

FEATURES

| $V_{DS}=30V, R_{DS(ON)} \leq 63m\Omega$ @ $V_{GS}=4.5V, I_D=3.4A$

| For PWM application

| For Load switch application

| Surface Mount device

APPLICATION

| Case: SOT-23

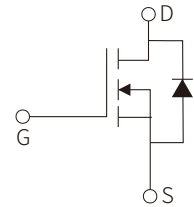
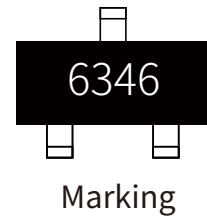
| Case Material: Molded Plastic. UL flammability

| Classification Rating: 94V-0

APPROVALS

RoHS Compliance with 2011/65/EU

HF Compliance with IEC61249-2-21:2003



Schematic Symbol

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Drain Current-Continuous	$T_A=25^\circ\text{C}$	I_D	3.4	A
Drain Current-Continuous	$T_A=70^\circ\text{C}$	I_D	2.7	A
Pulsed Drain Current		I_{DM}	17	A
Gate-Source Voltage		V_{GS}	± 12	V
Total Power Dissipation	$T_A=25^\circ\text{C}$	P_D	1.3	W
Total Power Dissipation	$T_A=70^\circ\text{C}$	P_D	0.8	W
Linear Derating Factor			0.01	W/ $^\circ\text{C}$
Thermal Resistance.Junction- to-Ambient (Note.1)		R_{thJA}	100	$^\circ\text{C}/\text{W}$
			99	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Note.1: Surface mounted on 1 in square Cu board

ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	Reference to $25^{\circ}\text{C}, I_D=1\text{mA}$		0.02		$V/^{\circ}\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$			1.0	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=10\mu A$	0.5	0.8	1.1	V
Static Drain-Source On-Resistance(Note1)	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3.4A$		46	63	m Ω
		$V_{GS}=2.5V, I_D=2.7A$		59	80	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=3.4A$	9.5			S
Input Capacitance	C_{iss}	$V_{DS}=24V, V_{GS}=0V, f=1.0\text{MHz}$		270		pF
Output Capacitance	C_{oss}			32		
Reverse Transfer Capacitance	C_{rss}			21		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=4.5V, R_G=6.8\Omega$ $V_{DS}=15V, I_D=1.0A$		3.3		ns
Turn-On Rise Time	t_r			4.0		
Turn-Off Delay Time	$t_{d(off)}$			12		
Turn-Off Fall Time	t_f			4.9		
Diode forward voltage	V_{SD}	$I_S=3.4A, V_{GS}=0V, T_J=25^{\circ}\text{C}$			1.2	V
Total Gate Charge	Q_g	$V_{GS}=4.5V, V_{DS}=15V, I_D=3.4A$		2.9		nC
Gate Source Charge	Q_{gs}			0.13		
Gate Drain Charge	Q_{gd}			1.1		
Diode forward current(Body Diode)	I_S	MOSFET symbol showing the integral rever p-n junction diod 			1.3	A
Pulsed Source Current(Body Diode)	I_{SM}				17	A
Reverse Recovery Time	t_{rr}	$I_F=1.3A, V_R=24V$ $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}, (\text{Note.1})$		8.8	13	ns
Reverse Recovery Charge	Q_{rr}			2.7	4.1	nC

Note.1: Pulse test ; Pulse width $\leq 400\mu s$, Duty cycle $\leq 2\%$

Note.2: Repetitive rating; pulse width limited by max. junction temperature.

PARAMETER CHARACTERISTIC CURVE

Fig 1: Typical Output Characteristics

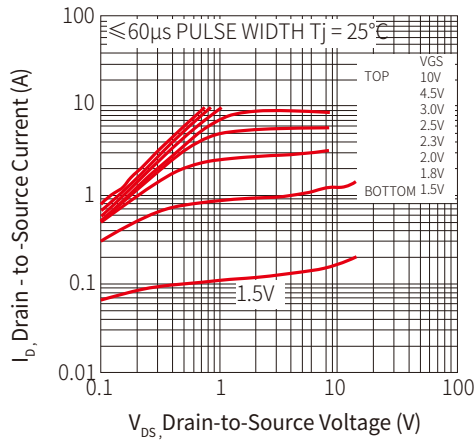


Figure 2: Typical Output Characteristics

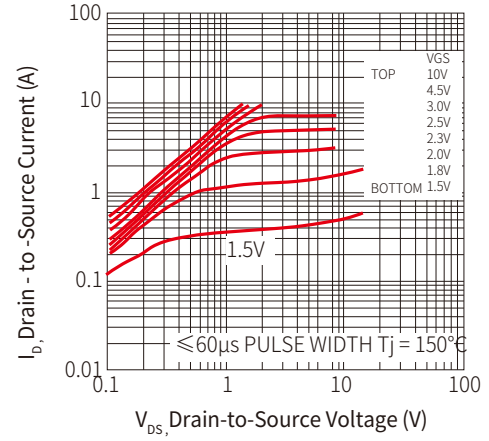


Figure 3: Typical Transfer Characteristics

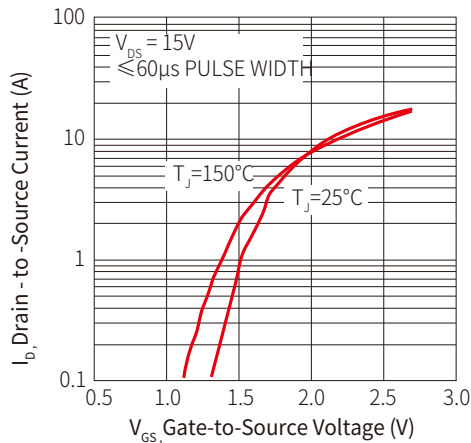


Figure 4: Normalized On-Resistance Vs. Temperature

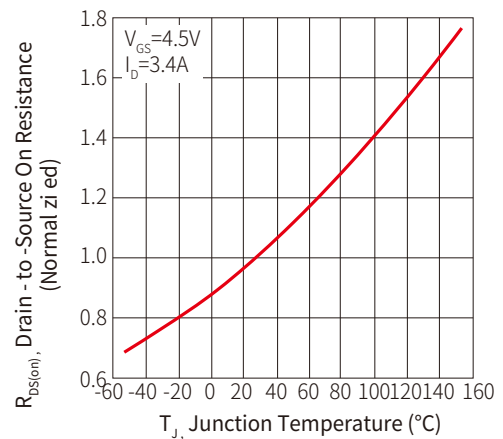


Figure 5: Typical Capacitance Vs. Drain-to-Source Voltage

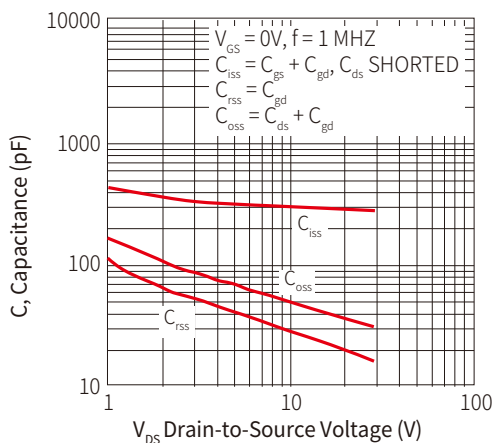


Figure 6: Typical Gate Charge Vs. Gate-to-Source Voltage

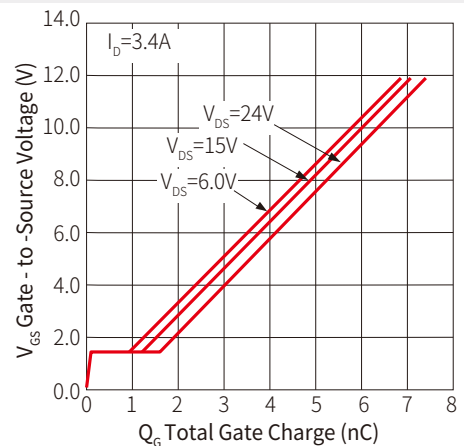


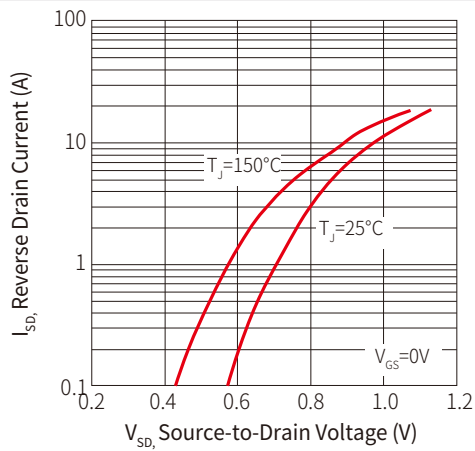
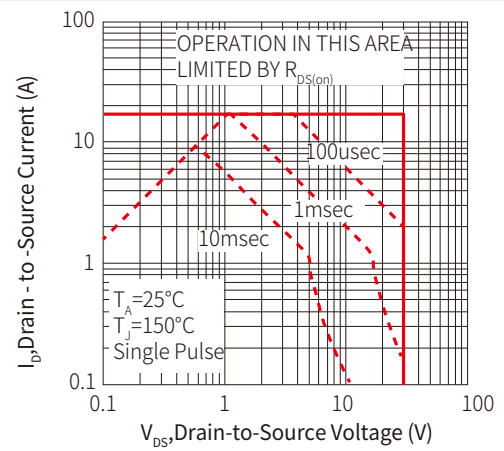
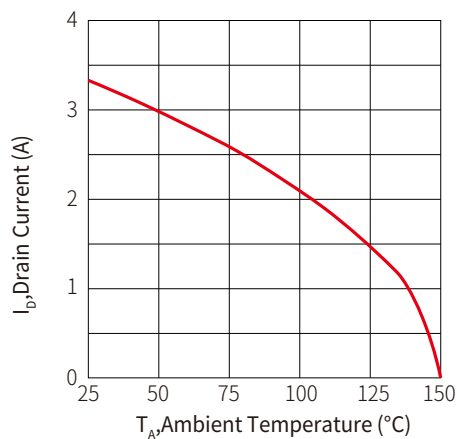
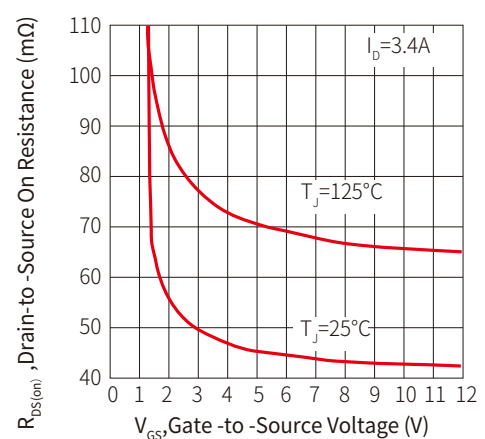
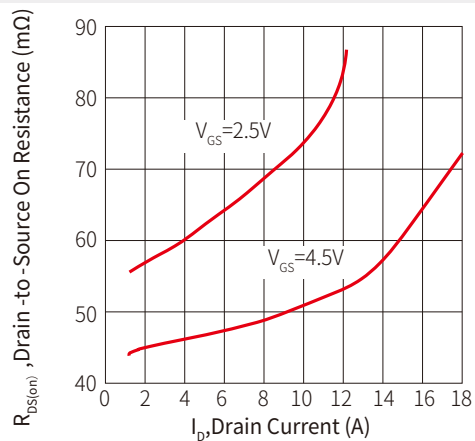
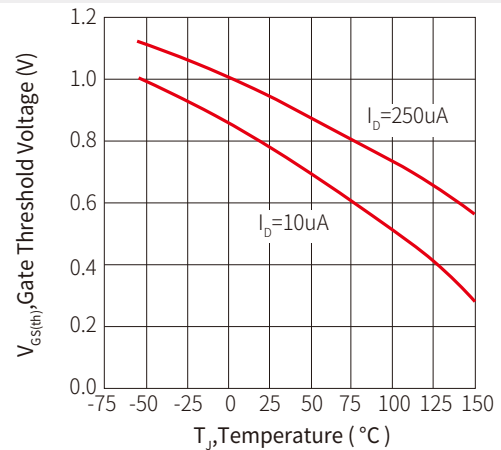
Figure 7: Typical Source-Drain Diode Forward Voltage

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


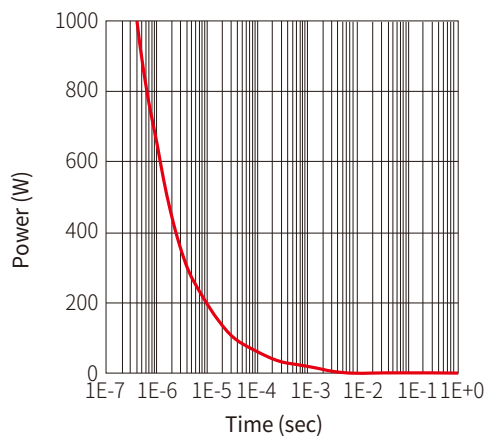
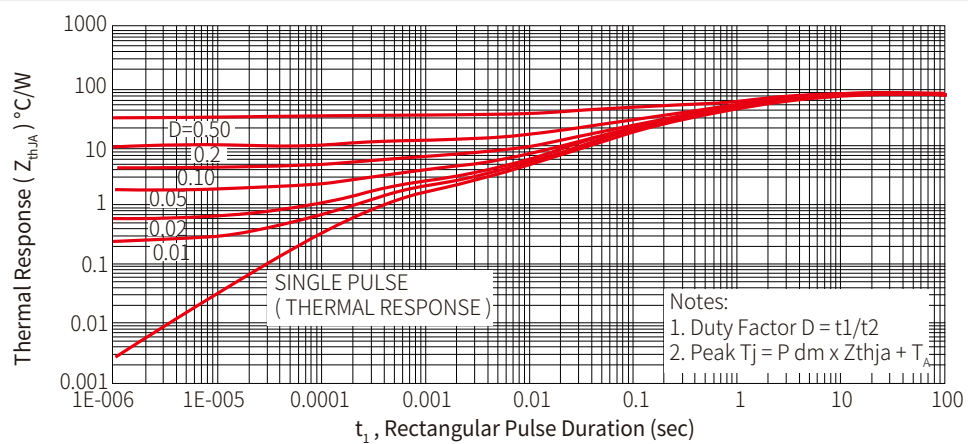
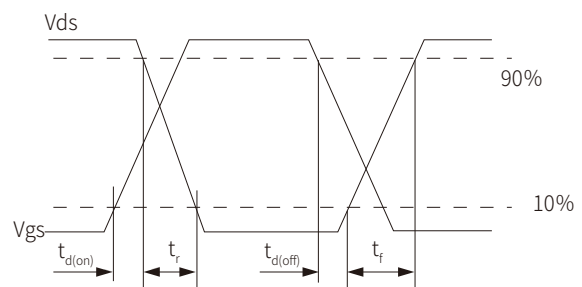
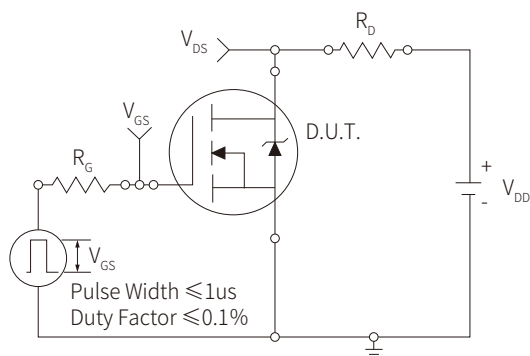
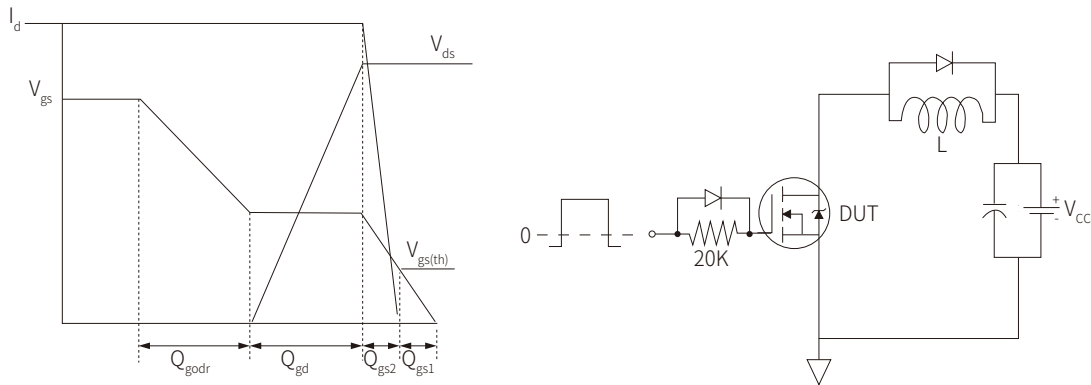
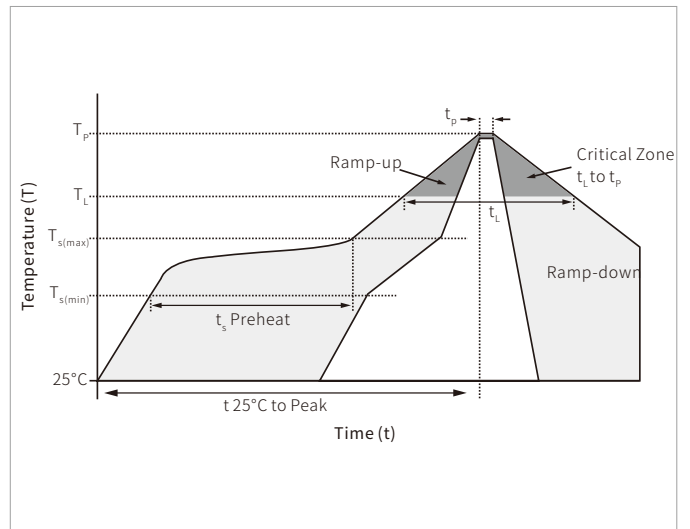
Figure 13: Typical Power Vs. Time

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

Figure 15: Switching Time Test Circuit & Waveforms


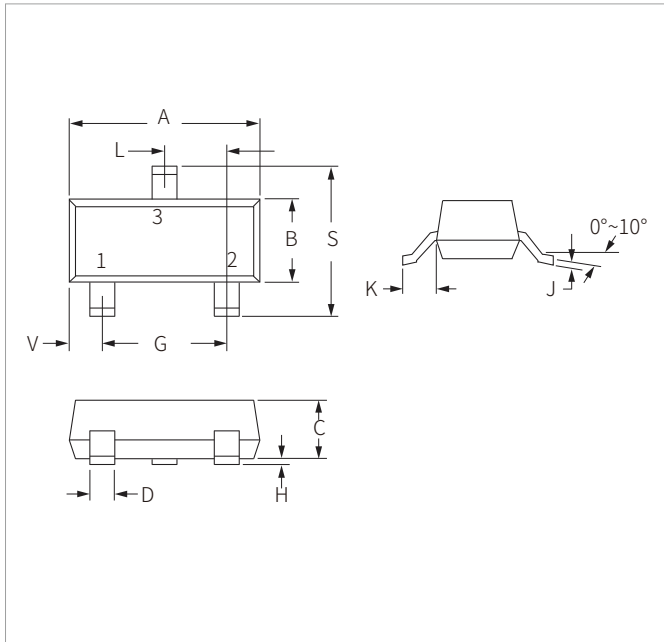
Figure 16: Basic Gate Charge Waveform & Test Circuit


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 _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

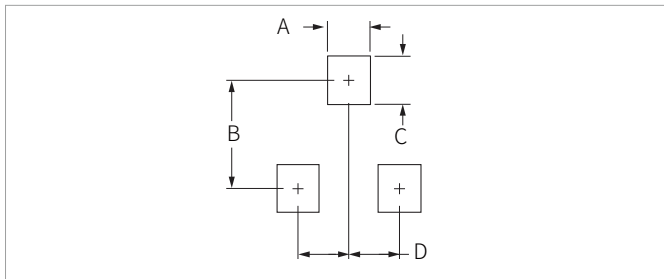


SOT-23 PACKAGE INFORMATION



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
SNM6346S	SOT-23	3000PCS	7"

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