

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

## DESCRIPTION

The SSF7401 uses advanced trench technology to provide excellent on-resistance, low gate charge and operation with gate voltage as low as 2.5V. It can be used for a wide variety of applications, including load switching, low current inverters and low current DC-DC converters. The SSF7401 is universally used for all commercial-industrial applications.

## FEATURES

- Small Package Outline
- Lower Gate Charge

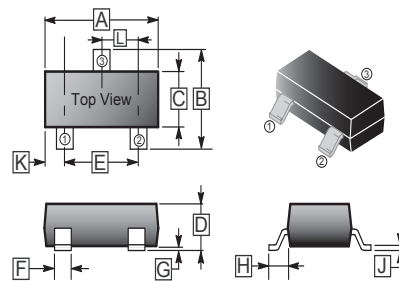
## MARKING CODE

7401

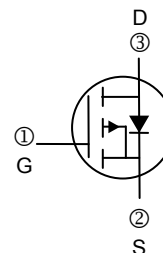
## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-323	3K	7 inch

## SOT-323



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.80	2.20	G	0.100	REF.
B	1.80	2.45	H	0.525	REF.
C	1.15	1.35	J	0.08	0.25
D	0.80	1.10	K	-	-
E	1.20	1.40	L	0.650	TYP.
F	0.20	0.40			



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit	
Drain-Source Voltage	$V_{DSS}$	-30	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V	
Continuous Drain Current <sup>3</sup>	$I_D$	$T_A=25^\circ\text{C}$	-2	A
		$T_A=70^\circ\text{C}$	-1.5	A
Pulsed Drain Current <sup>1,2</sup>	$I_{DM}$	-10	A	
Linear Derating Factor		0.0028	$^\circ\text{C} / \text{W}$	
Power Dissipation	$P_D$	0.35	W	
Thermal Resistance Junction-Ambient <sup>3</sup>	$R_{\theta JA}$	360	$^\circ\text{C} / \text{W}$	
Operating Junction and Storage Temperature	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$	

Note:

1. Pulse width limited by Max. junction temperature.
2. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Surface mounted on FR4 board,  $t \leq 10\text{sec}$

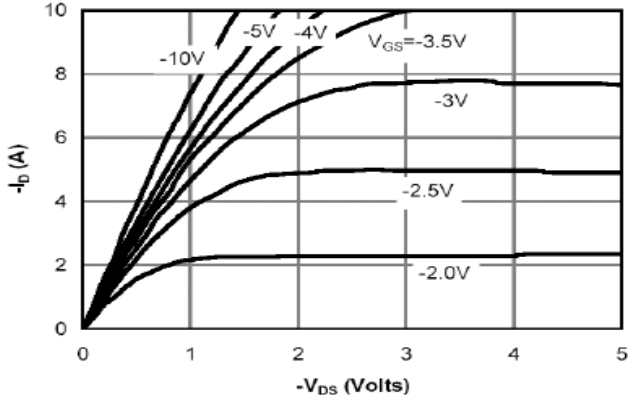
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-30	-	-	V	$V_{GS}=0, I_D = -250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.2	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$	
Gate Body Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 12\text{V}$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$T_J = 25^\circ\text{C}$	-	-	-1	$\mu\text{A}$	$V_{DS} = -30\text{V}, V_{GS}=0$
		$T_J = 70^\circ\text{C}$	-	-	-10		$V_{DS} = -24\text{V}, V_{GS}=0$
Drain-Source on-State Resistance	$R_{DS(on)}$		-	-	120	$\text{m}\Omega$	$V_{GS} = -10\text{V}, I_D = -2\text{A}$
			-	-	150		$V_{GS} = -4.5\text{V}, I_D = -1.5\text{A}$
			-	-	190		$V_{GS} = -2.5\text{V}, I_D = -1\text{A}$
Forward Transconductance	$g_{FS}$	-	4		S	$V_{DS} = -5\text{V}, I_D = -1.2\text{A}$	
Gate Resistance	$R_g$	-	12	-	$\Omega$	$f=1.0\text{MHz}$	
<b>Dynamic</b>							
Total Gate Charge <sup>2</sup>	$Q_g$	-	5.06	-	$\text{nC}$	$V_{DS} = -15\text{V},$ $V_{GS} = -4.5\text{V},$ $I_D = -1\text{A}$	
Gate-Source Charge	$Q_{gs}$	-	0.72	-			
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	1.58	-			
Input Capacitance	$C_{iss}$	-	409	-	$\text{pF}$	$V_{DS} = -15\text{V},$ $V_{GS}=0,$ $f = 1\text{MHz}$	
Output Capacitance	$C_{oss}$	-	55	-			
Reverse Transfer Capacitance	$C_{rss}$	-	42	-			
Turn-On Time <sup>2</sup>	$t_{d(on)}$	-	6.2	-	$\text{ns}$	$V_{DS} = -15\text{V},$ $R_L = 15\Omega,$ $V_{GS} = -10\text{V},$ $R_G = 3\Omega$	
	$t_r$	-	3.2	-			
Turn-Off Time	$t_{d(off)}$	-	41.2	-			
	$t_f$	-	14.5	-			
<b>Source-Drain Diode</b>							
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	-	-	-1	V	$I_S = -1\text{A}, V_{GS}=0$	
Reverse Recovery Time <sup>2</sup>	$T_{RR}$	-	13.2	-	nS	$I_S = -1\text{A}, V_{GS}=0,$	
Reverse Recovery Charge	$Q_{rr}$	-	5.4	-	nC	$di/dt=100\text{A} / \mu\text{S}$	
Continuous Source Current (Body Diode)	$I_S$	-	-	-0.5	A	$V_D = V_G = 0, V_S = -1\text{V}$	

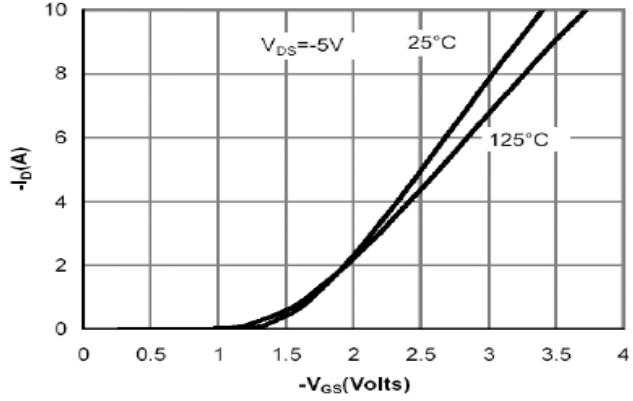
Note:

1. Pulse width limited by Max. junction temperature.
2. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Surface mounted on FR4 board,  $t \leq 10\text{sec}$

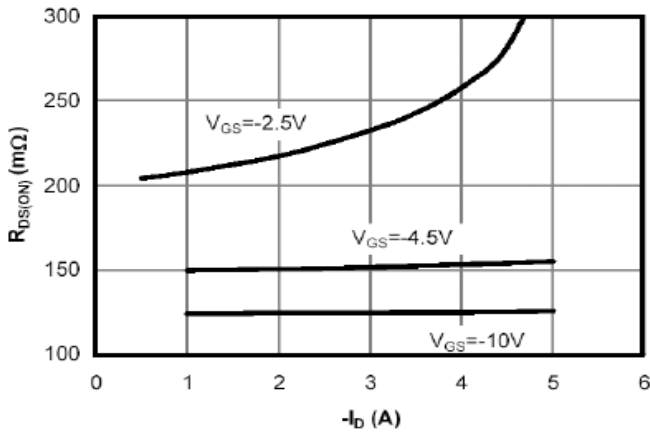
**CHARACTERISTIC CURVE**



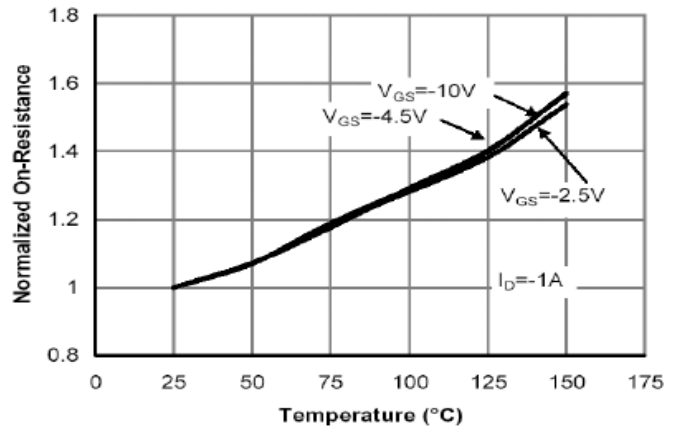
**Fig 1. Typical Output Characteristics**



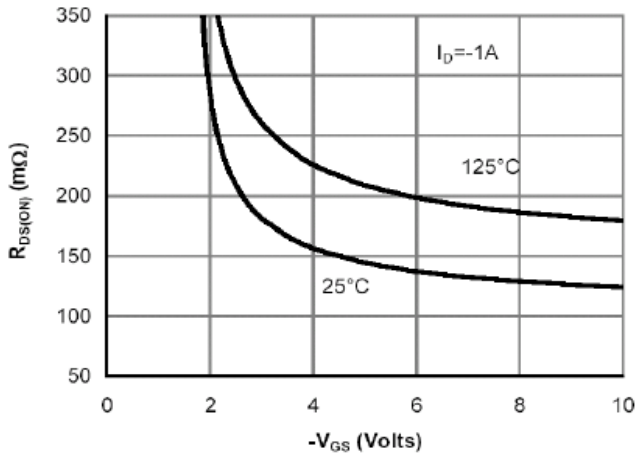
**Fig 2. Transfer Characteristics**



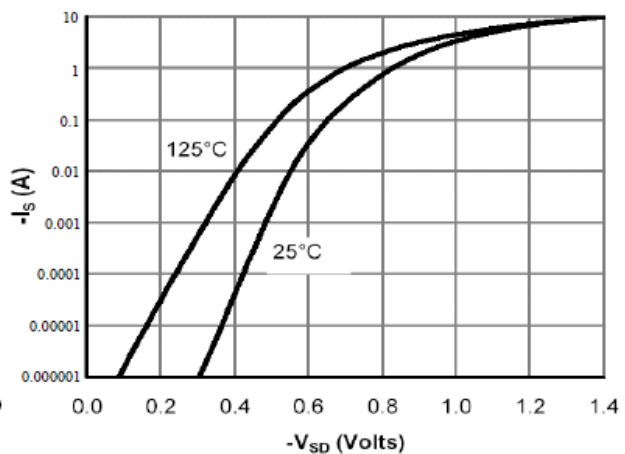
**Fig 3. On-Resistance v.s. Drain Current and Gate Voltage**



**Fig 4. On-Resistance v.s. Junction Temperature**

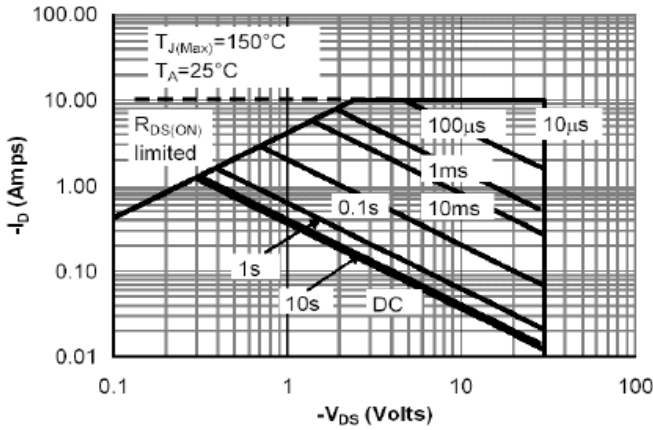


**Fig 5. On-Resistance v.s. Gate-Source Voltage**

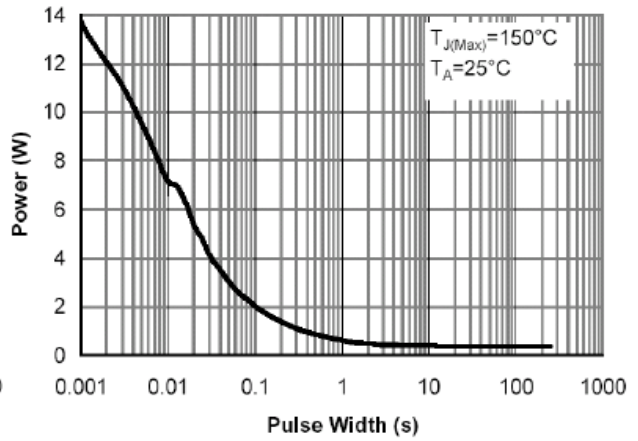


**Fig 6. Body Diode Characteristics**

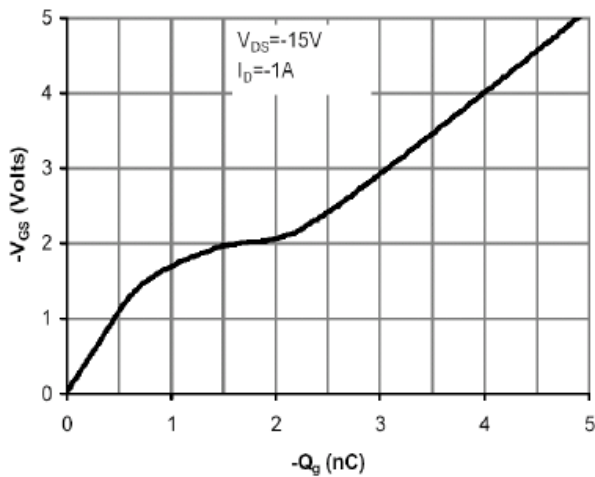
**CHARACTERISTIC CURVE**



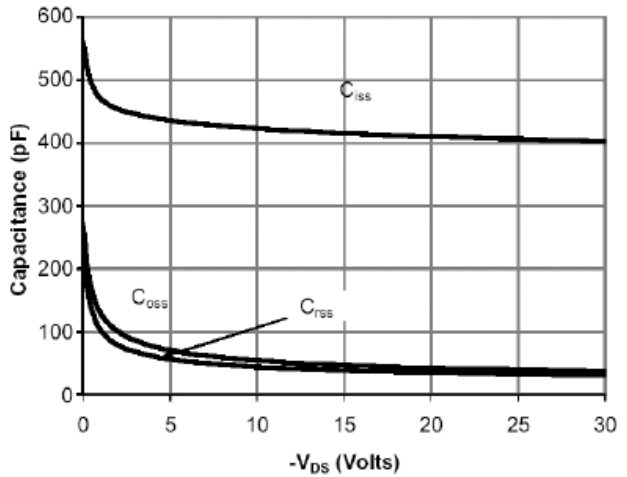
**Fig 7. Maximum Safe Operating Area**



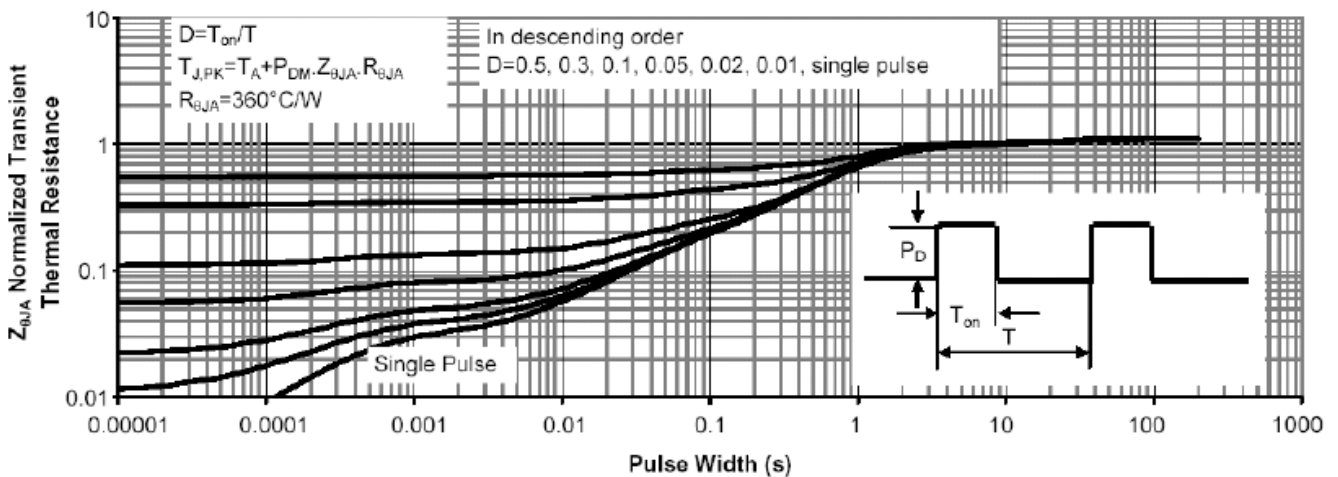
**Fig 8. Single Pulse Power Rating Junction-to-Ambient**



**Fig 9. Gate Charge Characteristics**



**Fig 10. Typical Capacitance Characteristics**



**Fig 11. Normalized Maximum Transient Thermal Impedance**