

N-Channel Enhancement Mode MOSFET

Features

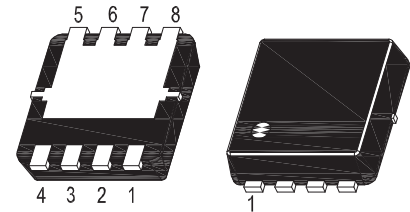
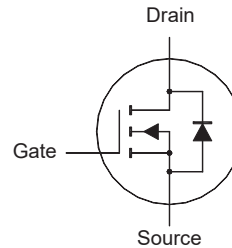
- Low Gate Charge
- Very Low $R_{DS(on)}$
- Halogen and Antimony Free(HAF), RoHS compliant

Application

- DC/DC Converters

Key Parameters

Parameter	Value	Unit
BV_{DSS}	30	V
$R_{DS(ON)}$ Max	4 @ $V_{GS} = 10\text{ V}$	m Ω
	6.8 @ $V_{GS} = 4.5\text{ V}$	
$V_{GS(th)}$ typ	1.7	V
Q_g typ	62 @ $V_{GS} = 10\text{ V}$	nC



1. Source 2. Source 3. Source 4. Gate
5. Drain 6. Drain 7. Drain 8. Drain
DFN3030 Plastic Package

Absolute Maximum Ratings(at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	60	A
		37.8	
Peak Drain Current, Pulsed ³⁾	I_{DM}	200	A
Drain Current-Continuous	I_{DSM}	21	A
		17	
Power Dissipation ²⁾	P_{tot}	31	W
		12	
Power Dissipation ¹⁾	P_{DSM}	3.1	W
		2	
Avalanche Current	I_{AS}	26.6	A
Avalanche Energy	E_{AS}	35.3	mJ
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance-Junction to Case	$R_{\theta JC}$	4	$^\circ\text{C/W}$
Thermal Resistance-Junction to Ambient ¹⁾ $t \leq 10\text{ s}$	$R_{\theta JA}$	40	$^\circ\text{C/W}$
Thermal Resistance-Junction to Ambient ^{1) 4)}	$R_{\theta JA}$	75	$^\circ\text{C/W}$

¹⁾ The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_a = 25^\circ\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} t \leq 10\text{ s}$ value and the maximum allowed junction temperature of 150°C .

²⁾ The power dissipation P_D is based on $T_{J(MAX)} = 150^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

³⁾ Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.

⁴⁾ The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250\ \mu\text{A}$	BV_{DSS}	30	-	-	V
Drain-Source Leakage Current at $V_{DS} = 30\ \text{V}$	I_{DSS}	-	-	1	μA
Gate-Source Leakage Current at $V_{GS} = \pm 20\ \text{V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	1.2	-	2.2	V
Drain-Source On-State Resistance at $V_{GS} = 10\ \text{V}$, $I_D = 20\ \text{A}$ at $V_{GS} = 4.5\ \text{V}$, $I_D = 16\ \text{A}$	$R_{DS(on)}$	- -	- -	4 6.8	$\text{m}\Omega$
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5\ \text{V}$, $I_D = 20\ \text{A}$	g_{FS}	-	40	-	S
Gate Resistance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	R_g	-	1	3	Ω
Input Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 15\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}	-	3520	-	pF
Output Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 15\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}	-	459	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 15\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}	-	420	-	pF
Gate Charge Total at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 10\ \text{V}$ at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_g	- -	62 31	- -	nC
Gate to Source Charge at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gs}	-	9	-	nC
Gate to Drain Charge at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gd}	-	13	-	nC
Turn-On Delay Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 15\ \text{V}$, $R_L = 0.75\ \Omega$, $R_{GEN} = 3\ \Omega$	$t_{d(on)}$	-	7	-	ns
Turn-On Rise Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 15\ \text{V}$, $R_L = 0.75\ \Omega$, $R_{GEN} = 3\ \Omega$	t_r	-	8.3	-	ns
Turn-Off Delay Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 15\ \text{V}$, $R_L = 0.75\ \Omega$, $R_{GEN} = 3\ \Omega$	t_{off}	-	24	-	ns
Turn-Off Fall Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 15\ \text{V}$, $R_L = 0.75\ \Omega$, $R_{GEN} = 3\ \Omega$	t_f	-	10	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S = 1\ \text{A}$, $V_{GS} = 0\ \text{V}$	V_{SD}	-	-	1	V
Body-Diode Continuous Current	I_S	-	-	60	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	200	A

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

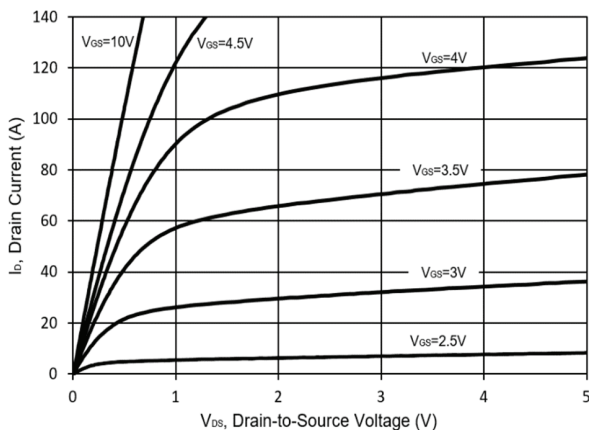


Fig. 2 Typical Transfer Characteristics

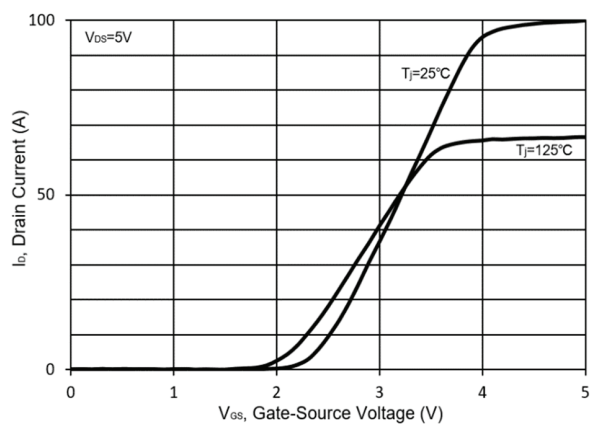


Fig. 3 on-Resistance vs. Gate to Source Voltage

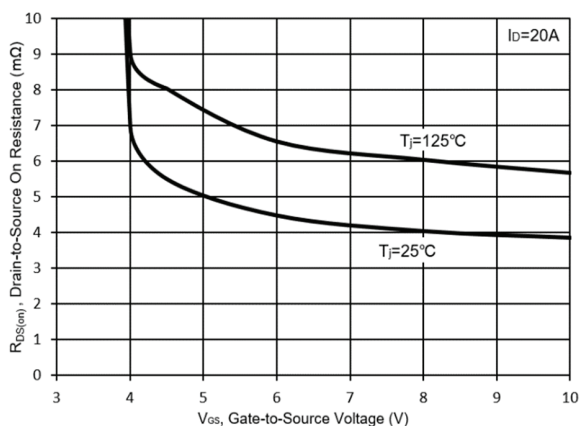


Fig. 4 on-Resistance vs. T_J

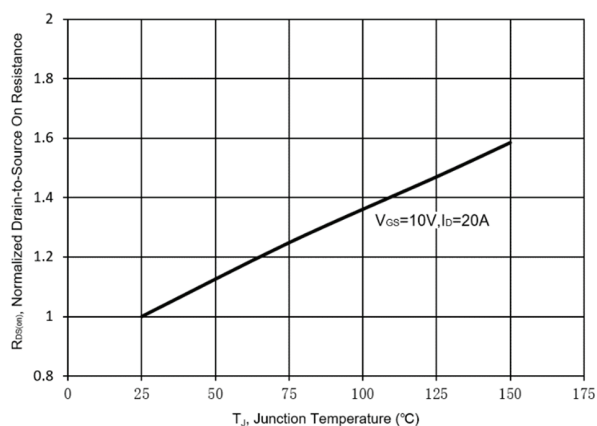


Fig. 5 Drain Source vs. on-Resistance

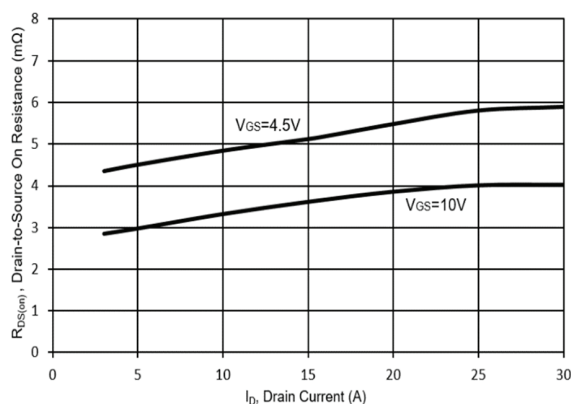
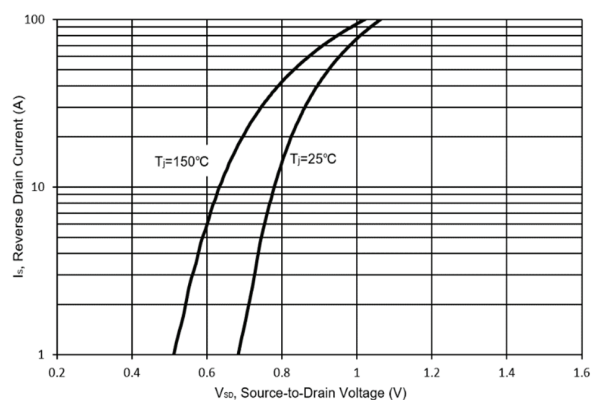


Fig. 6 Typical Body Diode Forward Characteristics



Test Circuits

Fig.1-1 Switching times test circuit

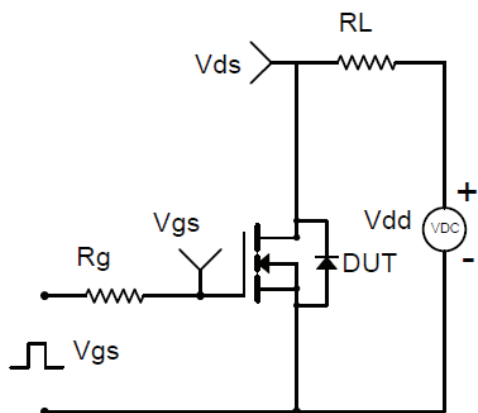


Fig.1-2 Switching Waveform

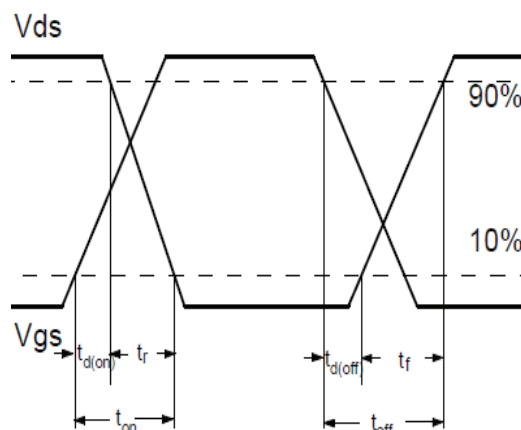


Fig.2-1 Gate charge test circuit

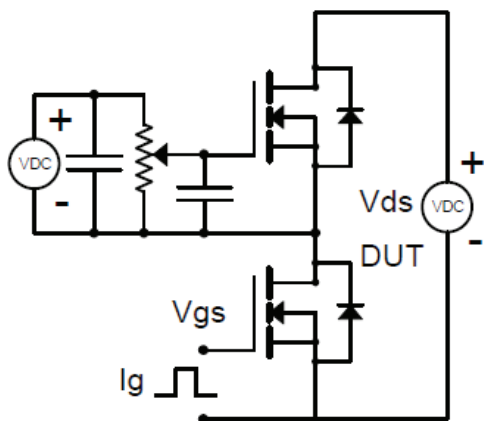


Fig.2-2 Gate charge waveform

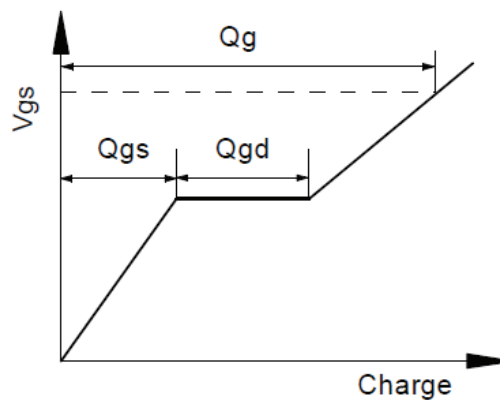


Fig.3-1 Avalanche test circuit

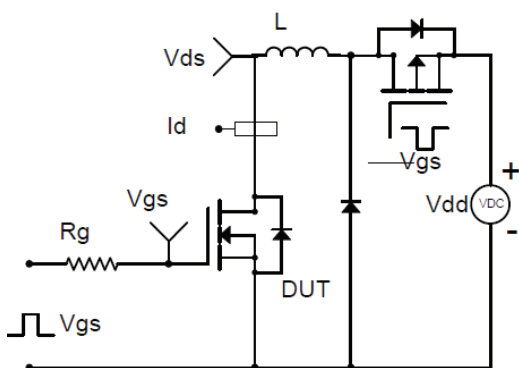
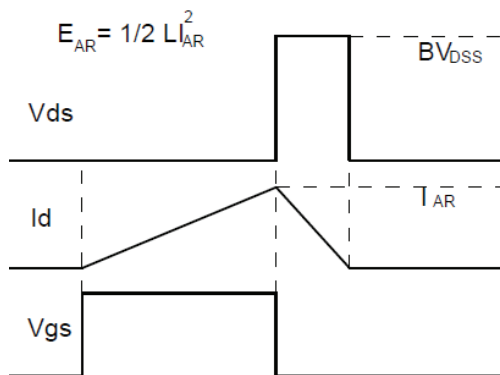
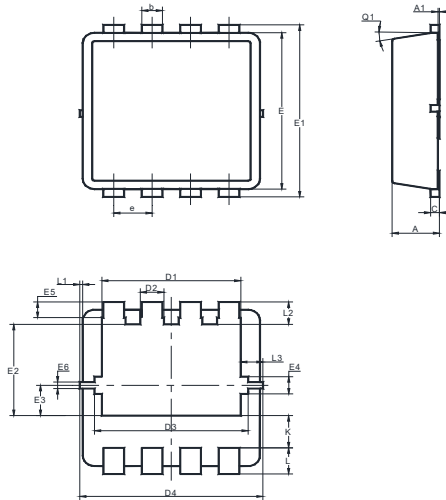


Fig.3-2 Avalanche waveform



Package Outline Dimensions (Units: mm)

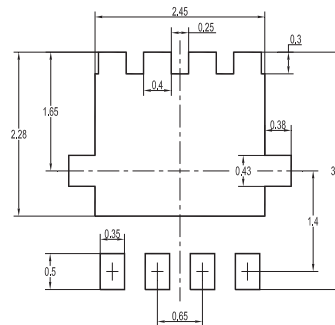
DFN3030



UNIT	A	A1	b	c	D1	D2	D3	D4	E	E1	E2	E3	E4
mm	0.9	0.05	0.35	0.25	2.6	0.5	2.7	3.2	3.1	3.3	1.85	0.68	0.43
	0.7	0	0.24	0.1	2.4	0.3	2.5	3	2.9	3.1	1.65	0.48	0.23

UNIT	E5	E6	e	K	L	L1	L2	L3	θ1
mm	0.4	0.25	0.7	0.72	0.5	0.1	0.53	0.475	12°
	0.2	0.15	0.6	0.52	0.3	0	0.33	0.275	0°

Recommended Soldering Footprint



Packing information

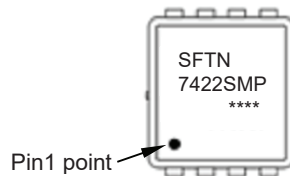
Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
DFN3030	12	8 ± 0.1	0.315 ± 0.004	330	13	5,000

Marking information

" SFTN7422SMP " = Part No.

" **** " = Date Code Marking

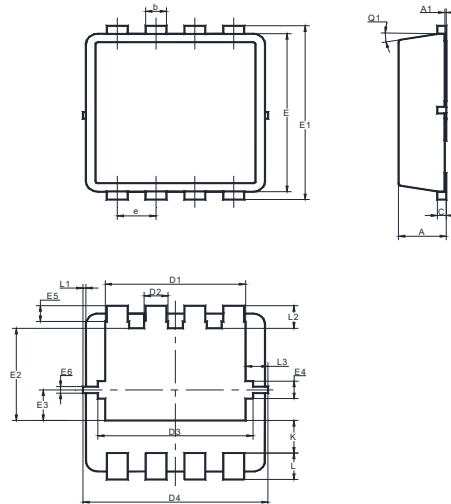
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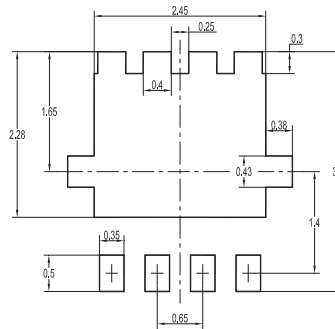
DFN3030



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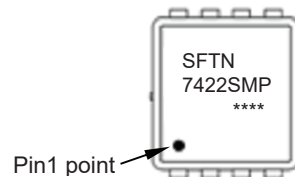
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