

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

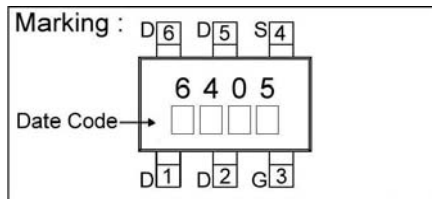
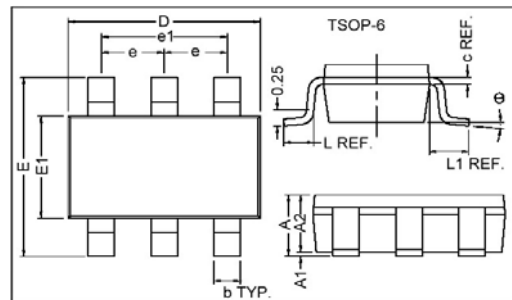
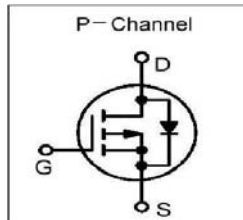
DESCRIPTION

The STT6405 uses advanced trench technology to provide excellent on-resistance with low gate charge. The device is suitable for use as a load switch or in PWM applications.

FEATURES

- N-Channel
- Lower Gate Charge
- Small Footprint & Low Profile Package

PACKAGE DIMENSIONS



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.10 Max		L	0.45 Ref	
A1	0	0.10	L1	0.60 Ref	
A2	0.70	1.00		0°	10°
c	0.12 Ref		b	0.30	0.50
D	2.70	3.10	e	0.95 Ref	
E	2.60	3.00	e1	1.90 Ref	
E1	1.40	1.80			

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ($T_J=150^\circ\text{C}$)	$I_D @ T_A=25^\circ\text{C}$ $I_D @ T_A=70^\circ\text{C}$	-5.0 -4.2	A
Pulsed Drain Current	I_{DM}	-20	A
Power Dissipation	$P_D @ T_A=25^\circ\text{C}$	2	W
Linear Derating Factor		0.016	W/°C
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 ~ +150	°C

Parameter	Symbol	Ratings	Unit
Thermal Resistance- Junction to Ambient ³ Max.	$R_{\theta JA}$	62.5	°C/W

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

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	$V_{GS} = 0, I_D = -250 \mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	-	-3.0	V	$V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 20 \text{ V}$
Drain-Source Leakage Current ($T_j = 25^\circ\text{C}$)	I_{DSS}	-	-	-1	μA	$V_{DS} = -30 \text{ V}, V_{GS} = 0$
Drain-Source Leakage Current ($T_j = 55^\circ\text{C}$)		-	-	-5		$V_{DS} = -24 \text{ V}, V_{GS} = 0$
Static Drain-Source On-Resistance ²	$R_{DS(ON)}$	-	-	50	m Ω	$V_{GS} = -10 \text{ V}, I_D = -5.0 \text{ A}$
		-	-	75		$V_{GS} = -4.5 \text{ V}, I_D = -4.0 \text{ A}$
Forward Transconductance	g_{fs}	-	8.6	-	S	$V_{DS} = -5\text{V}, I_D = -5.0\text{A}$
Total Gate Charge ²	Q_g	-	14.7	18	nC	$I_D = -5.0 \text{ A}$ $V_{DS} = -15 \text{ V}$ $V_{GS} = -10 \text{ V}$
Gate-Source Charge	Q_{gs}	-	2	-		
Gate-Drain ("Miller") Charge	Q_{gd}	-	3.8	-		
Turn-on Delay Time ²	$T_{d(on)}$	-	8.3	-	ns	$V_{DS} = -15 \text{ V}$ $V_{GS} = -10 \text{ V}$ $R_G = 3 \Omega$ $R_L = 3 \Omega$
Rise Time	T_r	-	5	-		
Turn-off Delay Time	$T_{d(off)}$	-	29	-		
Fall Time	T_f	-	14	-		
Input Capacitance	C_{iss}	-	700	840	pF	$V_{GS} = 0 \text{ V}$ $V_{DS} = -15 \text{ V}$ $f = 1.0 \text{ MHz}$
Output Capacitance	C_{oss}	-	120	-		
Reverse Transfer Capacitance	C_{rss}	-	75	-		
Gate Resistance	R_g	-	10	-	Ω	$f = 1.0 \text{ MHz}$

SOURCE-DRAIN DIODE

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Forward On Voltage ²	V_{SD}	-	-	-1.0	V	$I_S = -1.0 \text{ A}, V_{GS} = -0 \text{ V}$
Reverse Recovery Time ²	T_{rr}	-	23.5	-	ns	$I_S = -5.0\text{A}, V_{GS}=0\text{V}, dI/dt=$ 100A/us
Reverse Recovery Charge	Q_{rr}	-	13.4	-	nC	

- Notes:
1. Pulse width limited by Max. junction temperature.
 2. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
 3. Surface mounted on 1 in² copper pad of FR4 board; 156°C/W when mounted on Min. copper pad.

CHARACTERISTIC CURVES

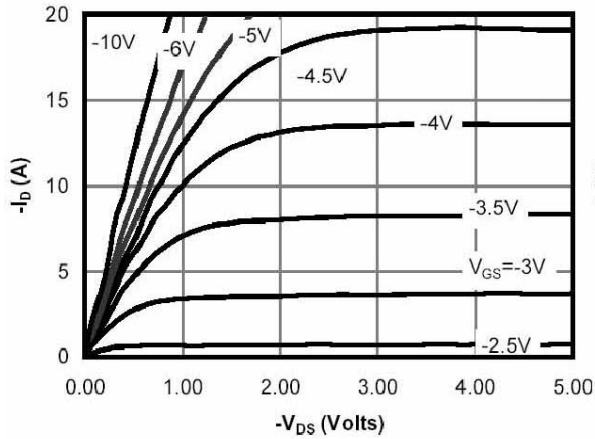


Fig 1. Typical Output Characteristics

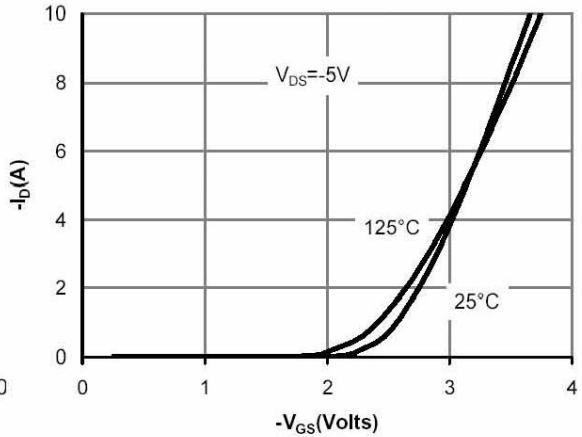


Fig 2. Transfer Characteristics

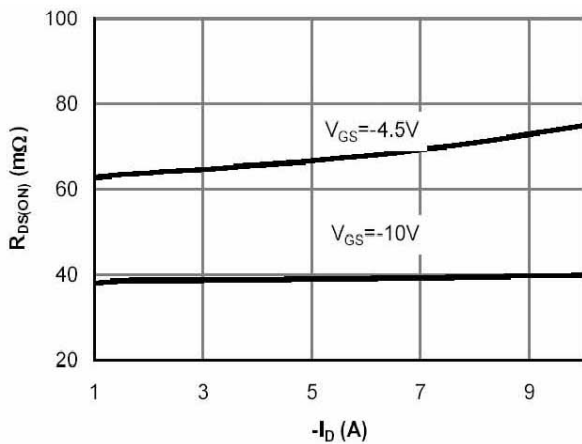


Fig 3. On-Resistance vs. Drain Current and Gate Voltage

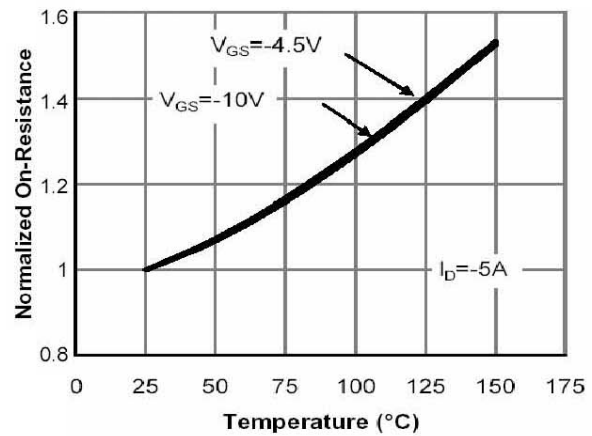


Fig 4. On-Resistance vs. Junction Temperature

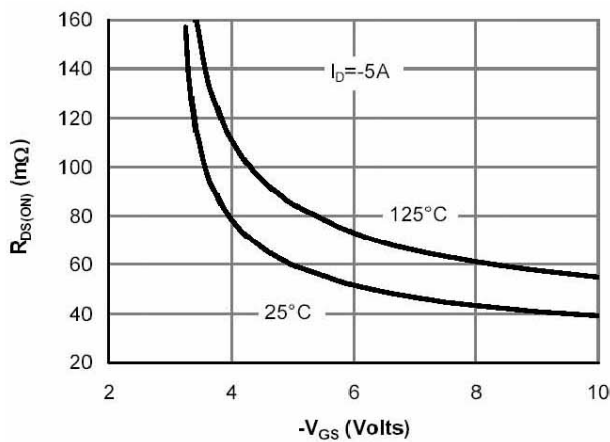


Fig 5. On-Resistance vs. Gate-Source Voltage

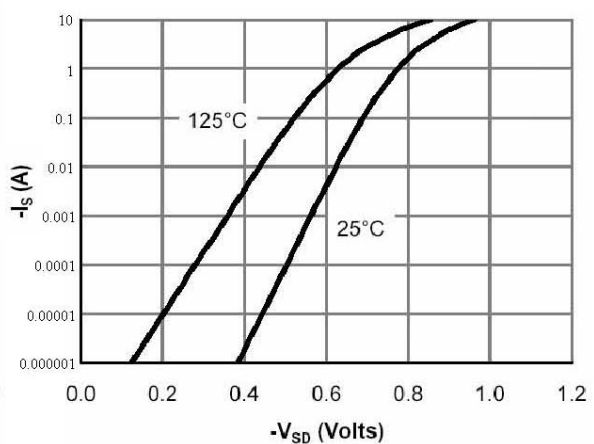


Fig 6. Body Diode Characteristics

CHARACTERISTIC CURVES

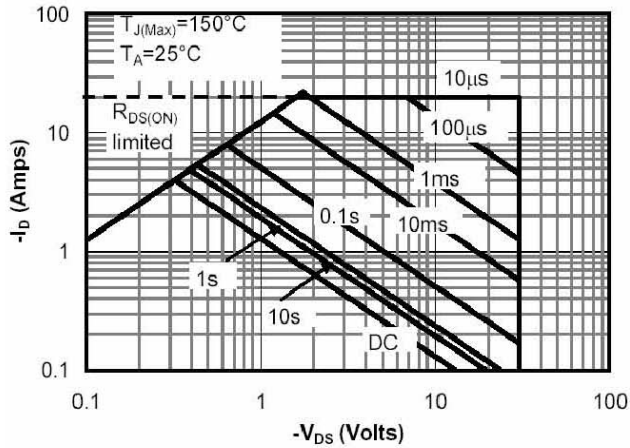


Fig 7. Maximum Safe Operating Area

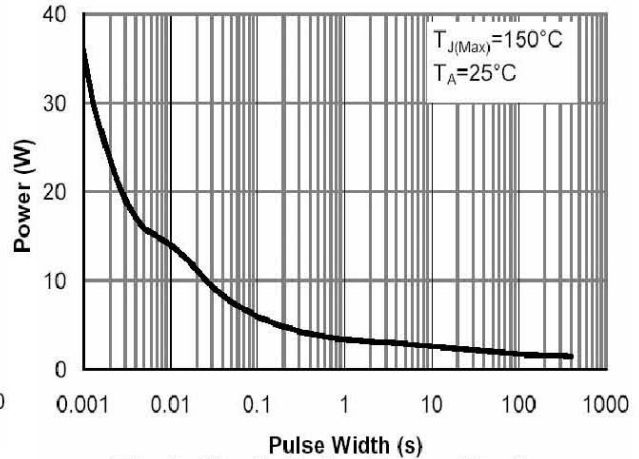


Fig 8. Single Pulse Power Rating Junction-to-Ambient

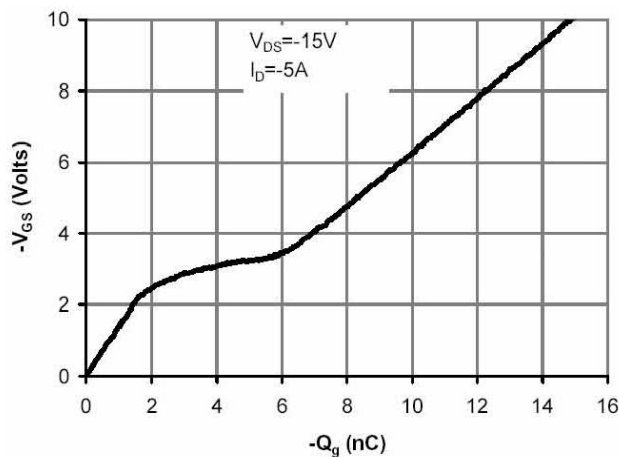


Fig 9. Gate Charge Characteristics

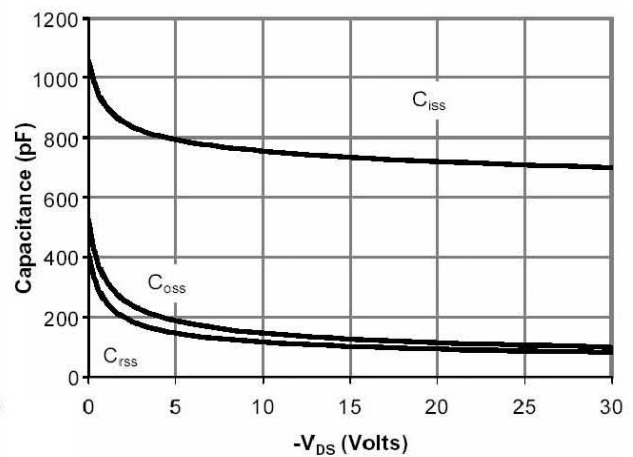


Fig 10. Typical Capacitance Characteristics

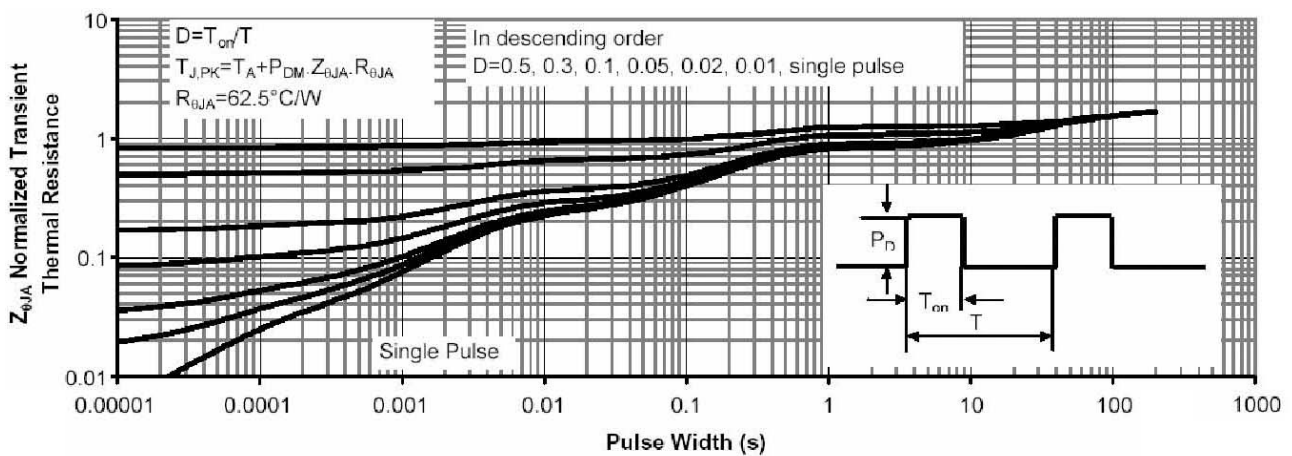


Fig 11. Normalized Maximum Transient Thermal Impedance