



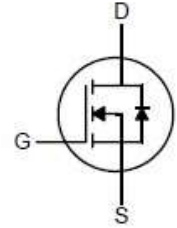
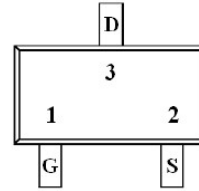
SM3414IDS

N-Channel Enhancement Mode Field Effect Transistor

FEATURES

- $BV_{DSS} \geq 20V$, $I_D \leq 6A$
- $R_{DS(ON)} \leq 24m\Omega @ V_{GS}=4.5V$
- Suffix "H" indicates Halogen-free parts, ex. SM3414IDSH

PIN CONFIGURATION



Pin	Description
1	Gate
2	Source
3	Drain

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current, $V_{GS} @ 4.5V$ ⁽¹⁾	I_D	6.0 4.1	A
Pulsed Drain Current ⁽²⁾	I_{DM}	24	A
Thermal Resistance Junction to Ambient ⁽¹⁾	$R_{\theta JA}$	125	$^\circ C/W$
Thermal Resistance Junction to Case	$R_{\theta JC}$	80	$^\circ C/W$
Power Dissipation ⁽³⁾	P_D	1	W
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	$^\circ C$

Note

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper. $t \leq 10SEC$
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Power dissipation is limited by 150 $^\circ C$ junction temperature



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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	$V_{GS}=0V, I_D=250\mu A$	V_{DSS}	20	-	-	V
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	0.4	0.7	1.0	V
Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 8V$	I_{GSS}	-	-	± 10	μA
Zero Gate Voltage Drain Current	$V_{DS}=16V, V_{GS}=0V, T_j=25^\circ C$	I_{DSS}	-	-	1	μA
	$V_{DS}=16V, V_{GS}=0V, T_j=85^\circ C$		-	-	30	
Static Drain Source On-Resistance ⁽²⁾	$V_{GS}=4.5V, I_D=6A$	$R_{DS(on)}$	-	18	24	m Ω
	$V_{GS}=2.5V, I_D=4A$		-	27	39	
Dynamic⁽⁴⁾						
Total Gate Charge	$V_{DS}=15V, V_{GS}=4.5V, I_D=5.1A$	Q_g	-	15.0	-	nC
Gate-Source Charge		Q_{gs}	-	0.9	-	
Gate-Drain Charge		Q_{gd}	-	5.8	-	
Input Capacitance	$V_{DS}=15V, f=1MHz, V_{GS}=0V$	C_{iss}	-	680	-	pF
Output Capacitance		C_{oss}	-	145	-	
Reverse Transfer Capacitance		C_{rss}	-	138	-	
Turn-On Delay Time	$V_{DS}=15V, I_D=1.5A, V_{GEN}=4.5V, R_G=6\Omega, R_L=10\Omega$	$t_{d(on)}$	-	4.0	-	nS
Rise Time		t_r	-	5.0	-	
Turn-Off Delay Time		$t_{d(off)}$	-	30.0	-	
Fall Time		t_f	-	4.5	-	
Drain-Source Body Diode						
Diode Forward Voltage	$V_{GS}=0V, I_S=1.5A$	V_{SD}	-	0.7	1.1	V
Reverse Recovery Time	$I_{SD}=6.5A, di_{SD}/dt=100A/\mu s$	t_{rr}	-	25	-	ns
Reverse Recovery Charge		Q_{rr}	-	17	-	nC
Body Diode Continuous Current	-	I_S	-	-	1.5	A

Note

4. Guarantee by design, not test in mass production



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RATINGS AND CHARACTERISTIC CURVES

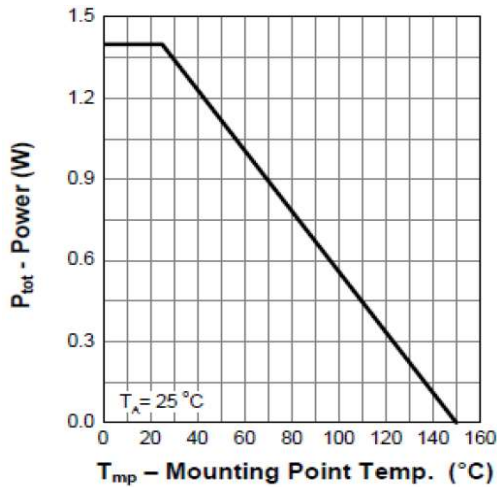


Fig.1 Power Capability

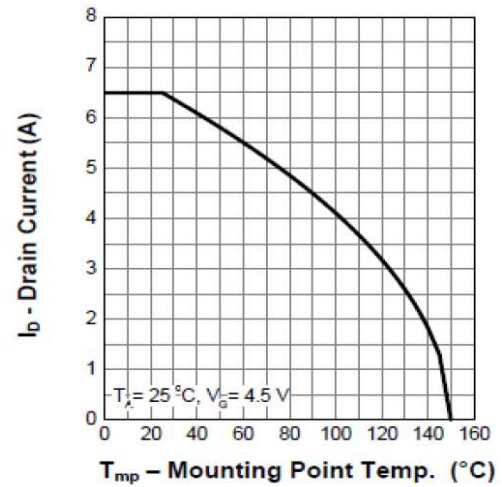


Fig.2 Current Capability

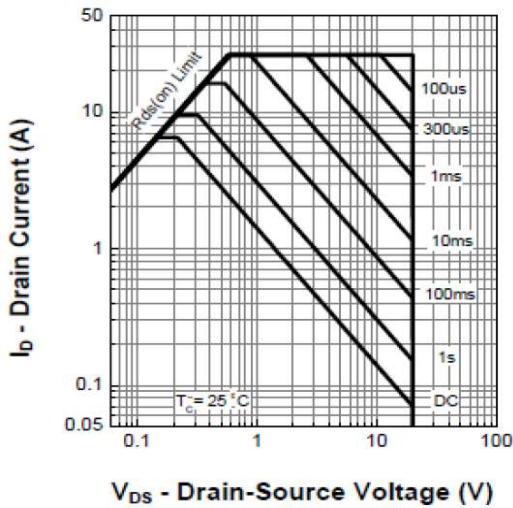


Fig.3 Operating

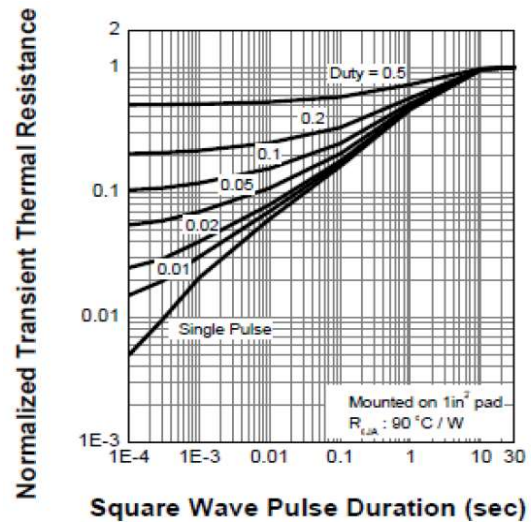


Fig.4 Transient Thermal Impedance

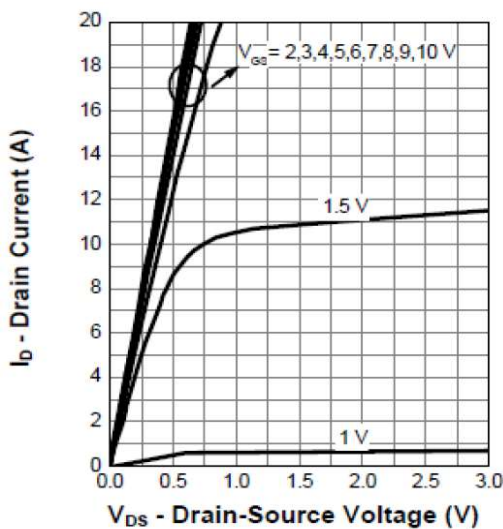


Fig.5 Output Characteristics

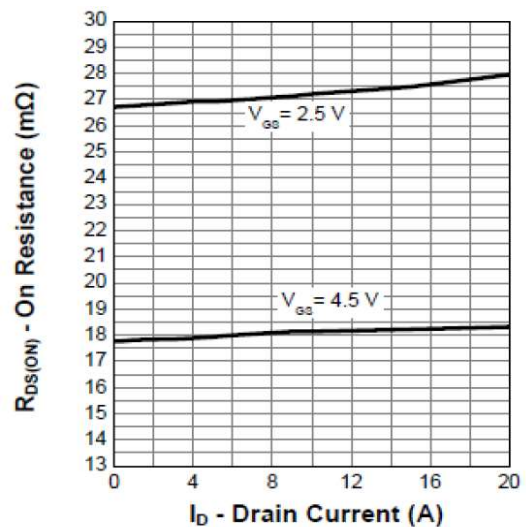


Fig.6 On Resistance



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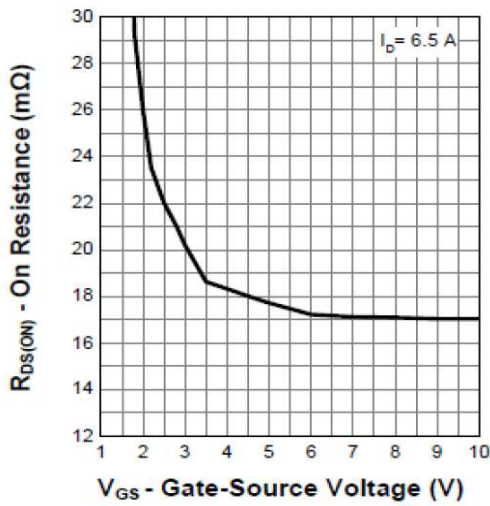


Fig.7 Transfer Characteristics

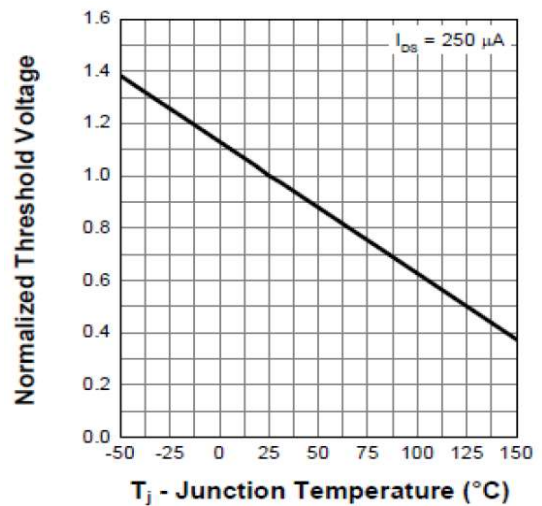


Fig.8 Normalized Threshold Voltage

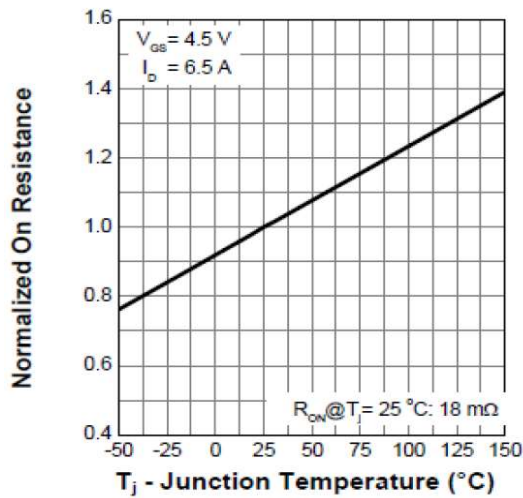


Fig.9 Normalized On Resistance

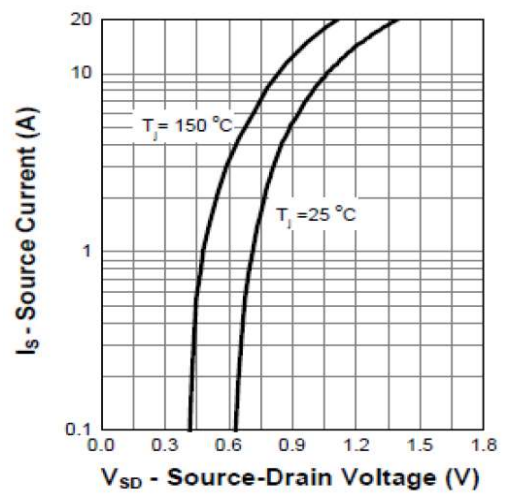


Fig.10 Diode Forward Current

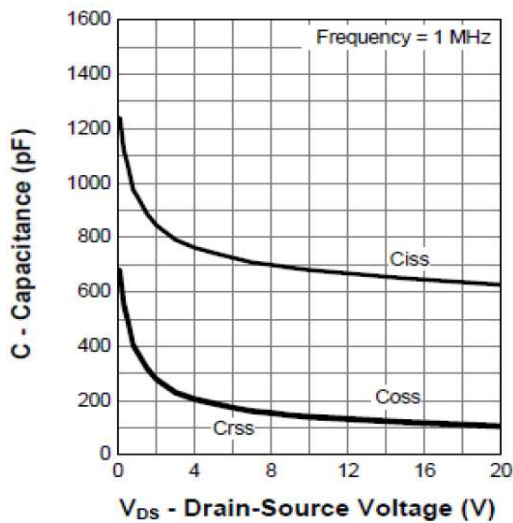


Fig.11 Capacitance

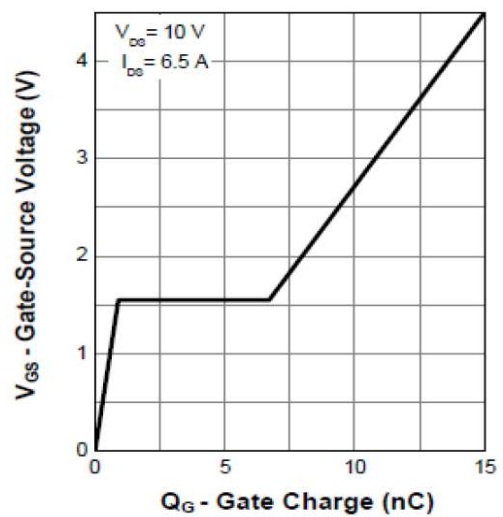


Fig.12 Gate Charge

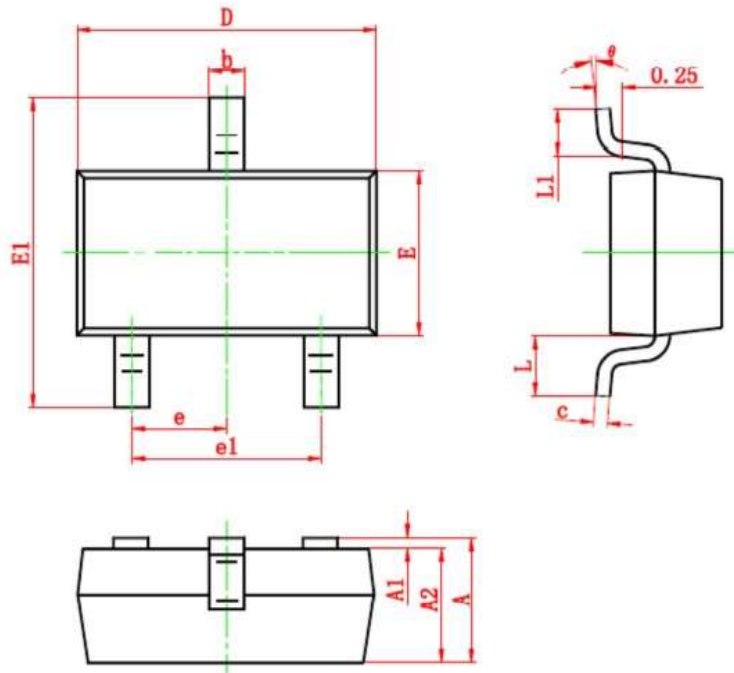


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Package Dimension

SOT-23



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.15	0.035	0.045
A1	0.00	0.10	0.000	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.08	0.15	0.003	0.006
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	TYP 0.95		TYP 0.037	
e1	1.80	2.00	0.071	0.079
L	REF 0.55		REF 0.022	
L1	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°