

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

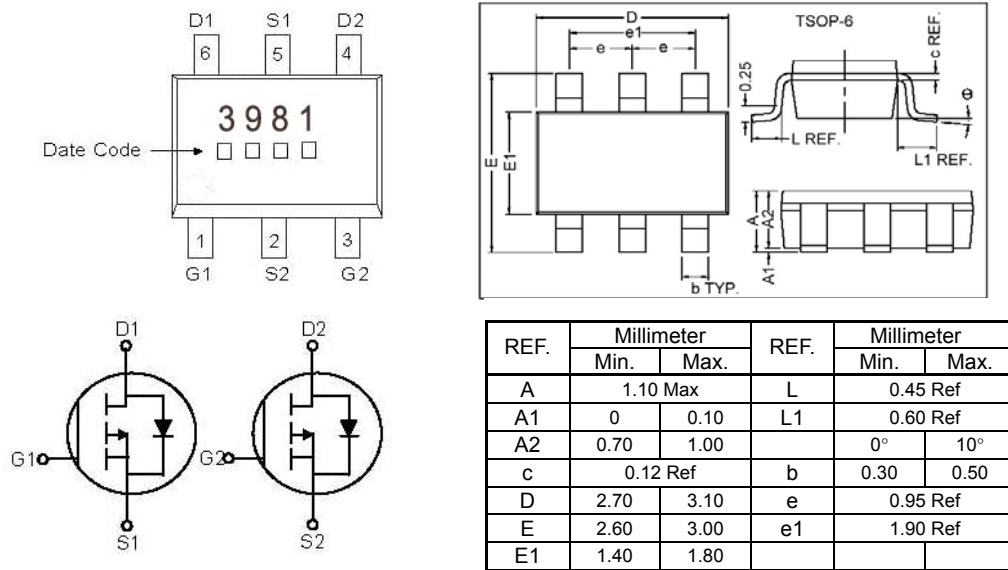
## DESCRIPTION

The STT3981 utilized advance processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device. The STT3981 is universally used for all commercial-industrial applications.

## FEATURES

- Low On-Resistance
- Low Gate Charge

## PACKAGE DIMENSIONS



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	±8	V
Continuous Drain Current <sup>3</sup>	$I_D @ T_A=25^\circ\text{C}$ $I_D @ T_A=70^\circ\text{C}$	-1.6 -1.3	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-8	A
Power Dissipation	$P_D @ T_A=25^\circ\text{C}$	0.8	W
Linear Derating Factor		0.006	W/°C
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	°C

## THERMAL DATA

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient <sup>3</sup> (Max)	$R_{\theta JA}$	150	°C/W

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

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
<b>Static</b>						
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	-	-1.1	V	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$
Gate Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 8 \text{ V}$
Drain-Source Leakage Current ( $T_j = 25^\circ\text{C}$ )	$I_{DSS}$	-	-	-1	uA	$V_{DS} = -20 \text{ V}, V_{GS} = 0$
Drain-Source Leakage Current ( $T_j = 70^\circ\text{C}$ )		-	-	-20		$V_{DS} = -16 \text{ V}, V_{GS} = 0$
Drain-Source On-Resistance	$R_{DS(ON)}$	-	100	150	mΩ	$V_{GS} = -4.5 \text{ V}, I_D = -1.9 \text{ A}$
		-	160	210		$V_{GS} = -2.5 \text{ V}, I_D = -1.6 \text{ A}$
		-	260	300		$V_{GS} = -1.8 \text{ V}, I_D = -0.7 \text{ A}$
Forward Transconductance	$g_{fs}$	-	4	-	S	$V_{DS} = -5 \text{ V}, I_D = -1.9 \text{ A}$
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	-	-0.84	-1.1	V	$I_S = -1.0 \text{ A}, V_{GS} = 0 \text{ V}$
<b>Dynamic</b>						
Total Gate Charge <sup>2</sup>	$Q_g$	-	6	7.5	nC	$I_D = -1.9 \text{ A}$ $V_{DS} = -10 \text{ V}$ $V_{GS} = -4.5 \text{ V}$
Gate-Source Charge	$Q_{gs}$	-	0.52	-		
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	1.02	-		
Turn-on Delay Time <sup>2</sup>	$T_{d(on)}$	-	50	65	nS	$V_{DS} = -10 \text{ V}$ $I_D = -1 \text{ A}$ $V_{GEN} = -4.5 \text{ V}$ $R_G = 6 \Omega$ $R_L = 10 \Omega$
Rise Time	$T_r$	-	40	60		
Turn-off Time	$T_{d(off)}$	-	168	180		
Fall Time	$T_f$	-	64	75		
Input Capacitance	$C_{iss}$	-	450	-	pF	$V_{GS} = 0 \text{ V}$ $V_{DS} = -15 \text{ V}$ $f = 1.0 \text{ MHz}$
Output Capacitance	$C_{oss}$	-	60	-		
Reverse Transfer Capacitance	$C_{rss}$	-	47	-		

- Notes: 1. Pulse width limited by maximum junction temperature.  
2. Pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .  
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 180 °C/W when mounted on minimum copper pad.

**CHARACTERISTIC CURVES**

