

# STT3520C

N-Ch: 3.7 A, 23 V,  $R_{DS(ON)}$  58 m $\Omega$   
P-Ch: -2.7 A, -23 V,  $R_{DS(ON)}$  112 m $\Omega$   
N & P-Channel Enhancement Mode Mos.FET

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

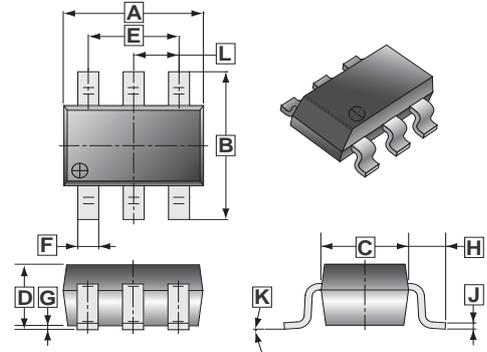
## DESCRIPTION

These miniature surface mount MOSFETs utilize high cell density process. Low  $R_{DS(on)}$  assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are DC-DC converters, power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

## FEATURES

- Low  $R_{DS(on)}$  Provides Higher Efficiency And Extends Battery Life.
- Miniature TSOP-6 Surface Mount Package Saves Board Space.

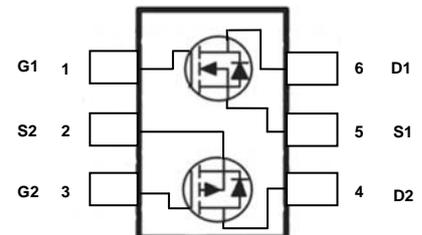
## TSOP-6



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	1.10	MAX.	K	0°	10°
E	1.90	REF.	L	0.95	REF.
F	0.30	0.50			

## PACKAGE INFORMATION

Package	MPQ	LeaderSize
TSOP-6	3K	7' inch



## ABSOLUTE MAXIMUM RATINGS( $T_A=25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Ratings		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	$V_{DS}$	23	-23	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	$\pm 12$	V
Continuous Drain Current <sup>1</sup>	$I_D @ T_A=25^\circ\text{C}$	3.7	-2.7	A
	$I_D @ T_A=70^\circ\text{C}$	2.9	-2.1	
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	8	-8	A
Continuous Source Current (Diode Conduction) <sup>1</sup>	$I_S$	1.05	-1.05	A
Power Dissipation <sup>1</sup>	$P_D @ T_A=25^\circ\text{C}$	1.15		W
	$P_D @ T_A=70^\circ\text{C}$	0.7		
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55 ~ +150		$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	N-Channel		P-Channel		Unit	
		Typ	Max	Typ	Max		
Maximum Junction to Ambient <sup>1</sup>	t $\leq$ 10 sec	$R_{\theta JA}$	93	110	93	110	$^{\circ}C / W$
	Steady State		130	150	130	150	

Notes

- 1 Surface Mounted on 1" x 1" FR4 Board.
- 2 Pulse width limited by maximum junction temperature.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-Threshold Voltage	N-Ch	1	-	-	V	$V_{DS}=V_{GS}, I_D=250\mu A$
	P-Ch	-1	-	-		$V_{DS}=V_{GS}, I_D=-250\mu A$
Gate-Body Leakage Current	N-Ch	-	-	100	uA	$V_{DS}=0 V, V_{GS}=12 V$
	P-Ch	-	-	-100		$V_{DS}=0 V, V_{GS}=-12 V$
Zero Gate Voltage Drain Current	N-Ch	-	-	1	uA	$V_{DS}=16 V, V_{GS}=0 V$
	P-Ch	-	-	-1		$V_{DS}=-16V, V_{GS}=0 V$
	N-Ch	-	-	10		$V_{DS}=16V, V_{GS}=0 V, T_J=55^{\circ}C$
	P-Ch	-	-	-10		$V_{DS}=-16V, V_{GS}=0 V, T_J=55^{\circ}C$
On-State Drain Current <sup>1</sup>	N-Ch	5	-	-	A	$V_{DS}=5V, V_{GS}=4.5 V$
	P-Ch	-5	-	-		$V_{DS}=-5V, V_{GS}=-4.5 V$
Drain-Source On-Resistance <sup>1</sup>	N-Ch	-	-	58	m $\Omega$	$V_{GS}=4.5V, I_D=3.7A$
	P-Ch	-	-	112		$V_{GS}=-4.5V, I_D=3.1A$
	N-Ch	-	-	82		$V_{GS}=2.5V, I_D=2.7A$
	P-Ch	-	-	172		$V_{GS}=-2.5V, I_D=-2.2A$
	N-Ch	-	-	160		$V_{GS}=1.8V, I_D=2.2A$
	P-Ch	-	-	210		$V_{GS}=-1.8V, I_D=-2.0A$
Forward Transconductance <sup>1</sup>	N-Ch	-	10	-	S	$V_{DS}=5V, I_D=3.7A$
	P-Ch	-	5	-		$V_{DS}=-5V, I_D=3.1A$
Diode Forward Voltage <sup>1</sup>	N-Ch	-	0.80	-	S	$I_S=1.05A, V_{GS}=0V$
	P-Ch	-	-0.83	-		$I_S=-1.05A, V_{GS}=0V$

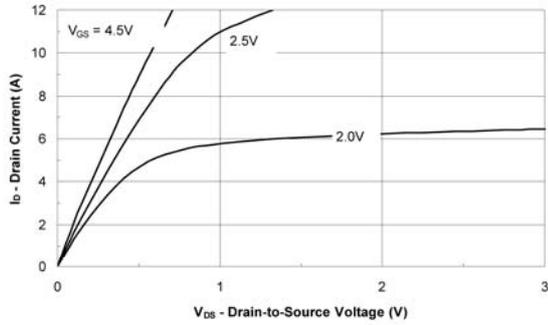
## DYNAMIC<sup>2</sup>

DYNAMIC <sup>2</sup>											
Total Gate Charge	N-Ch	$Q_g$	-	7.5	-	nC	N-Channel $V_{DS}=15V, V_{GS}= 4.5V,$ $I_D= 2.7A$				
	P-Ch		-	3.8	-						
Gate-Source Charge	N-Ch	$Q_{gs}$	-	0.6	-			nS	P-Channel $V_{DS}= -15V, V_{GS}= -4.5V,$ $I_D= -3.1A$		
	P-Ch		-	0.6	-						
Gate-Drain Charge	N-Ch	$Q_{gd}$	-	1.0	-					nS	N-Channel $V_{DD}= 15V, R_{GEN}= 15\Omega,$ $V_{GS}= 4.5V, I_D= 1A$
	P-Ch		-	1.5	-						
Turn-on Delay Time	N-Ch	$T_{d(on)}$	-	5	-	nS	P-Channel $V_{DD}= -15V, R_{GEN}= 15\Omega$ $V_{GS}= -4.5V, I_D= -1A$				
	P-Ch		-	5	-						
Rise Time	N-Ch	$T_r$	-	12	-			nS	P-Channel $V_{DD}= -15V, R_{GEN}= 15\Omega$ $V_{GS}= -4.5V, I_D= -1A$		
	P-Ch		-	15	-						
Turn-off Delay Time	N-Ch	$T_{d(off)}$	-	13	-					nS	P-Channel $V_{DD}= -15V, R_{GEN}= 15\Omega$ $V_{GS}= -4.5V, I_D= -1A$
	P-Ch		-	20	-						
Fall Time	N-Ch	$T_f$	-	7	-	nS	P-Channel $V_{DD}= -15V, R_{GEN}= 15\Omega$ $V_{GS}= -4.5V, I_D= -1A$				
	P-Ch		-	20	-						

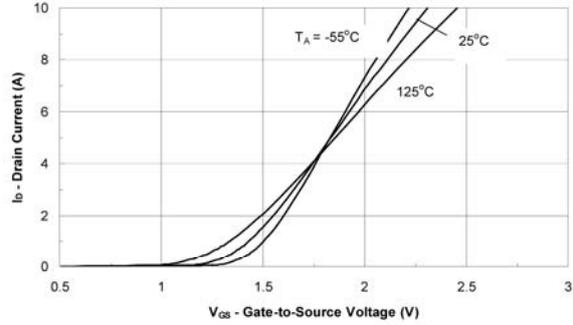
### Notes

- 1 Pulse test :  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- 2 Guaranteed by design, not subject to production testing.

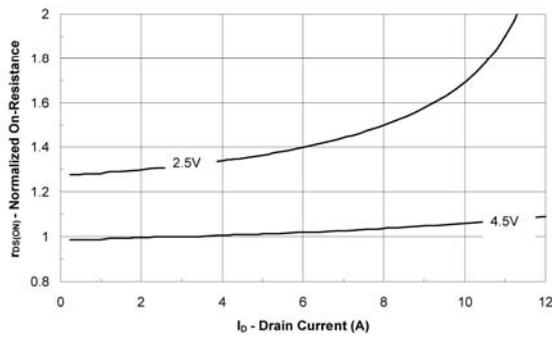
**CHARACTERISTIC CURVES (N-Channel)**



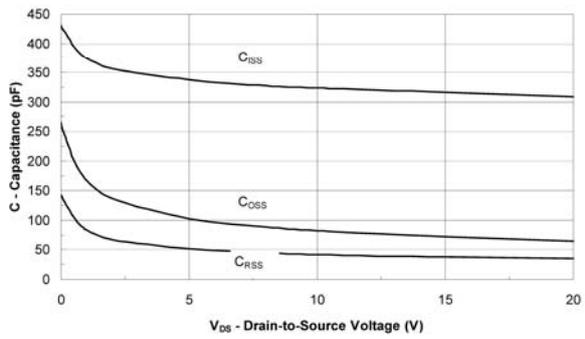
**Output Characteristics**



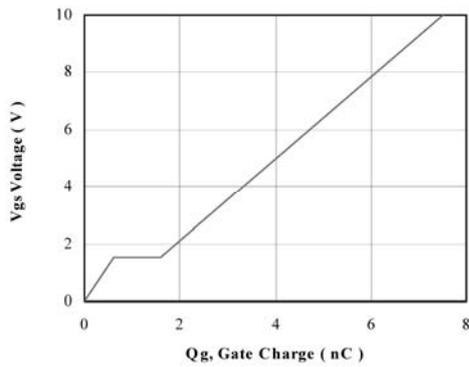
**Transfer Characteristics**



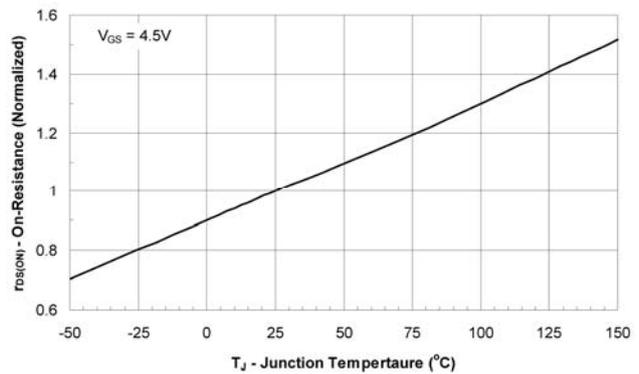
**On-Resistance vs. Drain Current**



**Capacitance**



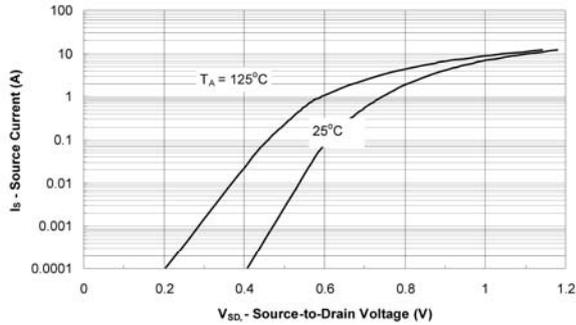
**Gate Charge**



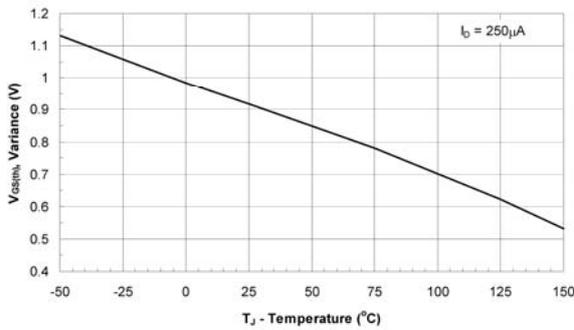
**On-Resistance vs. Junction Temperature**

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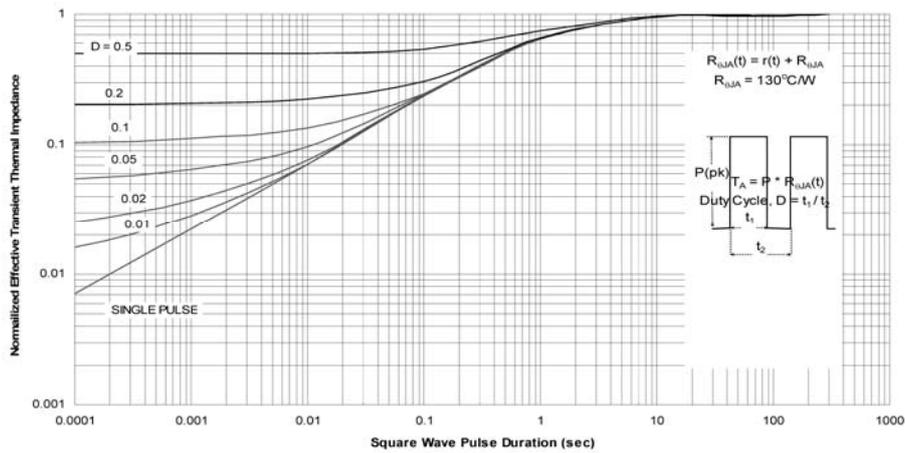
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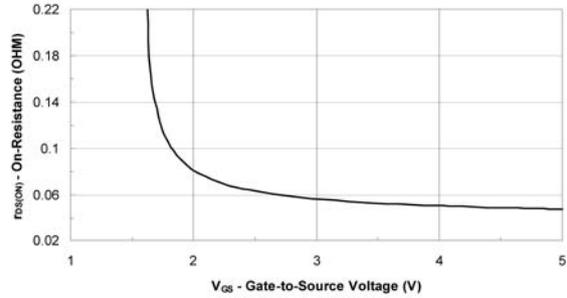
Source-Drain Diode Forward Voltage



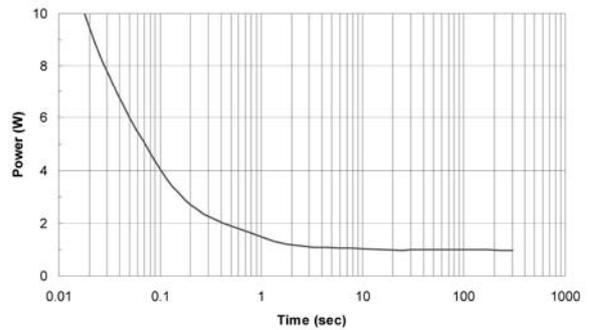
Threshold Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient

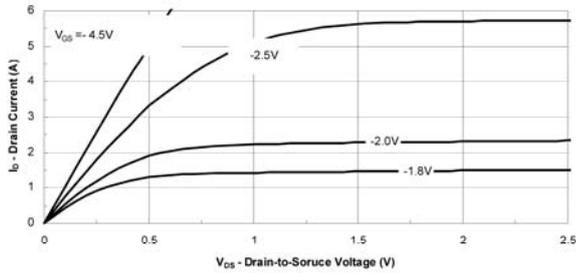


On-Resistance vs. Gate-to Source Voltage

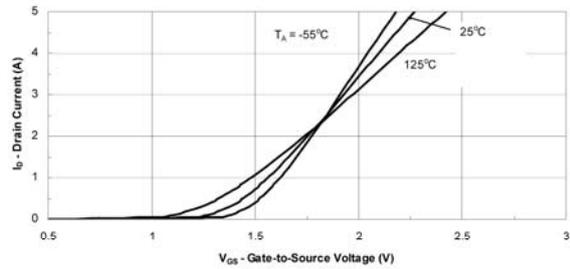


Single Pulse Power

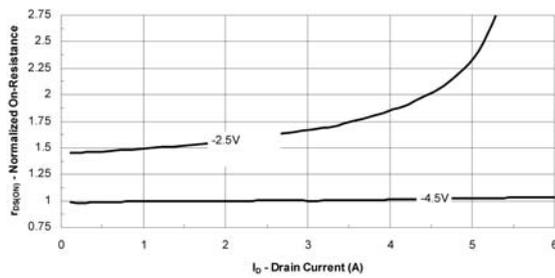
**CHARACTERISTIC CURVES (P-Channel)**



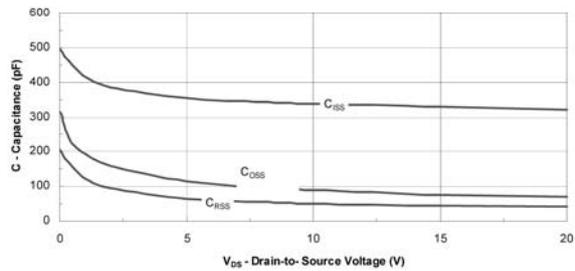
Output Characteristics



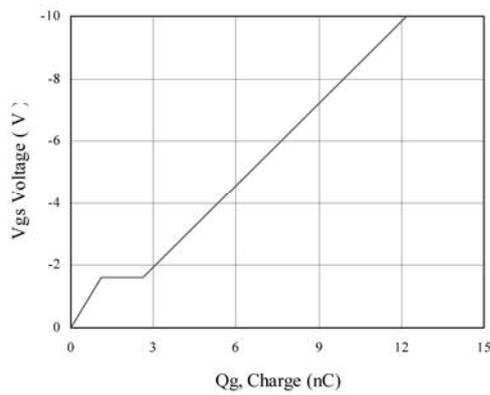
Transfer Characteristics



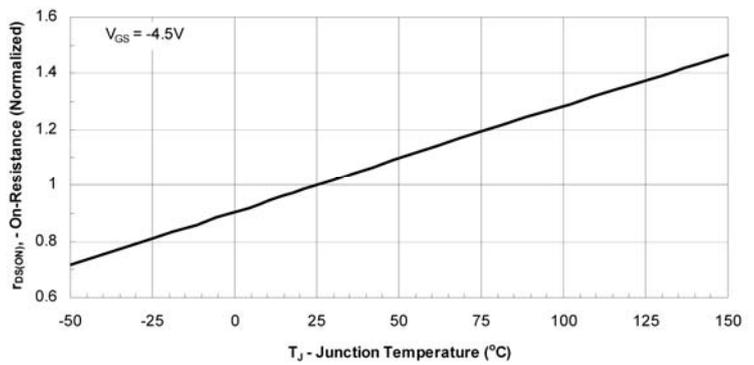
On-Resistance vs. Drain Current



Capacitance



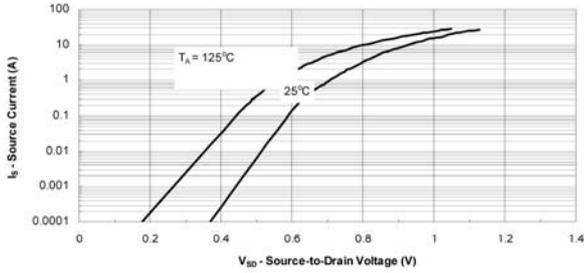
Gate Charge



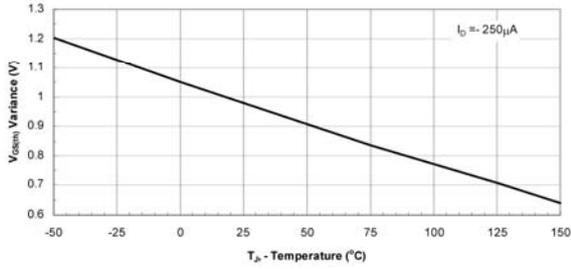
On-Resistance vs. Junction Temperature

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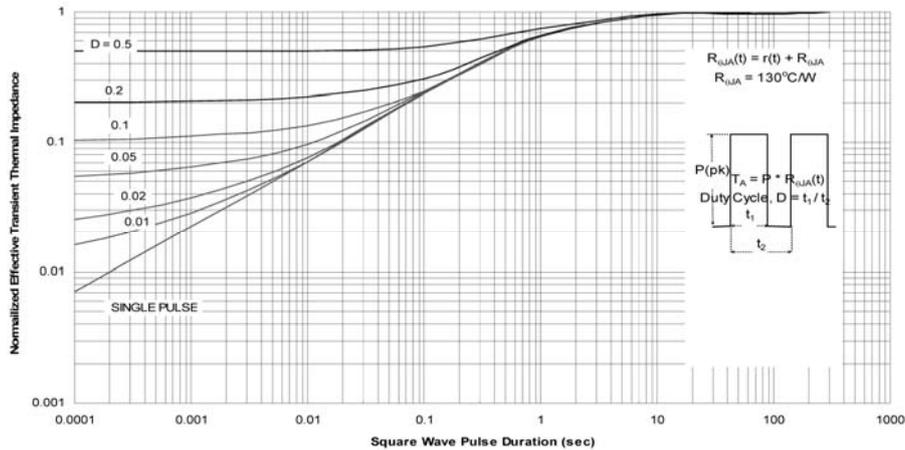
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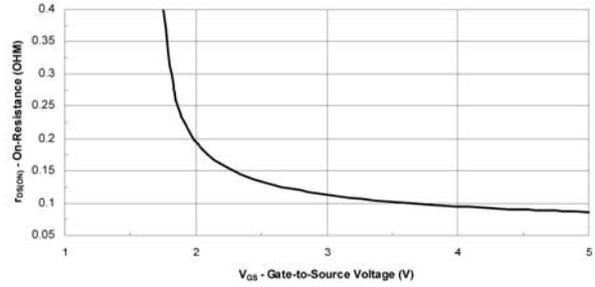
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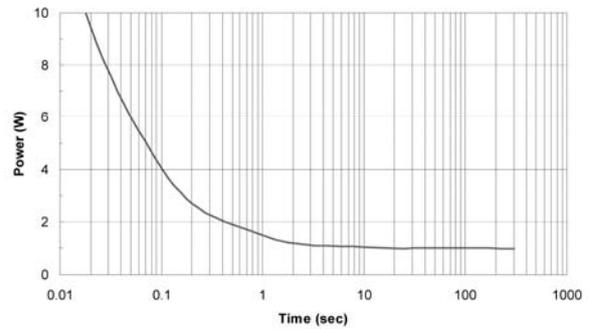
Threshold Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient



On-Resistance vs. Gate-to Source Voltage



Single Pulse Power