

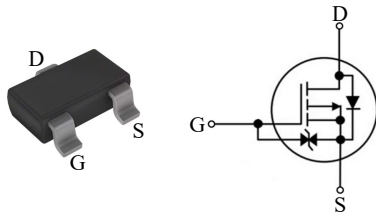


SM13003KTDSH

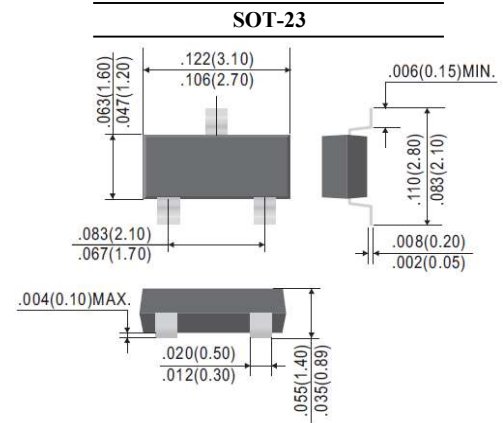
P-Channel Enhancement Mode Field Effect Transistor

FEATURES

- ESD protected gate > 2kV (HBM)
- Suffix "H" indicates Halogen-free parts, ex. SM13003KTDSH



PIN	Description
G	Gate
S	Source
D	Drain



Dimensions in inchs and (millimeters)

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

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DSS}	-30	V	
Gate-Source Voltage	V_{GSS}	± 20	V	
Continuous Drain Current (Note 1)	I_D	$T_A = 25^\circ\text{C}$	-2.6	A
		$T_A = 70^\circ\text{C}$	-2.2	A
Pulsed Drain Current (Note 2)	I_{DM}	-20	A	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	1.4	W
		$T_A = 70^\circ\text{C}$	1.0	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	(Note 1)	90	$^\circ\text{C}/\text{W}$
		(Note 3)	125	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Lead	$R_{\theta JL}$	80	$^\circ\text{C}/\text{W}$	
Operating and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ\text{C}$	

Note :

1. The value of $R_{\theta JA}$ is measured with device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch² copper plate, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depend on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.
2. Repetitive rating, pulse width limited by junction temperature.
3. Steady state



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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Static						
Drain Source Breakdown Voltage	$I_D = -250\mu\text{A}$	BV_{DSS}	-30	-	-	V
Zero Gate Voltage Drain Current	$V_{DS} = -24\text{V}$	I_{DSS}	-	-	-1	μA
Gate-Body Leakage Current	$V_{GS} = \pm 20\text{V}$	I_{GSS}	-	-	± 10	μA
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	$V_{GS(th)}$	-1	-	-3	V
Static Drain Source On-Resistance	$V_{GS} = -10\text{V}, I_D = -2.6\text{A}$ $V_{GS} = -4.5\text{V}, I_D = -2.0\text{A}$	$R_{DS(on)}$	-	-	130	m Ω
			-	-	200	
Forward Transconductance	$V_{DS} = -5\text{V}, I_D = -2.5\text{A}$	g_{FS}	3	-	-	S
Dynamic						
Gate Resistance	$V_{DS} = 0, V_{GS} = 0, f = 1\text{MHz}$	R_g	-	21	-	Ω
Total Gate Charge	$V_{DS} = -15\text{V}, I_D = -2.6\text{A}, V_{GS} = -4.5\text{V}$	Q_g	-	4.5	-	nC
			-	9.0	-	
Gate-Source Charge	$V_{DS} = -15\text{V}, I_D = -2.6\text{A}, V_{GS} = -10\text{V}$	Q_{gs}	-	3.0	-	
Gate-Drain Charge		Q_{gd}	-	1.2	-	
Input Capacitance	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	C_{iss}	-	441	-	pF
Output Capacitance		C_{oss}	-	41	-	
Reverse Transfer Capacitance		C_{rss}	-	35	-	
Turn-On Delay Time	$V_{DD} = -15\text{V}, V_{GS} = -10\text{V},$ $R_L = 5.8\Omega, R_g = 3\Omega$	$t_{d(on)}$	-	7.5	-	ns
Turn-On Rise Time		t_r	-	3.2	-	
Turn-Off Delay Time		$t_{d(off)}$	-	17.0	-	
Turn-Off Fall Time		t_f	-	6.8	-	
Drain-Source Body Diode						
Drain-Source Diode Forward Voltage	$I_S = -1\text{A}$	V_{SD}	-	-	-1	V
Reverse Recovery Time	$I_S = -2.6\text{A}, di/dt = 100\text{A}/\mu\text{s}$	t_{rr}	-	17	-	ns
Reverse Recovery Charge		Q_{rr}	-	10	-	nC



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RATINGS AND CHARACTERISTIC CURVES

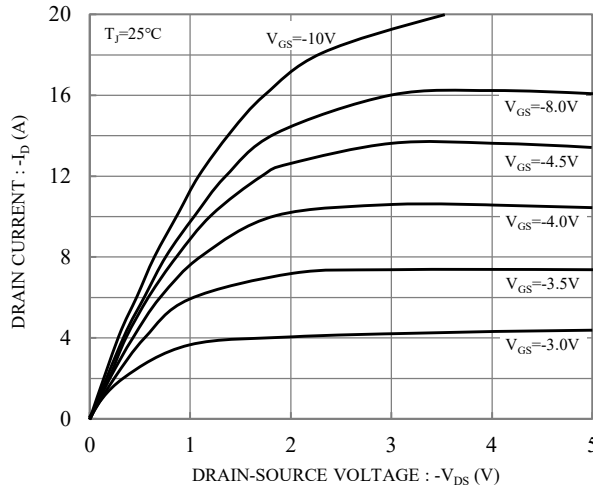


Fig.1 Typical Output Characteristics

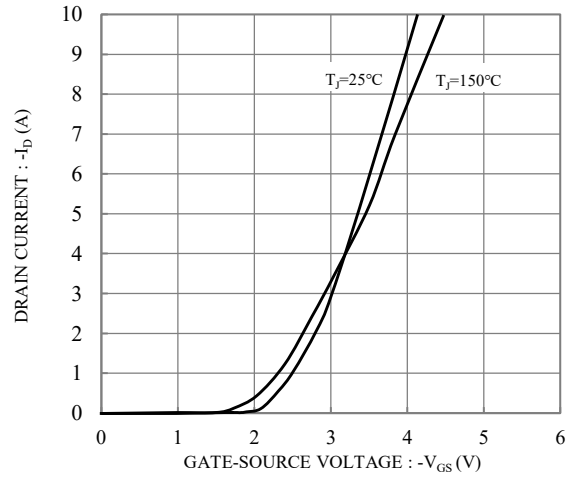


Fig.2 Typical Transfer Characteristics

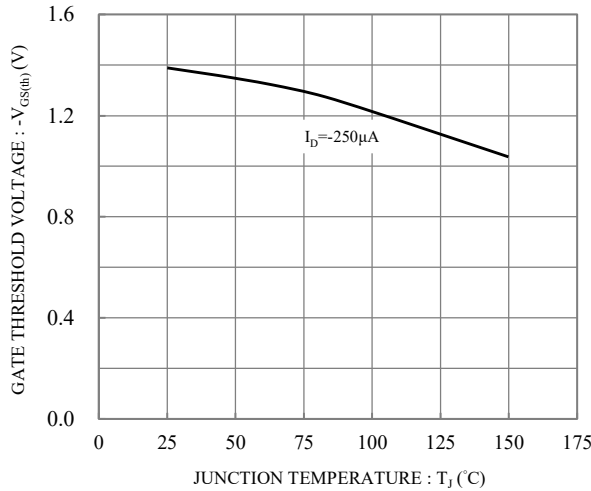


Fig.3 Gate Threshold Voltage vs. Junction Temperature

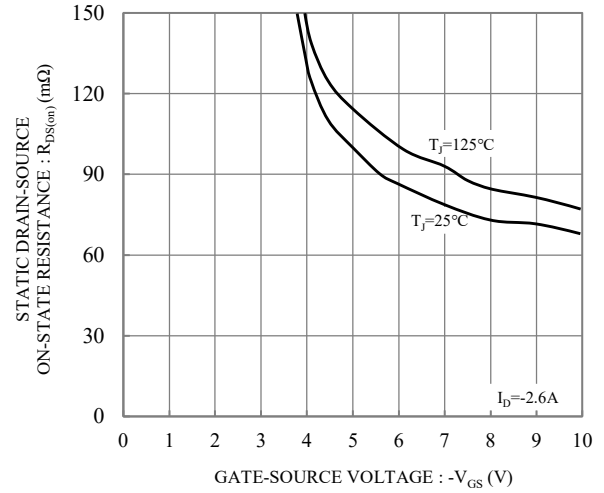


Fig.4 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

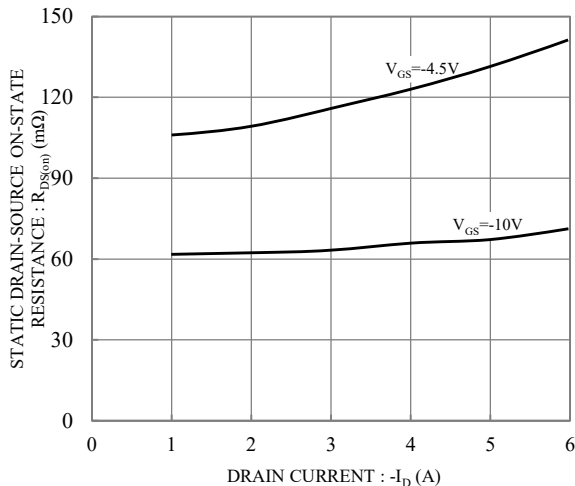


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

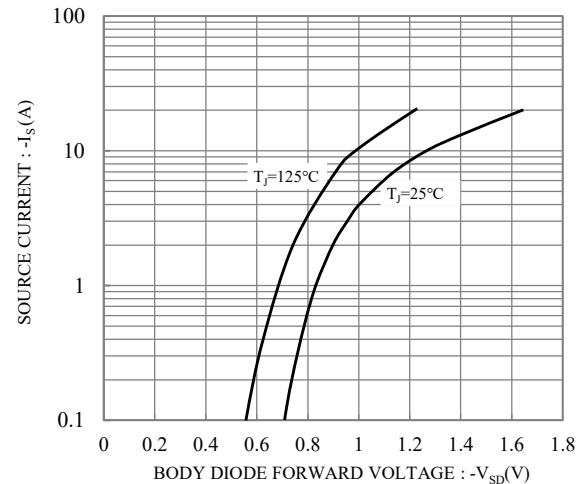


Fig.6 Body Diode Forward Voltage vs. Source Current



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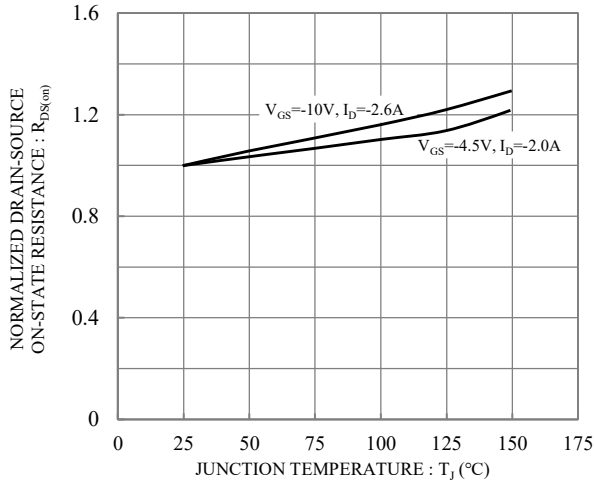


Fig.7 Drain-Source On-State Resistance vs. Junction Temperature

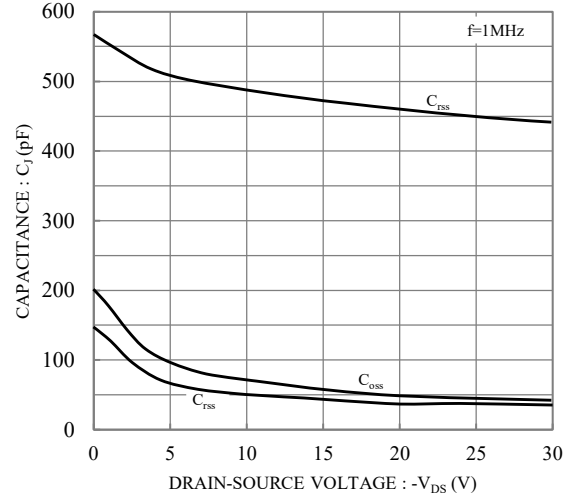


Fig.8 Capacitance vs. Drain-to-Source Voltage

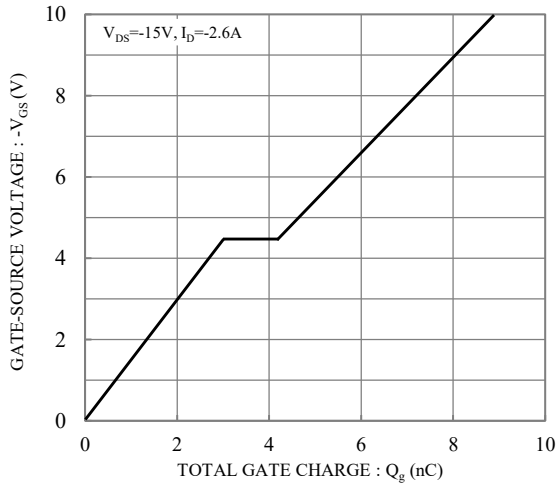


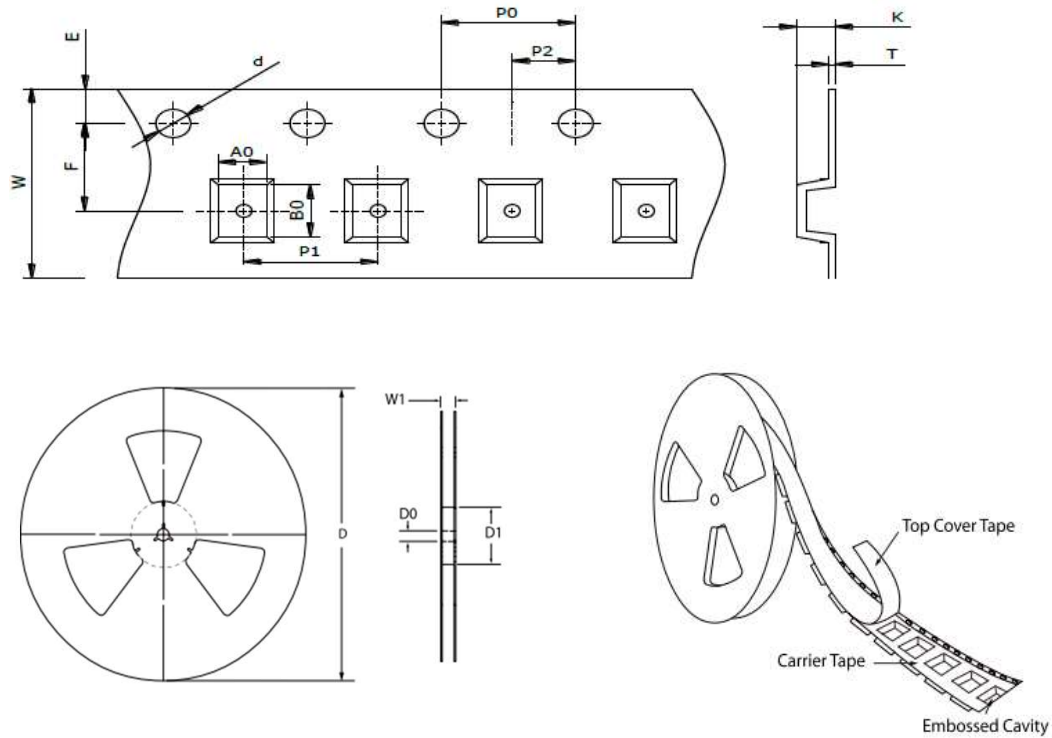
Fig.9 Gate Charge Characteristics



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TAPE & REEL SPECIFICATION



Item	Symbol	SOT-23
Carrier width	A ₀	3.30 ± 0.10
Carrier length	B ₀	3.00 ± 0.10
Carrier depth	K	1.70 ± 0.10
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	0.20 ± 0.05
Tape width	W	8.00 ± 0.20
Reel width	W ₁	MAX. 14.50

ORDER INFORMATION

Package	Reel Size	Quantity
SOT-23	7"	3,000

MARKING CODE

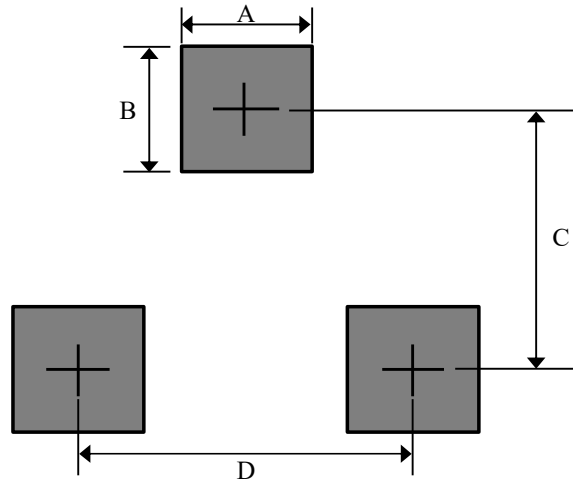
Part Number	Marking Code
SM13003KTDSH	TR



SM13003KTDSH

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SUGGESTED SOLDER PAD LAYOUT



Unit : mm

PACKAGE	A	B	C	D
SOT-23	0.80	1.00	2.40	1.90