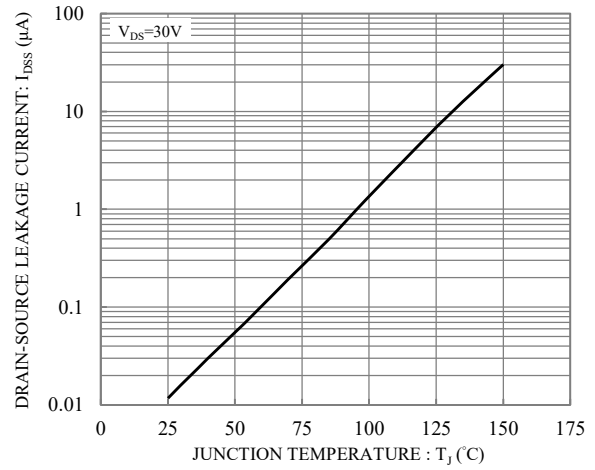
**Fig.7 On-Resistance vs. Junction Temperature**



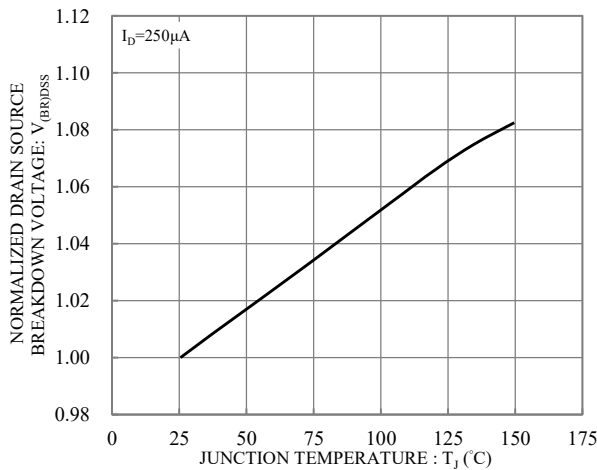
**Fig.8 Capacitance vs. Drain-Source Voltage**



**Fig.9 Gate Charge**



**Fig.10 Drain-Source Leakage Current vs. Junction Temperature**



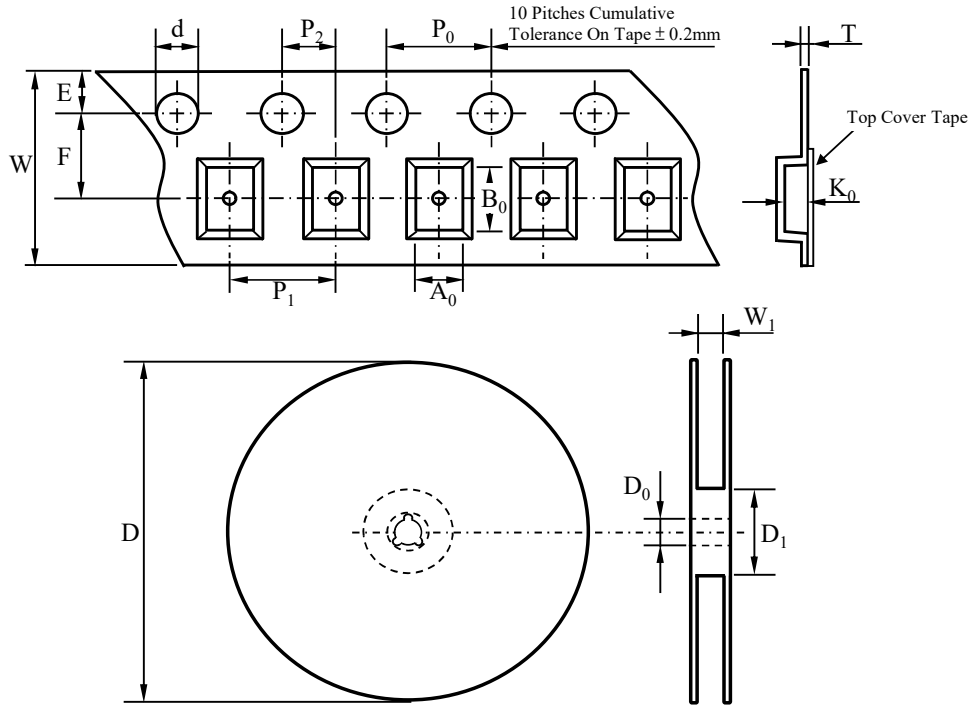
**Fig.11 Drain Source Breakdown Voltage vs. Junction Temperature**



# SM2306TDSH

## N-Channel Enhancement Mode Field Effect Transistor

### TAPE & REEL SPECIFICATION



Item	Symbol	SOT-23
Carrier width	$A_0$	*
Carrier length	$B_0$	
Carrier depth	$K_0$	
Sprocket hole	$d$	$1.60 \pm 0.10$
Reel outside diameter	$D$	$178.00 \pm 2.00$
Feed hole width	$D_0$	$13.00 \pm 0.50$
Reel inner diameter	$D_1$	MIN. 50.00
Sprocket hole position	$E$	$1.75 \pm 0.10$
Punch hole position	$F$	$3.50 \pm 0.10$
Sprocket hole pitch	$P_0$	$4.00 \pm 0.10$
Punch hole pitch	$P_1$	$4.00 \pm 0.10$
Embossment center	$P_2$	$2.00 \pm 0.10$
Overall tape thickness	$T$	$0.20 \pm 0.05$
Tape width	$W$	$8.00 \pm 0.20$
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

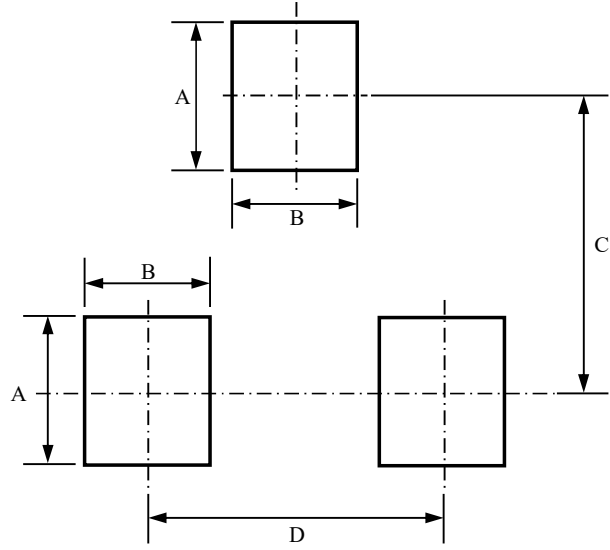
Part Number	Marking Code	Reel Size	Quantity
SM2306TDSH	M26	7"	3,000



# SM2306TDSH

*N-Channel Enhancement Mode Field Effect Transistor*

## SUGGESTED SOLDER PAD LAYOUT



Unit :mm

PACKAGE	A	B	C	D
SOT-23	1.00	0.80	2.00	1.90