

FEATURES

| $V_{DS}=20V, R_{DS(ON)} \leq 21m\Omega @ V_{GS}=4.5V, I_D=6.3A$

| Fast switching

| Ultra Low On-Resistance

| Surface Mount device

APPLICATION

| Case: SOT-23

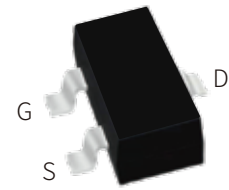
| Case Material: Molded Plastic. UL flammability

| Classification Rating: 94V-0

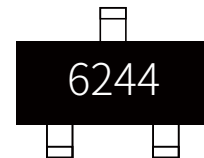
APPROVALS

RoHS | Compliance with 2011/65/EU

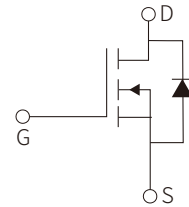
HF | Compliance with IEC61249-2-21:2003



SOT-23



Marking



Schematic Symbol

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	6.3	A
Drain Current-Continuous	I_D	5.1	A
Pulsed Drain Voltage	I_{DM}	32	A
Gate-Source Voltage	V_{GS}	± 12	V
Total Power Dissipation	P_D	1.3	W
Total Power Dissipation	P_D	0.8	W
Linear Derating Factor		0.01	W/°C
Thermal resistance from Junction to ambient	$R_{\theta JA}$	100	°C/W
Storage temperature	T_{STG}	-55 to 150	°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} =16V, V _{GS} =0V			1	μA
		V _{DS} =16V, V _{GS} =0V, T _j =125°C			150	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±12V, V _{DS} =0V			±100	nA
Gate Threshold Voltage (Note1)	V _{GS(th)}	V _{DS} =V _{GS} , I _D =10μA	0.5	0.9	1.1	V
Static Drain-Source On-Resistance(Note1)	R _{DS(on)}	V _{GS} =4.5V, I _D =6.3A		16	21	mΩ
		V _{GS} =2.5V, I _D =5.1A		22	27	
Forward Transconductance(Note1)	g _{FS}	V _{DS} =10V, I _D =6.3A	17			S
Gate resistance	R _g			1.7		Ω
Input Capacitance	C _{iss}	V _{DS} =16V, V _{GS} =0V, f=1.0MHz		700		pF
Output Capacitance	C _{oss}			140		
Reverse Transfer Capacitance	C _{rss}			98		
Turn-On Delay Time	t _{d(on)}	V _{GS} =4.5V, R _G =6.8Ω V _{DD} =10V, I _D =1A		4.9		ns
Turn-On Rise Time	t _r			7.5		
Turn-Off Delay Time	t _{d(off)}			19		
Turn-Off Fall Time	t _f			12		
Diode forward voltage (note 1)	V _{SD}	I _S =6.3A, V _{GS} =0V, T _j =25°C			1.2	V
Total Gate Charge	Q _g	V _{GS} =4.5V, V _{DS} =10V, I _D =6.3A		8.9		nC
Gate Source Charge	Q _{gs}			0.68		
Gate Drain Charge	Q _{gd}			4.4		
Diode forward current(Body Diode)	I _S	integral reverse p-n junction diode			1.3	A
Pulsed Source Current(Body Diode)	I _{SM}				32	A
Reverse Recovery Time	t _{rr}	I _F =1.3A, V _R =15V dI/dt=100A/us, T _j =25°C		12	18	ns
Reverse Recovery Charge	Q _{rr}			5.1	7.7	nC

Note:1. Pulse test ; Pulse width ≤400μs, Duty cycle ≤ 2%

PARAMETER CHARACTERISTIC CURVE

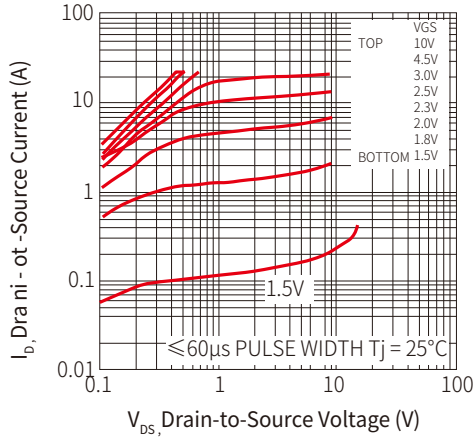
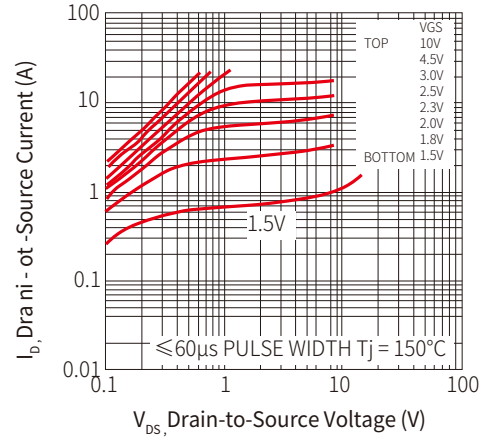
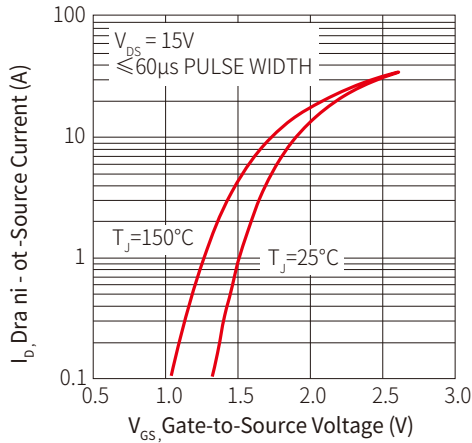
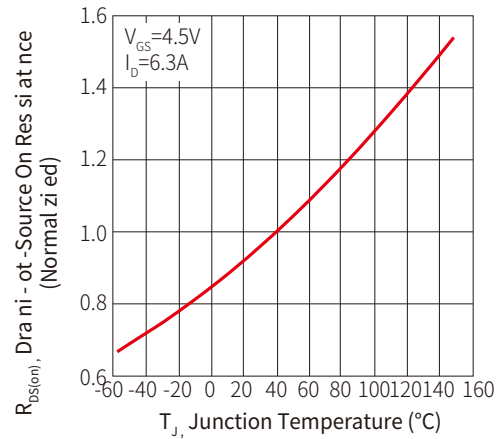
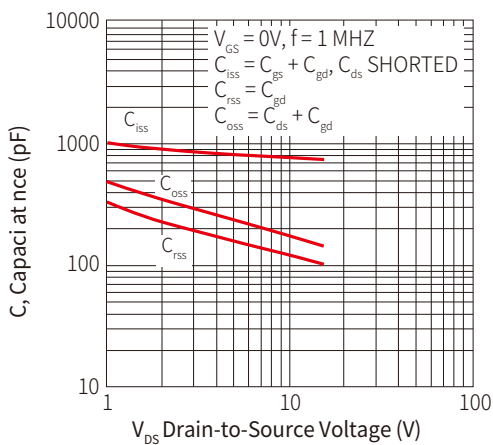
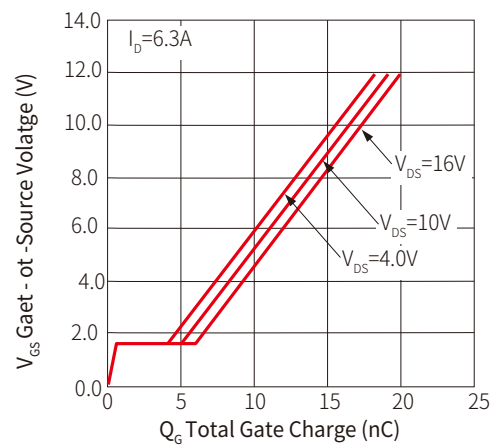
Fig 1: Typical Output Characteristics

Figure 2: Typical Output Characteristics

Figure 3: Typical Transfer Characteristics

Figure 4: Normalized On-Resistance Vs. Temperature

Figure 5: Typical Capacitance Vs. Drain-to-Source Voltage

Figure 6: Typical Gate Charge Vs. Gate-to-Source Voltage


Figure 7: Typical Source-Drain Diode Forward Voltage

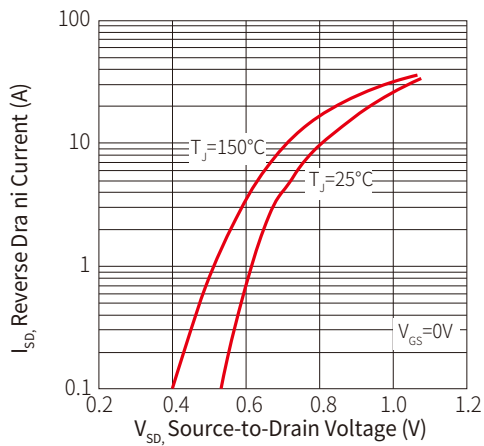


Figure 8: Maximum Safe Operating Area

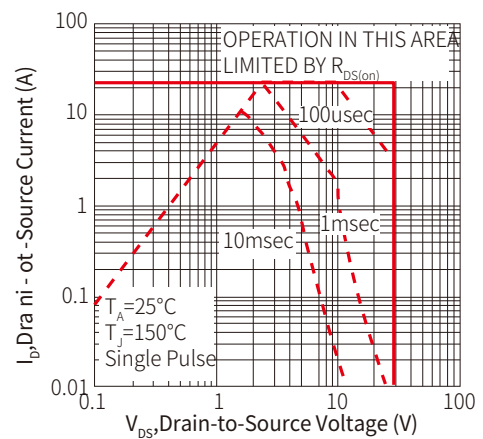


Figure 9: Maximum Drain Current Vs. Ambient Temperature

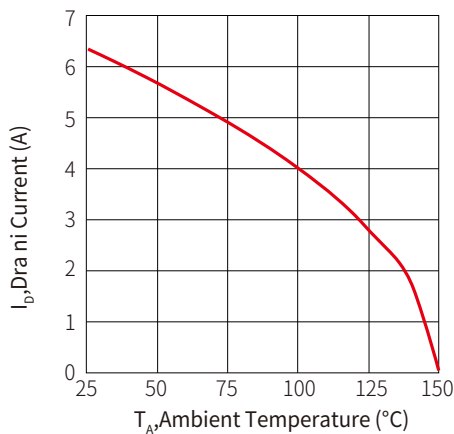


Figure 10: Typical On-Resistance Vs. Gate Voltage

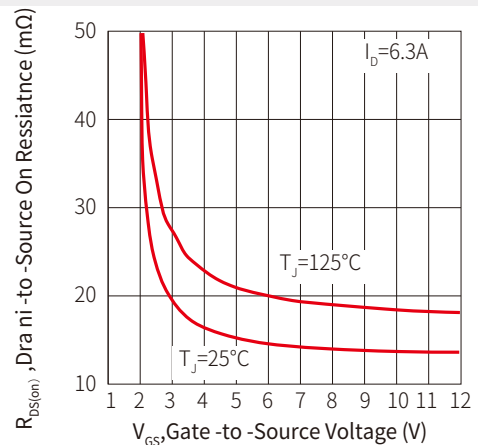


Figure 11: Typical On-Resistance Vs. Drain Current

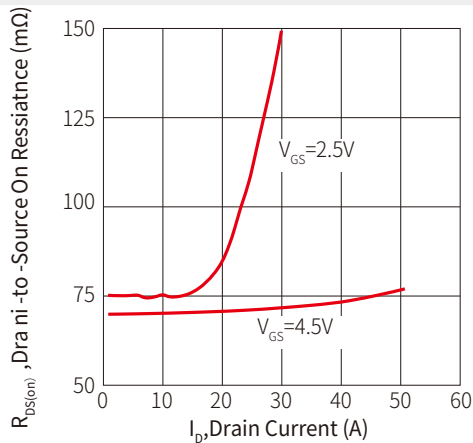


Figure 12: Typical Threshold Voltage Vs. Junction Temperature

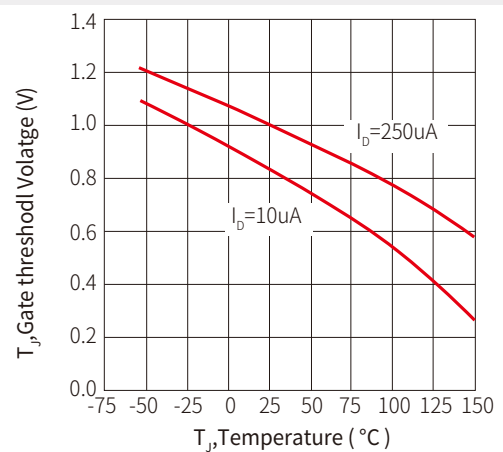


Figure 13: Typical Power Vs. Time

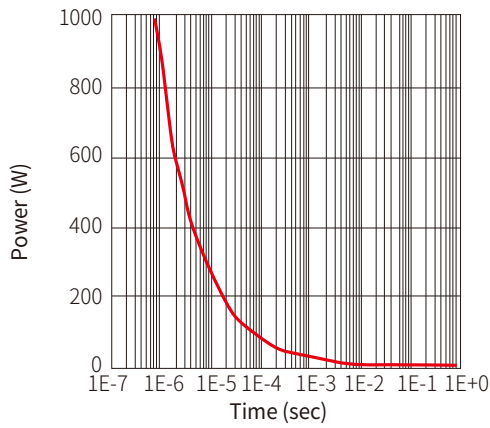


Figure 14: Typical Effective Transient Thermal Impedance, Junction-to-Ambient

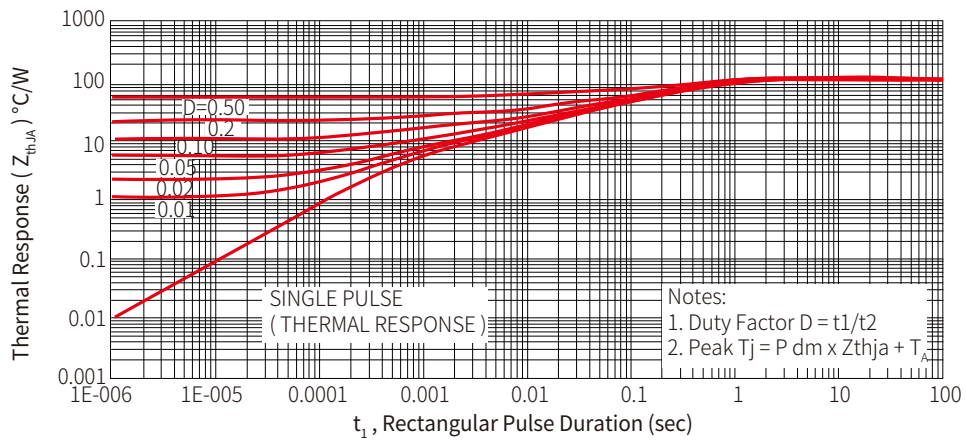


Figure 15: Switching Time Test Circuit & Waveforms

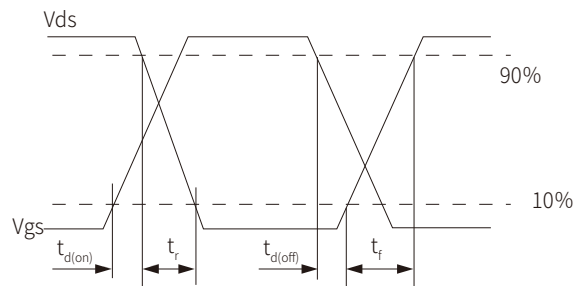
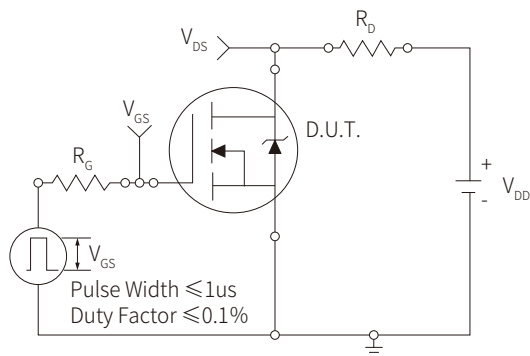
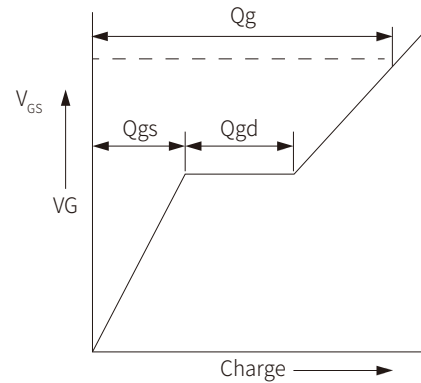
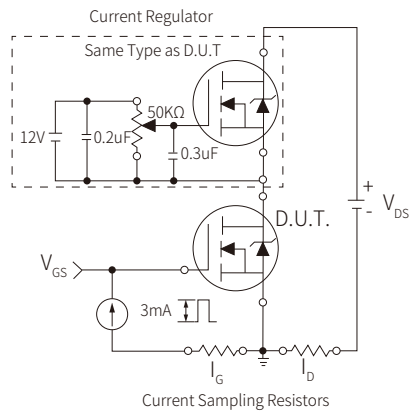
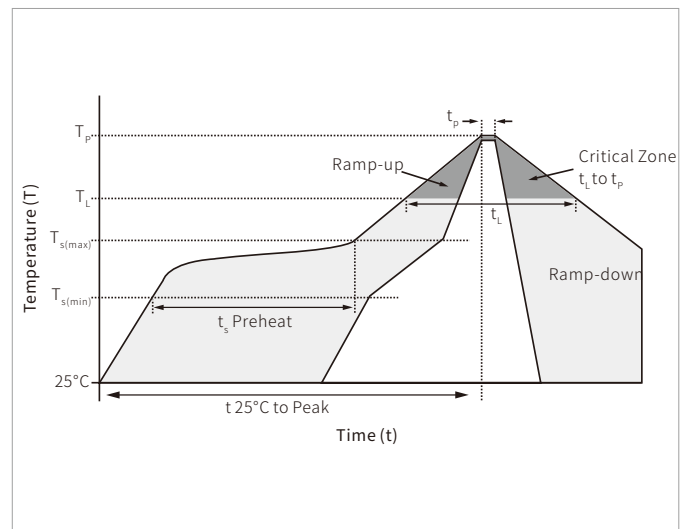


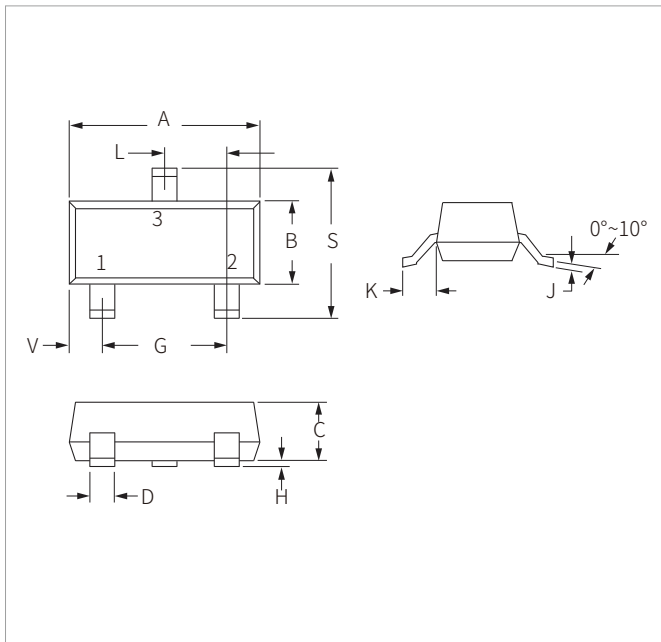
Figure 16: Basic Gate Charge Waveform & Test Circuit


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_r)	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

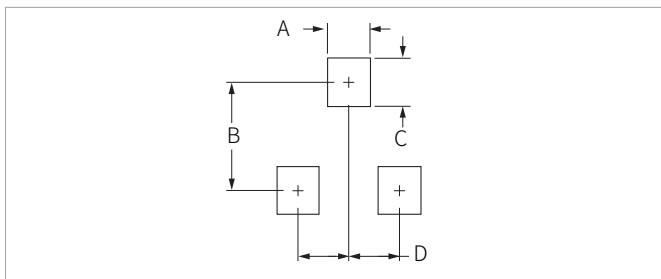


SOT-23 PACKAGE INFORMATION



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
SNM6244S	SOT-23	3000PCS	7"

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