

FEATURES

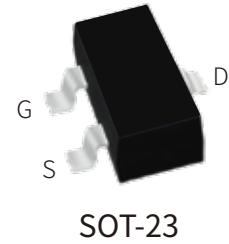
Ultra low on-resistance: $V_{DS}=20V, R_{DS(ON)} \leq 22m\Omega$

@ $V_{GS}=4.5V, I_D=6.5A$

For PWM application

For Load switch application

Surface Mount device

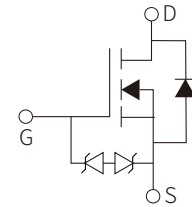


APPLICATION

Case: SOT-23

Case Material: Molded Plastic. UL flammability

Classification Rating: 94V-0



Schematic Symbol

APPROVALS

RoHS Compliance with 2011/65/EU

HF Compliance with IEC61249-2-21:2003

ABSOLUTE MAXIMUM RATINGS($T_a=25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Drain Current-Continuous	I_D	6.5	A
Drain Current-Continuous	I_D	5.2	A
Pulsed Drain Voltage	I_{DM}	30	A
Gate-Source Voltage	V_{GS}	± 8	V
Total Power Dissipation	P_D	1.40	W
Total Power Dissipation	P_D	0.9	W
Thermal resistance from Junction to ambient	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction temperature	T_J	150	$^\circ\text{C}$
Storage temperature	T_{STG}	-55 to 150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS(T_a=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-source Breakdown Voltage*	BV _{DSS}	V _{GS} =0V, I _D =250μA	20			V
Zero Gate Voltage Drain Current*	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate-Body Leakage*	I _{GSS}	V _{GS} =±8V, V _{DS} =0V			±10	μA
Gate Threshold Voltage*	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.4	0.7	1.1	V
Static Drain-Source On-Resistance*	R _{DS(on)}	V _{GS} =4.5V, I _D =6.5A		16	22	mΩ
		V _{GS} =2.5V, I _D =5.5A		18	26	
		V _{GS} =1.8V, I _D =5A		21	34	
On-State Drain Current	I _{D(on)}	V _{DS} =5V, V _{GS} =4.5V	30			A
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =6.5A		50		S
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.8		kΩ
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1.0MHz		1295	1650	pF
Output Capacitance	C _{oss}			160		
Reverse Transfer Capacitance	C _{rss}			87		
Turn-On Delay Time	t _{d(on)}	V _{GS} =4.5V, R _L =1.54Ω V _{DS} =10V, R _{GEN} =3Ω		280		ns
Turn-On Rise Time	t _r			328		
Turn-Off Delay Time	t _{d(off)}			3.78		
Turn-Off Fall Time	t _f			2.24		
Diode forward voltage	V _{SD}	I _S =1A, V _{GS} =0V		0.62	1	V
Total Gate Charge	Q _g	V _{GS} =4.5V, V _{DS} =10V, I _D =6.5A		10		nC
Gate Source Charge	Q _{gs}			4.2		
Gate Drain Charge	Q _{gd}			2.6	1	
Diode forward current	I _S				2	A
Body Diode Reverse Recovery Time	t _{rr}	I _F =6.5A, di/dt=100A/us		31	41	ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =6.5A, di/dt=100A/us		6.8		nC

*Pulse test ; Pulse width ≤300μs, Duty cycle ≤ 0.5%

PARAMETER CHARACTERISTIC CURVE

Fig 1: On-Region Characteristics

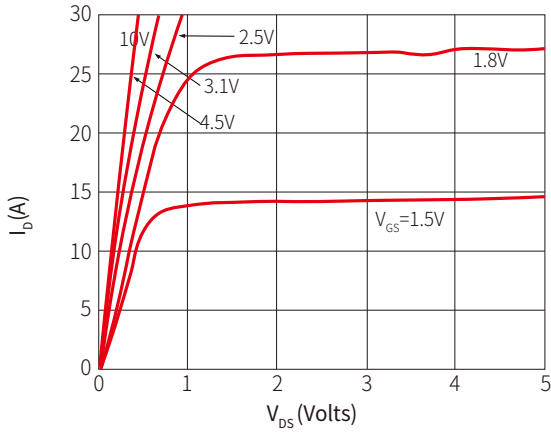


Figure 2: Transfer Characteristics

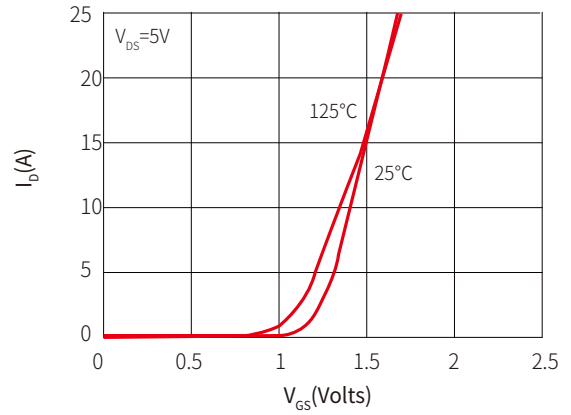


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

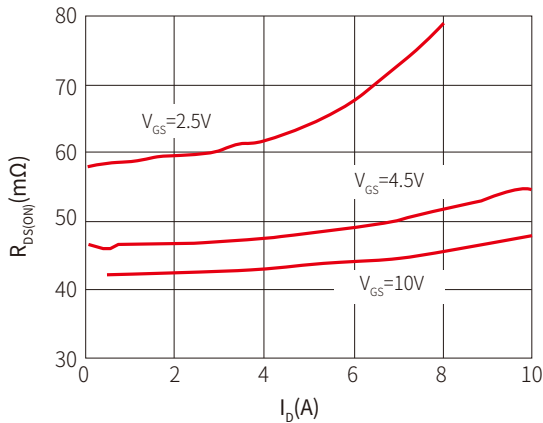


Figure 4: On-Resistance vs. Junction Temperature

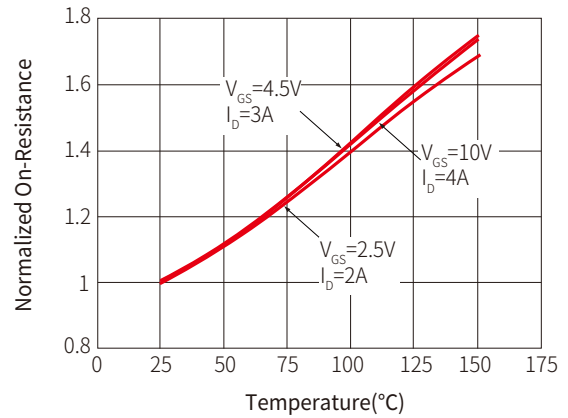


Figure 5: On-Resistance vs. Gate-Source Voltage

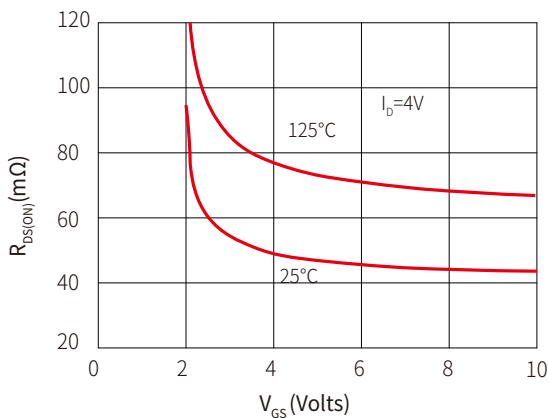


Figure 6: Body-Diode Characteristics

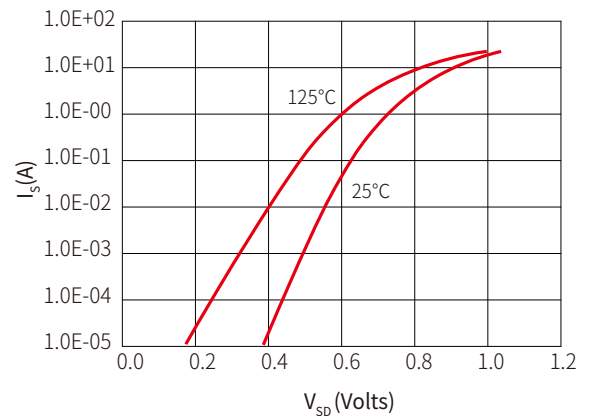


Figure 7: Gate-Charge Characteristics

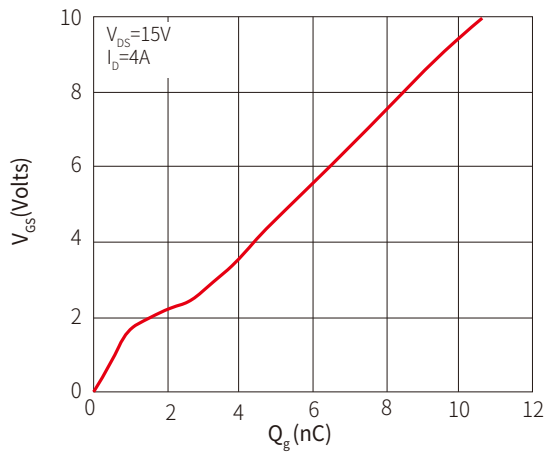


Figure 8: Capacitance Characteristics

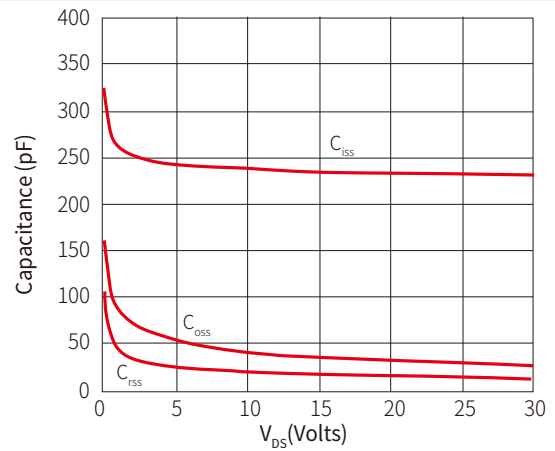


Figure 9: Maximum Forward Biased Safe Operating Area

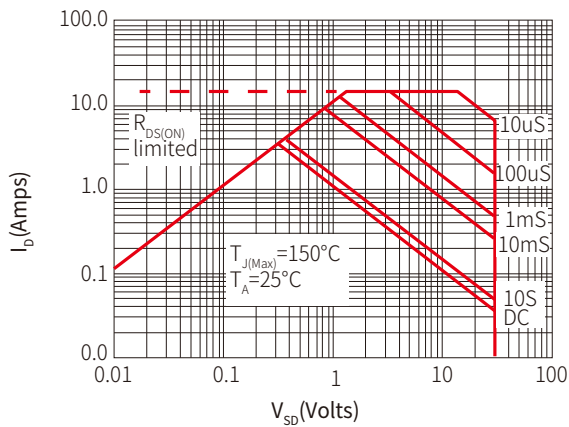


Figure 10: Single Pulse Power Rating Junction-to-Ambient

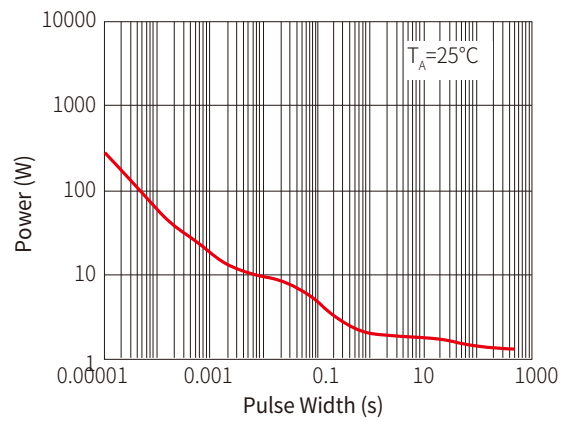


Figure 11: Normalized Maximum Transient Thermal Impedance

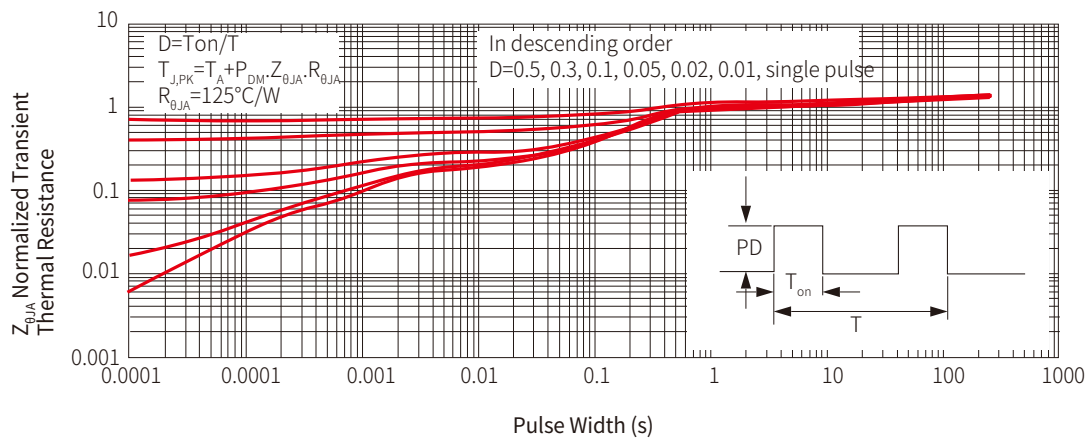


Figure 12: Gate Charge Test Circuit & Waveform

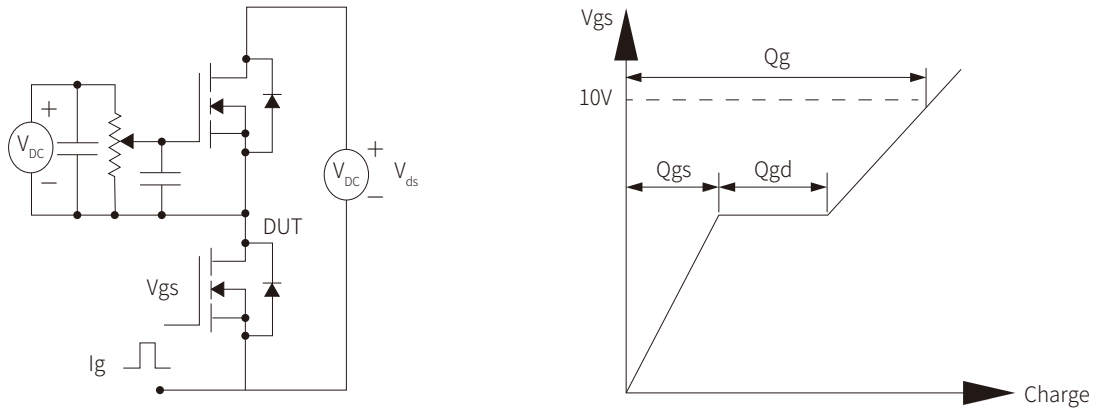


Figure 13: Resistive Switching Test Circuit & Waveforms

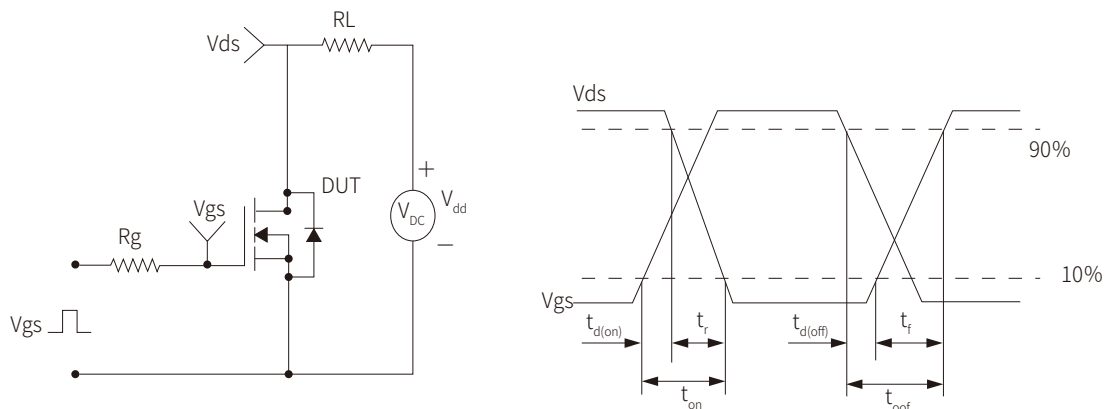
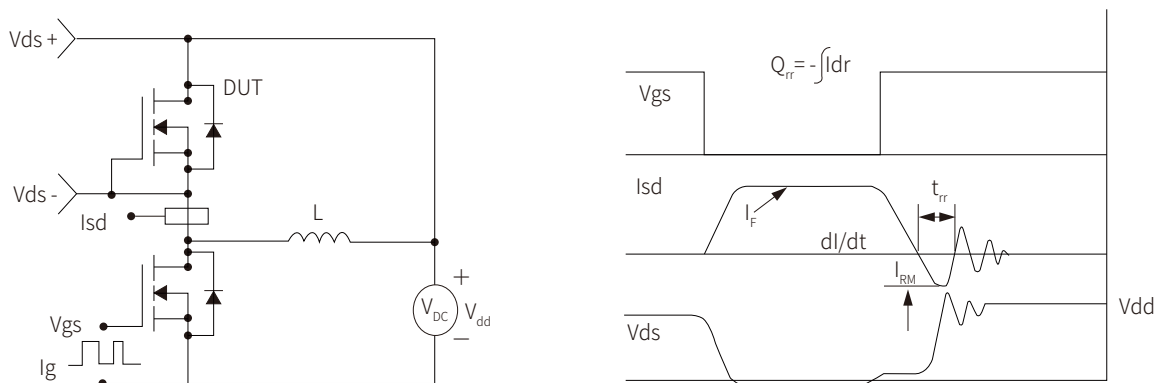
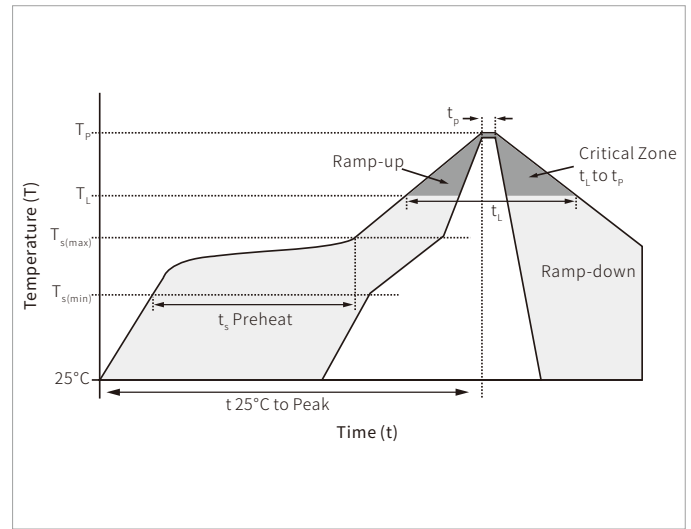


Figure 14: Diode Recovery Test Circuit & Waveforms

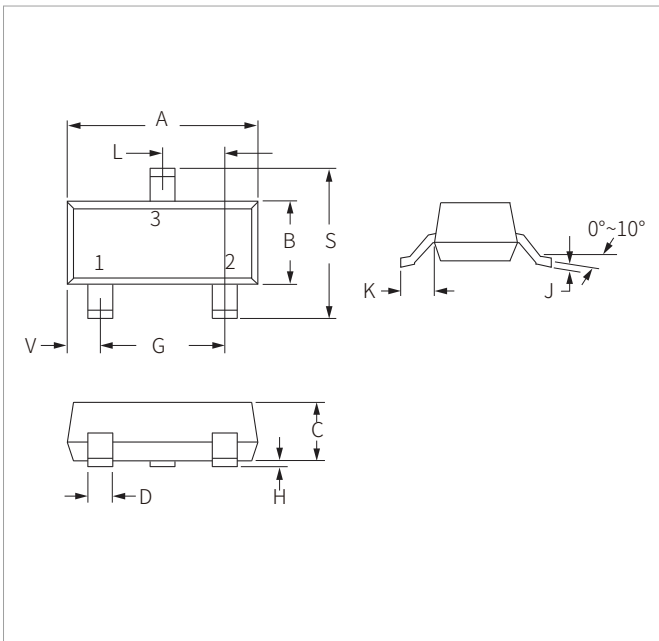


SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Time (min to max) (t_L)	60 – 150 seconds
Peak Temperature (T_p)		260°C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes max.
Do not exceed		260°C

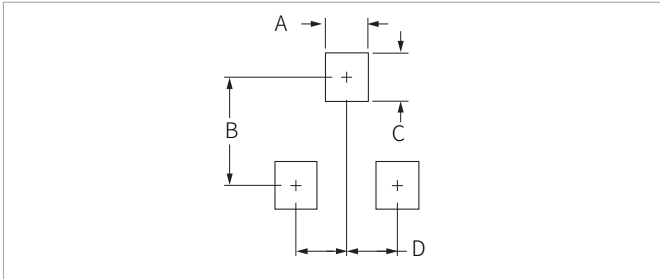


SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.05	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.90	1.15	0.035	0.045
D	0.37	0.50	0.015	0.020
G	1.75	2.05	0.069	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.65	0.083	0.104
V	0.45	0.60	0.018	0.024

RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SNM3402S	SOT-23	3000PCS	7"

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