

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

## FEATURES

- 20V / -4.5A
- $R_{DS(ON)} \leq 45m\Omega$  @  $V_{GS} = -4.5V$
- $R_{DS(ON)} \leq 60m\Omega$  @  $V_{GS} = -2.5V$
- $R_{DS(ON)} \leq 85m\Omega$  @  $V_{GS} = -1.8V$
- Reliable and Rugged
- Green Device Available

## APPLICATION

- Power Management in Notebook Computer
- Portable Equipment and Battery Powered Systems

## MARKING



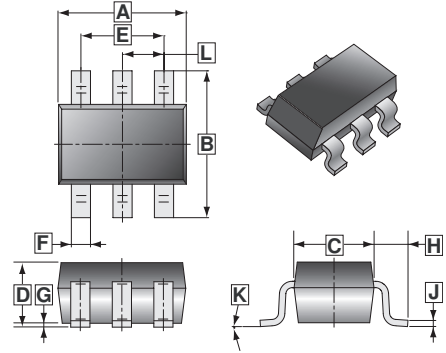
## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-26	3K	7 inch

## ORDER INFORMATION

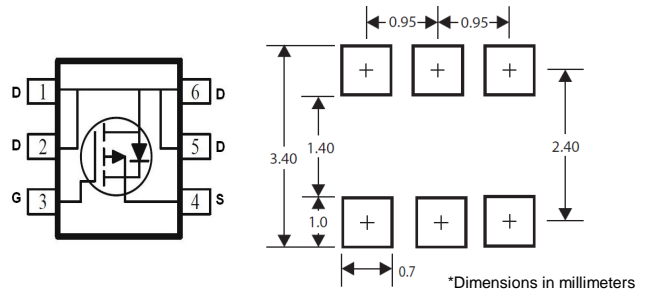
Part Number	Type
SST2013-C	Lead (Pb)-free and Halogen-free

## SOT-26



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0	0.10
B	2.60	3.00	H	0.60	REF.
C	1.40	1.80	J	0.12	REF.
D	-	1.30	K	0°	10°
E	1.90	REF.	L	0.95	REF.
F	0.25	0.50			

## Mounting Pad Layout



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current @ $V_{GS} = -4.5V$ <sup>1</sup>	$I_D$	$T_A = 25^\circ C$	-4.5
		$T_A = 70^\circ C$	-3.6
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	-20	A
Total Power Dissipation	$P_D$	1.25	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ C$
<b>Thermal Data</b>			
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	$t \leq 5sec, 62.5$	$^\circ C/W$
		Steady State, 100	
Thermal Resistance Junction-Ambient		156	
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	39	

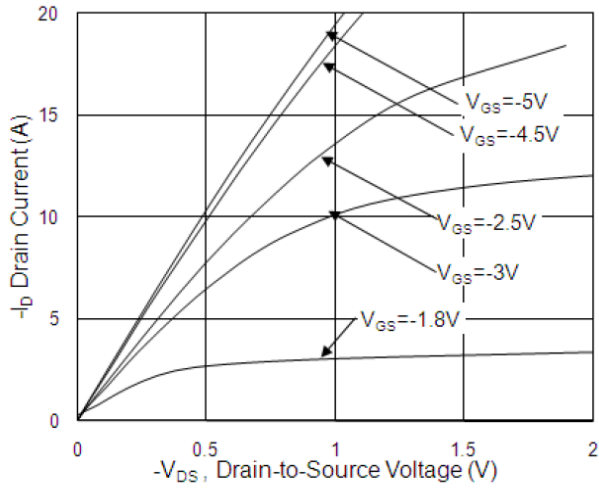
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ C$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$BV_{DSS}$	-20	-	-	V	$V_{GS}=0, I_D = -250\mu A$	
Gate Threshold Voltage	$V_{GS(th)}$	-0.3	-	-1	V	$V_{DS}=V_{GS}, I_D = -250\mu A$	
Forward Transconductance	$g_{fs}$	-	12.8	-	S	$V_{DS} = -5V, I_D = -3A$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 12V$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ C$	-	-	-1	$\mu A$	$V_{DS} = -16V, V_{GS}=0$
		$T_J=55^\circ C$	-	-	-5		
Static Drain-Source On-Resistance <sup>3</sup>	$R_{DS(ON)}$	-	-	45	m $\Omega$	$V_{GS} = -4.5V, I_D = -3A$	
		-	-	60		$V_{GS} = -2.5V, I_D = -2A$	
		-	-	85		$V_{GS} = -1.8V, I_D = -1A$	
Total Gate Charge	$Q_g$	-	10.2	-	nC	$I_D = -3A$ $V_{DS} = -15V$ $V_{GS} = -4.5V$	
Gate-Source Charge	$Q_{gs}$	-	1.89	-			
Gate-Drain Charge	$Q_{gd}$	-	3.1	-			
Turn-on Delay Time	$T_{d(on)}$	-	5.6	-	nS	$V_{DS} = -10V$ $I_D = -3A$ $V_{GS} = -4.5V$ $R_G = 3.3\Omega$	
Rise Time	$T_r$	-	40.8	-			
Turn-off Delay Time	$T_{d(off)}$	-	33.6	-			
Fall Time	$T_f$	-	18	-			
Input Capacitance	$C_{iss}$	-	857	-	pF	$V_{GS}=0$ $V_{DS} = -15V$ $f=1MHz$	
Output Capacitance	$C_{oss}$	-	114	-			
Reverse Transfer Capacitance	$C_{rss}$	-	108	-			
<b>Source-Drain Diode</b>							
Forward on Voltage <sup>3</sup>	$V_{SD}$	-	-	-1	V	$I_S = -1A, V_{GS}=0$	
Continuous Source Current <sup>1</sup>	$I_S$	-	-	-4.5	A		
Pulsed Source Current <sup>2</sup>	$I_{SM}$	-	-	-20			
Reverse Recovery Time	$t_{rr}$	-	21.8	-	nS	$I_F = -3A, dI/dt=100A/\mu s,$ $T_J=25^\circ C$	
Reverse Recovery Charge	$Q_{rr}$	-	6.9	-	nC		

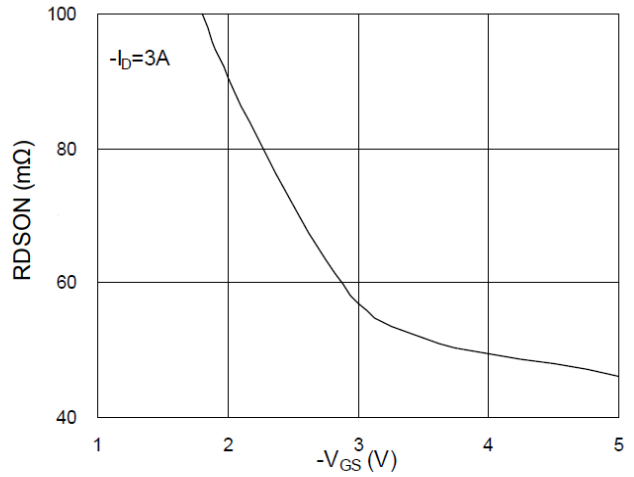
Notes:

1. Surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2oz copper.
2. The power dissipation is limited by 150°C junction temperature.
3. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

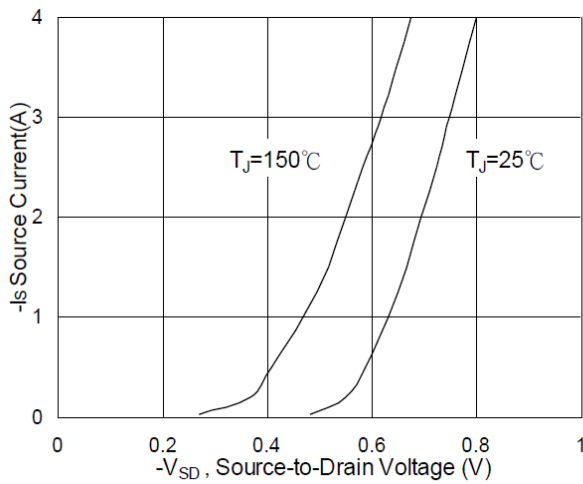
**CHARACTERISTIC CURVES**



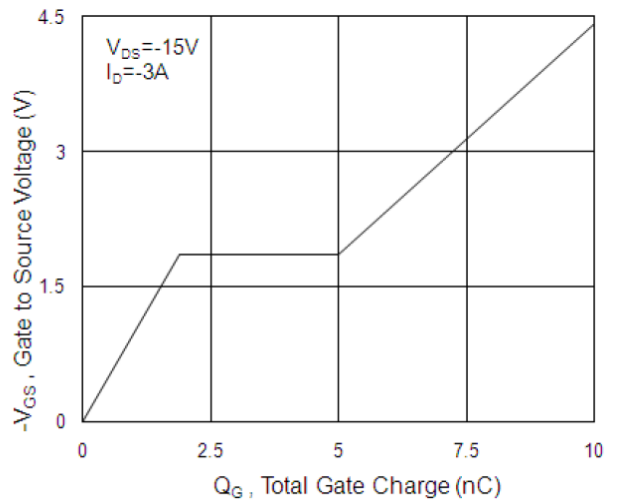
**Fig.1 Typical Output Characteristics**



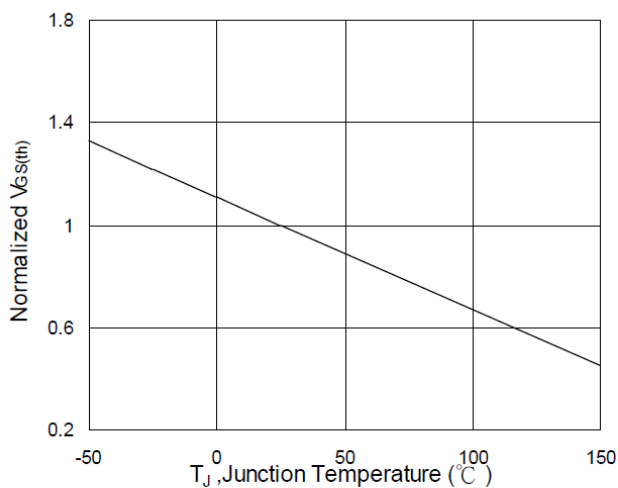
**Fig.2 On-Resistance vs. G-S Voltage**



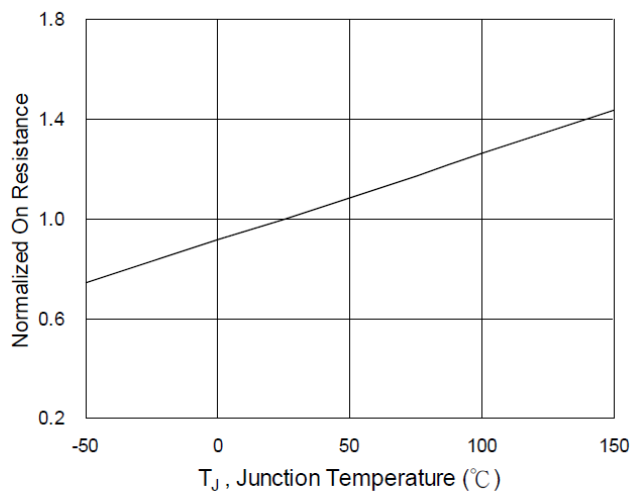
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-charge Characteristics**

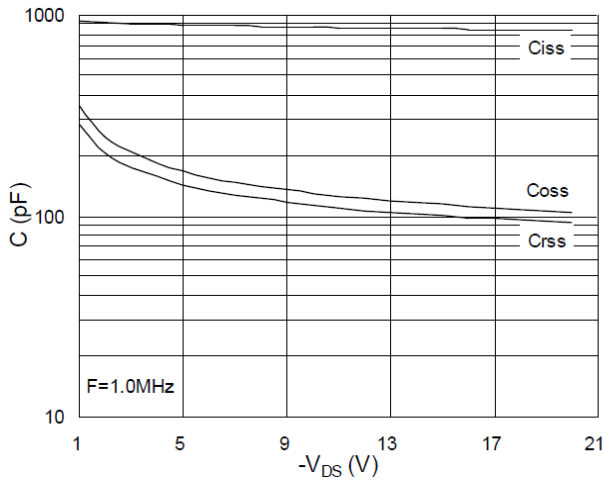


**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**

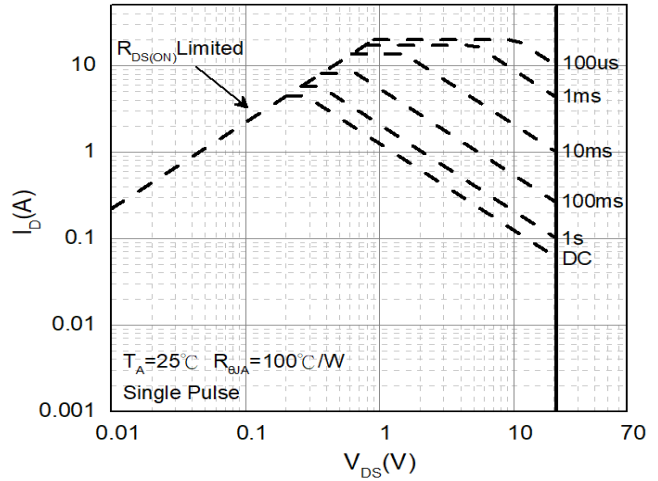


**Fig.6 Normalized  $R_{DS(ON)}$  vs.  $T_J$**

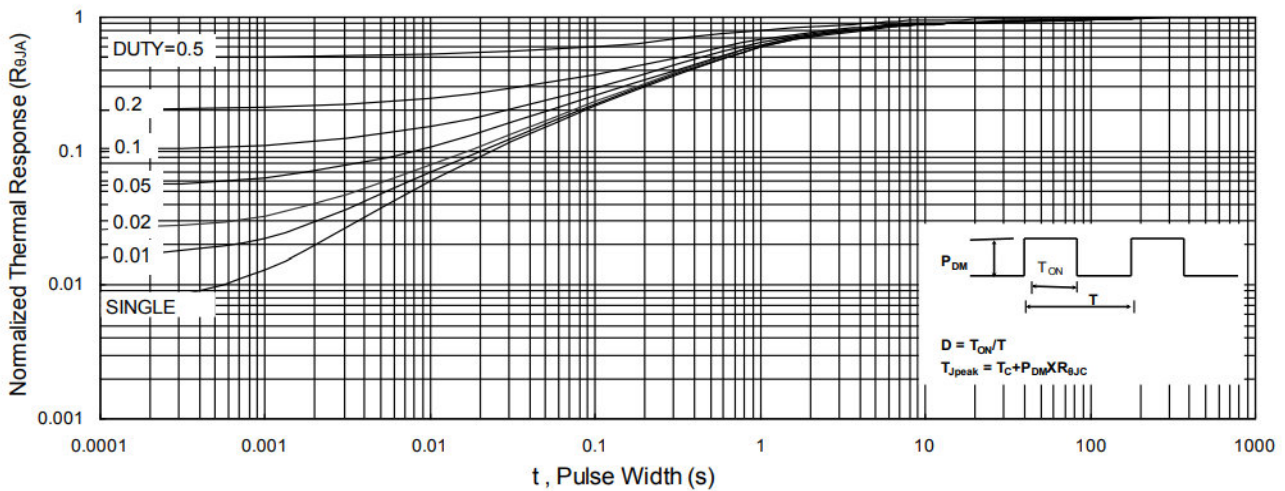
**CHARACTERISTIC CURVES**



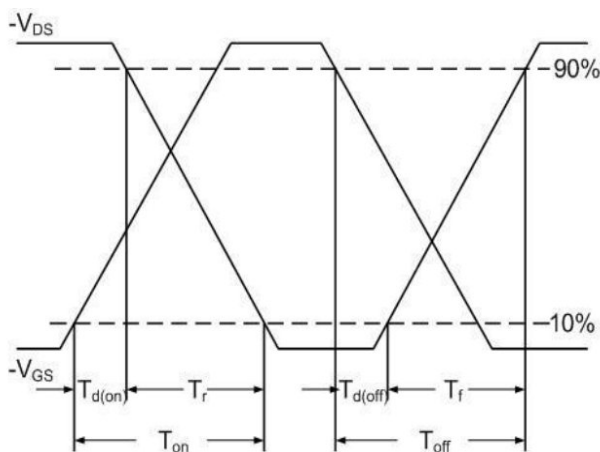
**Fig.7 Capacitance**



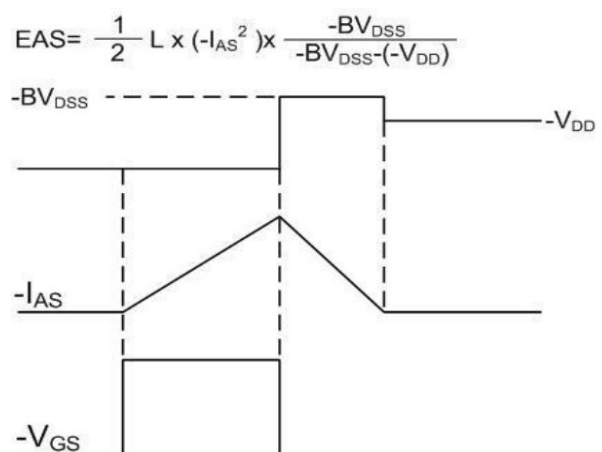
**Fig.8 Safe Operating Area**



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



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Waveform**