

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

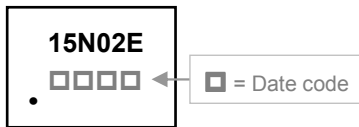
**DESCRIPTION**

The SDT15N02E-C is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent R<sub>DS(ON)</sub> and gate charge for most of the synchronous buck converter applications. The SDT15N02E-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**



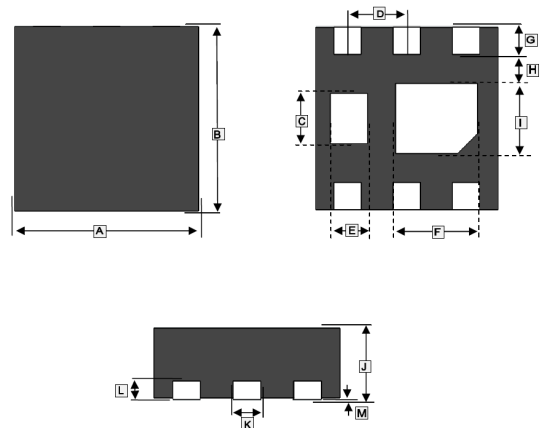
**PACKAGE INFORMATION**

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

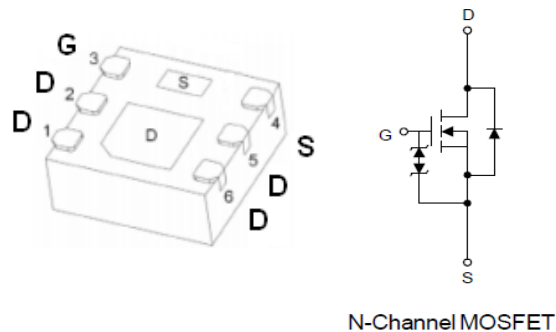
**ORDER INFORMATION**

Part Number	Type
SDT15N02E-C	Lead (Pb)-free and Halogen-free

**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	0.203REF	
F	0.80	1.00	M	0.00	0.05
G	0.174	0.326			



**ABSOLUTE MAXIMUM RATINGS** (T<sub>A</sub>=25°C unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Continuous Drain Current @V <sub>GS</sub> =4.5V <sup>1</sup>	I <sub>D</sub>	T <sub>C</sub> =25°C	15
		T <sub>C</sub> =100°C	10
Pulsed Drain Current <sup>4</sup>	I <sub>DM</sub>	35	A
Power Dissipation <sup>3</sup>	P <sub>D</sub>	10.4	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~150	°C
<b>Thermal Resistance Rating</b>			
Thermal Resistance from Junction to Ambient <sup>1</sup>	R <sub>θJA</sub>	75	°C / W
Thermal Resistance from Junction to Ambient <sup>2</sup>		165	
Thermal Resistance from Junction to Case <sup>2</sup>		R <sub>θJC</sub>	

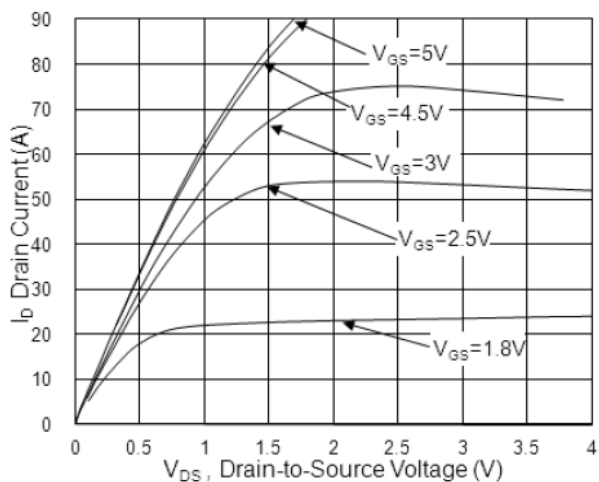
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Gate-Threshold Voltage	$V_{GS(th)}$	0.4	-	1	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Forward Transconductance	$g_{fs}$	-	11.5	-	S	$V_{DS}=10\text{V}, I_D=3\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 10$	$\mu\text{A}$	$V_{DS}=0, V_{GS}= \pm 12\text{V}$
Drain-Source Leakage Current	$I_{DSS}$	-	-	1	$\mu\text{A}$	$V_{DS}=16\text{V}, V_{GS}=0, T_J=25^\circ\text{C}$
		-	-	10		$V_{DS}=16\text{V}, V_{GS}=0, T_J=55^\circ\text{C}$
Drain-Source On-Resistance <sup>4</sup>	$R_{DS(ON)}$	-	-	18	m $\Omega$	$V_{GS}=4.5\text{V}, I_D=5\text{A}$
		-	-	24		$V_{GS}=2.5\text{V}, I_D=3\text{A}$
Total Gate Charge	$Q_g$	-	16.4	-	nC	$V_{DS}=10\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=3\text{A}$
Gate-Source Charge	$Q_{gs}$	-	0.5	-		
Gate-Drain Charge	$Q_{gd}$	-	5	-		
Turn-On Delay Time	$T_{d(on)}$	-	175	-	nS	$V_{DS}=10\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=3\text{A}$ $R_G=3.3\Omega$
Rise Time	$T_r$	-	508	-		
Turn-Off Delay Time	$T_{d(off)}$	-	2011	-		
Fall Time	$T_f$	-	1666	-		
Input Capacitance	$C_{iss}$	-	871	-	pF	$V_{DS}=15\text{V}$ $V_{GS}=0$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	115	-		
Reverse Transfer Capacitance	$C_{rss}$	-	83	-		
<b>Source-Drain Diode</b>						
Continuous Source Current <sup>1</sup>	$I_S$	-	-	15	A	
Pulsed Source Current <sup>4</sup>	$I_{SM}$	-	-	35	A	
Forward On Voltage <sup>4</sup>	$V_{SD}$	-	-	1.2	V	$I_S=1\text{A}, V_{GS}=0\text{V}$

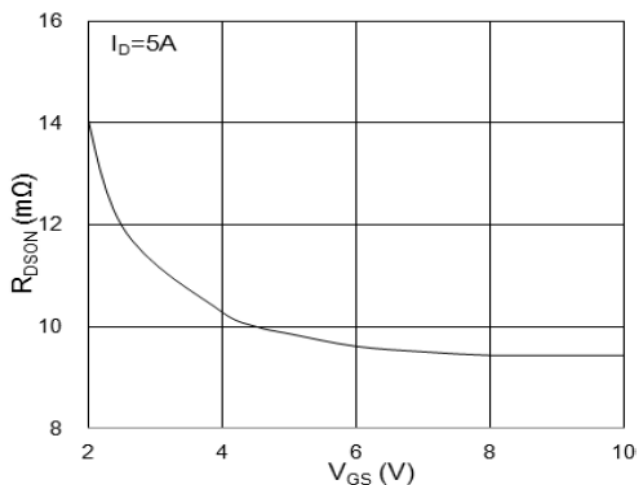
Notes:

1. Surface Mounted on 1inch<sup>2</sup> FR4 Board with 2OZ copper.
2. When mounted on minimum pad of 2 oz. copper.
3. Pulse width limited by maximum junction temperature.
4. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

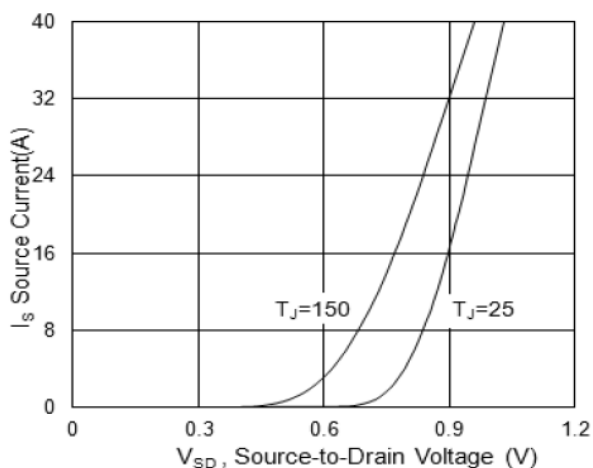
**TYPICAL CHARACTERISTIC CURVE**



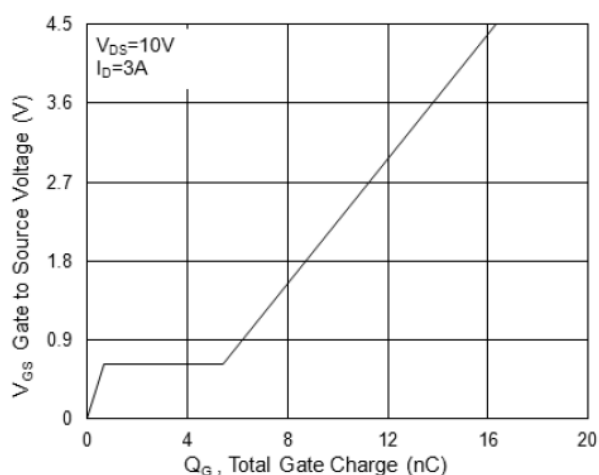
**Fig.1 Typical Output Characteristics**



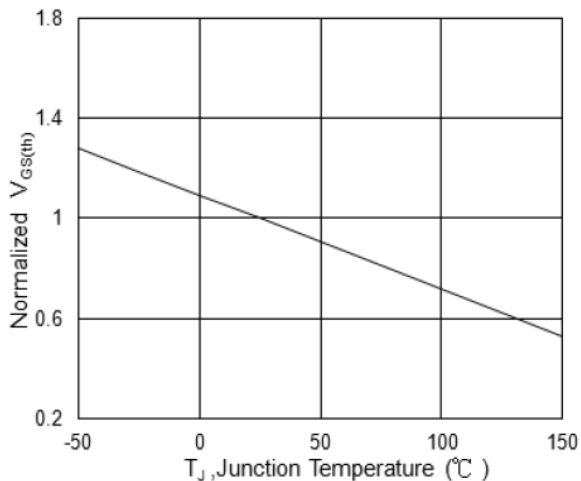
**Fig.2 On-Resistance vs. Gate-Source**



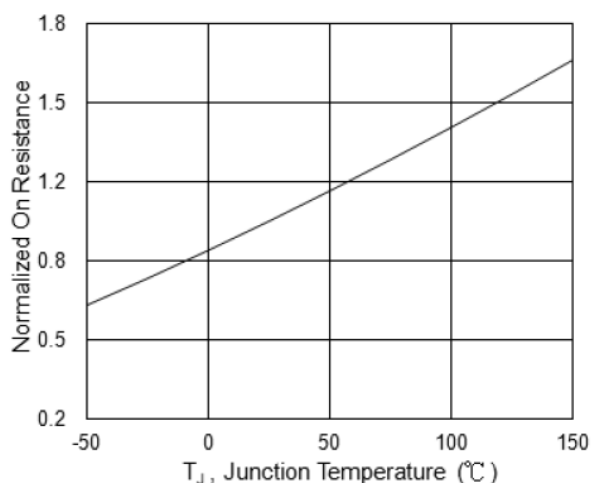
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**

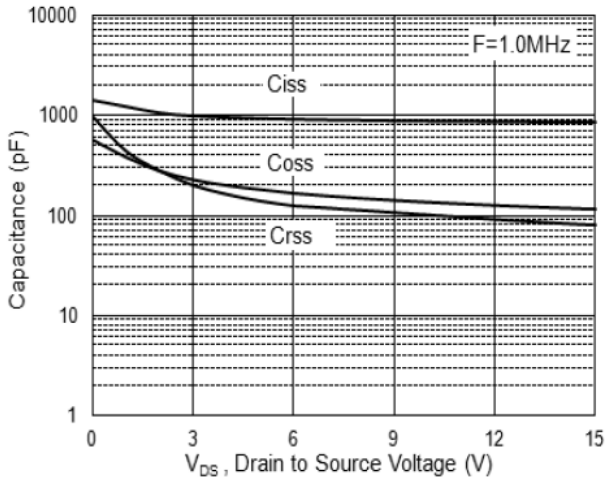


**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**

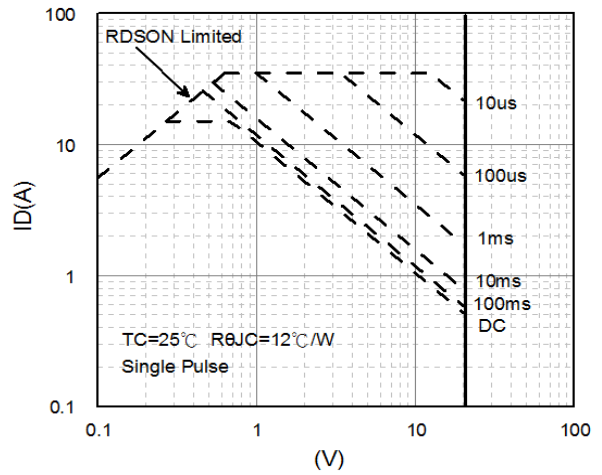


**Fig.6 Normalized  $R_{DS(ON)}$  vs.  $T_J$**

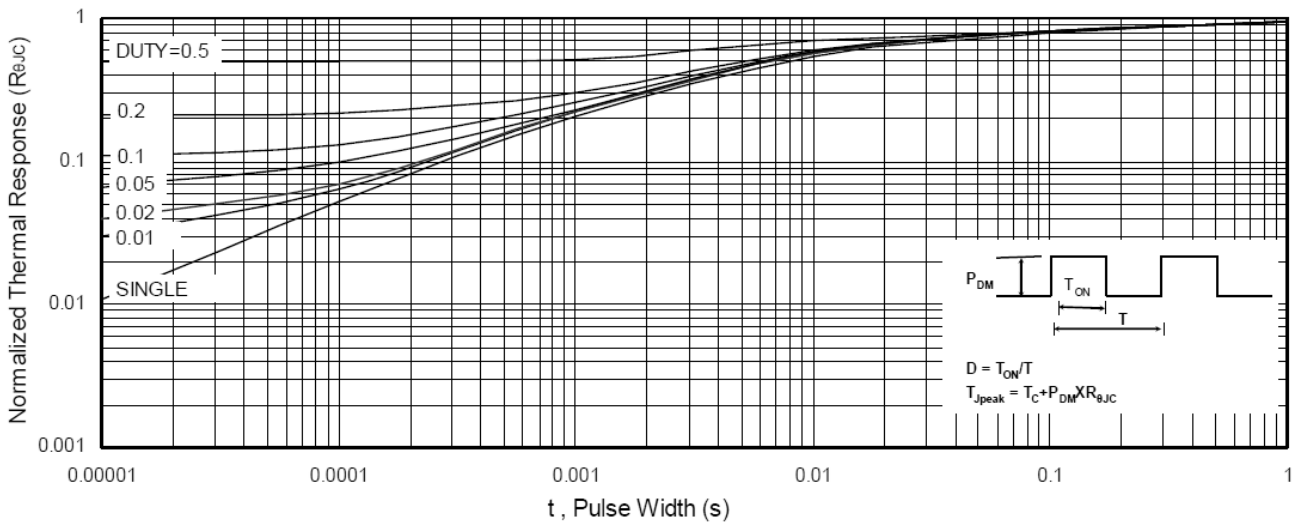
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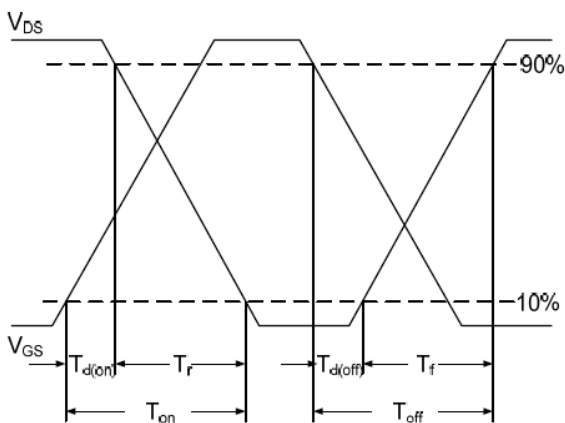
**Fig.9 Capacitance**



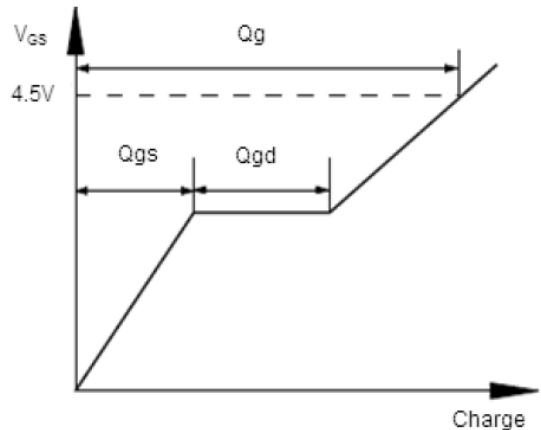
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**