

RoHS Compliant Product
A suffix of "-C" specifies halogen and lead-free

FEATURES

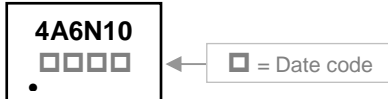
The SDT4A6N10ESV-C is the Shielded Gate Technology N-Ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SDT4A6N10ESV-C meet the RoHS and Green Product requirement with full function reliability approved.

FEATURES

- Advanced High Cell Density Trench Technology
- Super Low Gate Charge
- Green Device Available
- ESD Protection

MARKING



PACKAGE INFORMATION

Package	MPQ	Leader Size
DFN2x2-6J	3K	7 inch

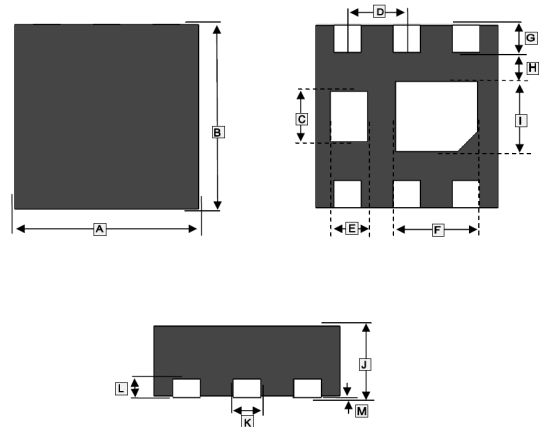
ORDER INFORMATION

Part Number	Type
SDT4A6N10ESV-C	Lead (Pb)-free and Halogen-free

ABSOLUTE MAXIMUM RATINGS

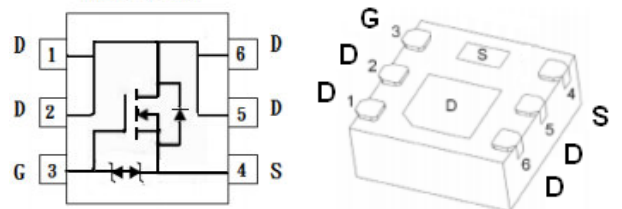
Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹ @ $V_{GS}=10V$	$T_C=25^\circ C$	13	A
	$T_A=25^\circ C$	4.6	
	$T_A=70^\circ C$	3.6	
Pulsed Drain Current ³	I_{DM}	35	A
Total Power Dissipation	$T_C=25^\circ C$	19.2	W
	$T_A=25^\circ C$	2	
Operating Junction & Storage Temperature Range	T_J, T_{STG}	-55~150	$^\circ C$
Thermal Resistance Ratings			
Thermal Resistance from Junction-Case ¹	$R_{\theta JC}$	6.5	$^\circ C/W$
Thermal Resistance from Junction-Ambient ¹	$R_{\theta JA}$	62.5	
Thermal Resistance from Junction-Ambient ²		165	

DFN2x2-6J



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.924	2.076	H	0.20	-
B	1.924	2.076	I	0.85	1.05
C	0.46	0.66	J	0.70	0.90
D	0.65 TYP.		K	0.20	0.40
E	0.20	0.40	L	0.203 REF	
F	0.80	1.00	M	0.00	0.05
G	0.174	0.326			

Top View



ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	BV_{DSS}	100	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$	
Gate-Threshold Voltage	$V_{GS(th)}$	2.2	-	4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 10	μA	$V_{GS}=\pm 20\text{V}$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	1	μA	$V_{DS}=80\text{V}, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	10		
Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	45	59	m Ω	$V_{GS}=10\text{V}, I_D=4.6\text{A}$	
		-	60	75		$V_{GS}=6\text{V}, I_D=3.5\text{A}$	
Total Gate Charge	Q_g	-	6.6	-	nC	$I_D=4.6\text{A}$ $V_{DS}=50\text{V}$ $V_{GS}=10\text{V}$	
Gate-Source Charge	Q_{gs}	-	1.8	-			
Gate-Drain Charge	Q_{gd}	-	2.1	-			
Turn-on Delay Time	$T_{d(on)}$	-	5.5	-	nS	$V_{DD}=50\text{V}$ $V_{GS}=10\text{V}$ $I_D=4.6\text{A}$ $R_G=3.3\Omega$	
Rise Time	T_r	-	22.5	-			
Turn-off Delay Time	$T_{d(off)}$	-	8.5	-			
Fall Time	T_f	-	18.5	-			
Input Capacitance	C_{iss}	-	336	-	pF	$V_{GS}=0$ $V_{DS}=50\text{V}$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	82	-			
Reverse Transfer Capacitance	C_{rss}	-	5	-			
Source-Drain Diode Characteristics							
Continuous Source Current ¹	I_S	-	-	4.6	A		
Pulsed Source Current ³	I_{SM}	-	-	35			
Forward on Voltage ⁴	V_{SD}	-	-	1.2	V	$I_S=1\text{A}, V_{GS}=0$	
Reverse Recovery Time	t_{rr}	-	30	-	nS	$I_F=4.6\text{A}, di/dt=100\text{A}/\mu\text{s}$	
Reverse Recovery Charge	Q_{rr}	-	30	-	nC	$T_J=25^\circ\text{C}$	

Notes:

- Surface Mounted on 2"x2" FR-4 Board with 2oz copper.
- When mounted on minimum pad of 2oz copper.
- Pulse width limited by maximum junction temperature, Pulse Width $\leq 100\mu\text{s}$, Duty Cycle $\leq 1\%$.
- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

CHARACTERISTIC CURVE

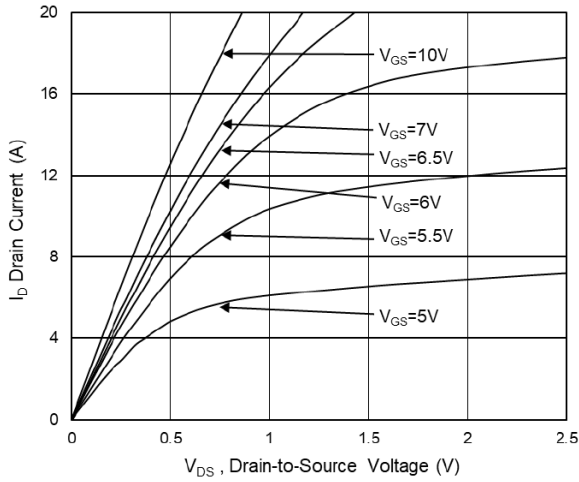


Fig.1 Typical Output Characteristics

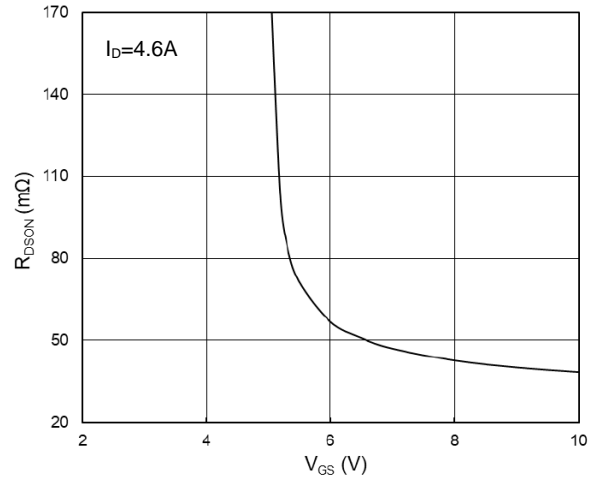


Fig.2 On-Resistance vs G-S Voltage

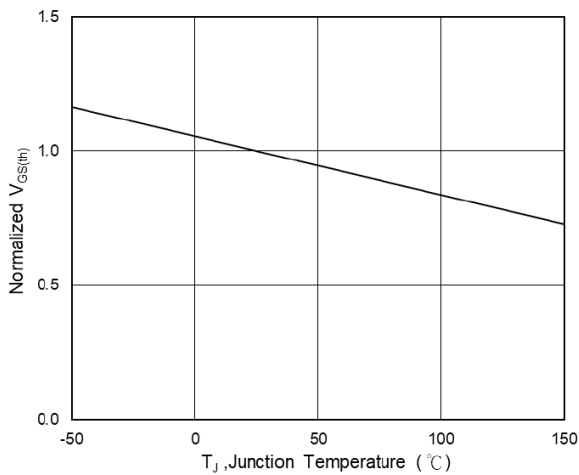


Fig.5 Normalized $V_{GS(th)}$ vs T_J

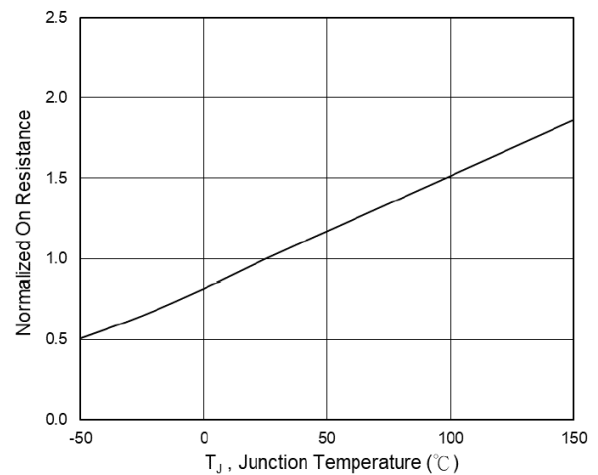


Fig.6 Normalized $R_{DS(ON)}$ vs T_J

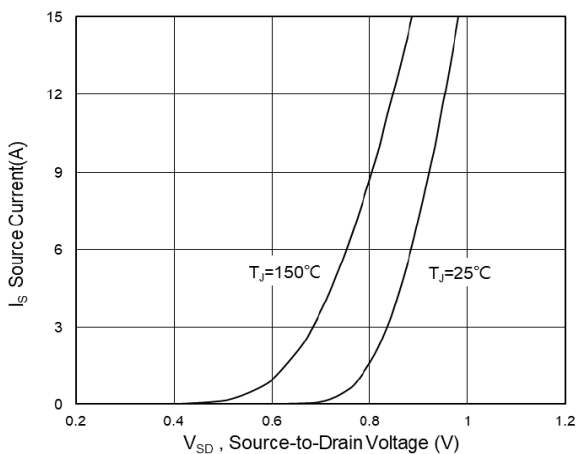


Fig.3 Source Drain Forward Characteristics

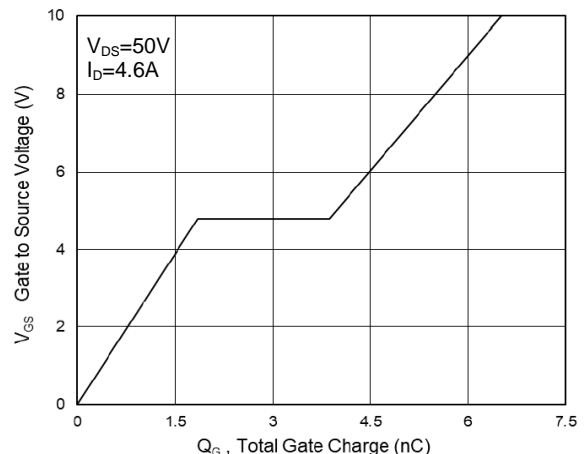


Fig.4 Gate-Charge Characteristics

CHARACTERISTIC CURVE

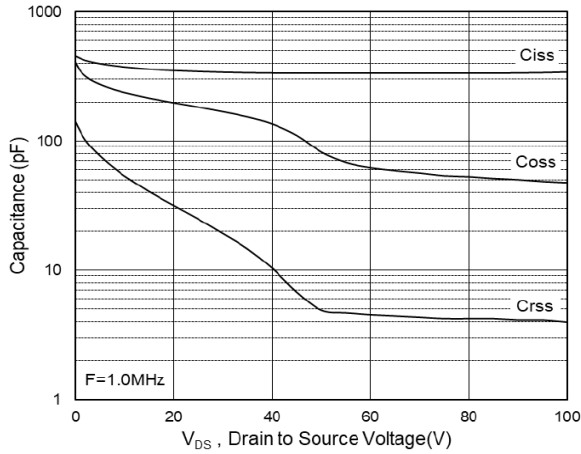


Fig.7 Capacitance

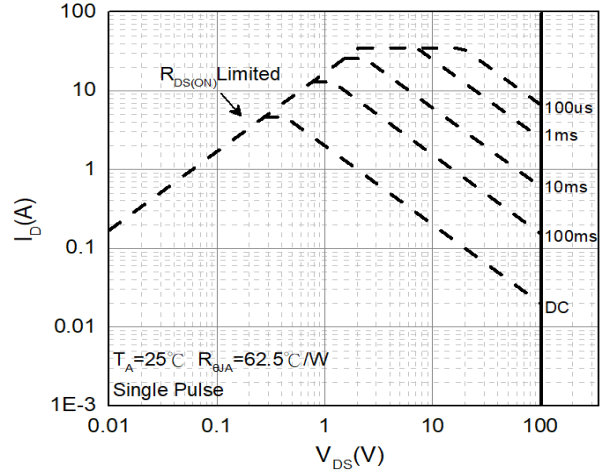


Fig.8 Safe Operating Area

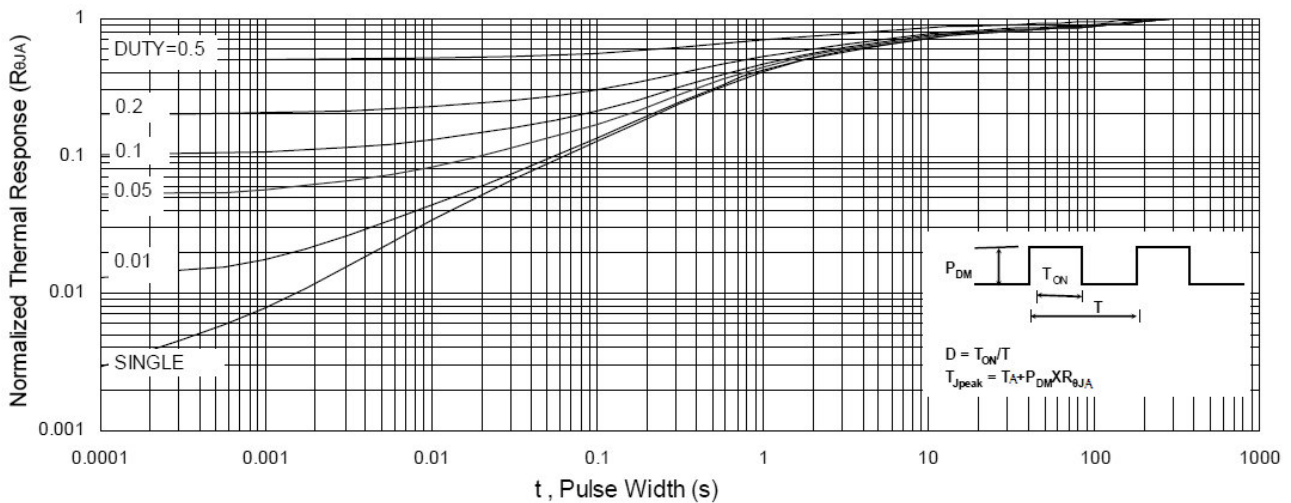


Fig.9 Normalized Maximum Transient Thermal Impedance

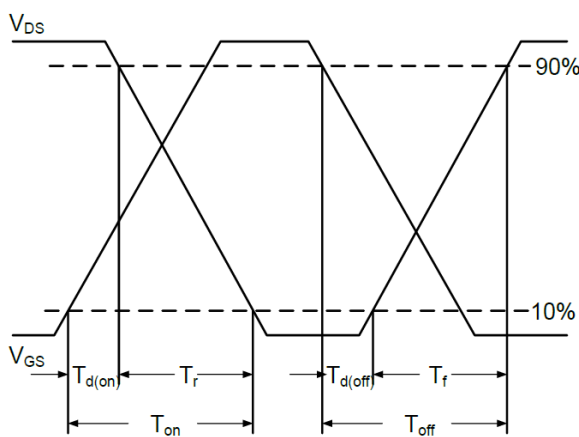


Fig.10 Switching Time Waveform

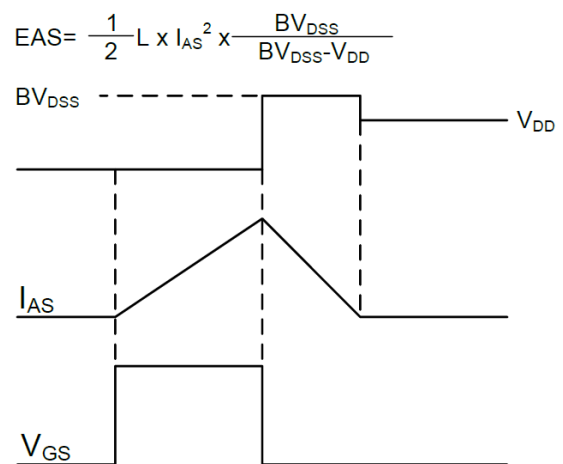


Fig.11 Unclamped Inductive Waveform