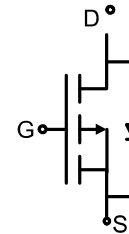


TP3401D

P-Channel Enhancement Mosfet

Feature

- -30V,-4.2A
 $R_{DS(ON)} < 59m\Omega @ V_{GS} = -10V$ TYP: 50 m Ω
 $R_{DS(ON)} < 74m\Omega @ V_{GS} = -4.5V$ TYP: 61 m Ω
 $R_{DS(ON)} < 100m\Omega @ V_{GS} = -4.5V$ TYP: 85 m Ω
- Advanced Trench Technology
- Lead free product is acquired



Schematic diagram

Application

- Interfacing Switching
- Load Switching
- Power management



SOT-23 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
A19T	TP3401D	Sot-23	7 inch	-	3000

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ($T_a = 25^\circ\text{C}$)	I_D	-4.2	A
Continuous Drain Current ($T_a = 70^\circ\text{C}$)	I_D	-2.7	A
Pulsed Drain Current	I_{DM}	-16	A
Power Dissipation	P_D	1.0	W
Thermal Resistance from Junction to Ambient ⁽⁴⁾	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =-250μA	-30	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-30V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±12V,V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽³⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.6	-0.85	-1.3	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =-10V, I _D =-4.2A	-	50	59	mΩ
		V _{GS} =-4.5V, I _D =-3A		61	74	
		V _{GS} =-2.5V, I _D =-1A	-	85	100	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f =1MHz	-	511	-	pF
Output Capacitance	C _{oss}		-	55	-	
Reverse Transfer Capacitance	C _{rss}		-	40	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =-15V, I _D =-1A, V _{GS} =-10V, R _G =6Ω	-	6.5	-	ns
Turn-on rise time	t _r		-	3.6	-	
Turn-off delay time	t _{d(off)}		-	32	-	
Turn-off fall time	t _f		-	11	-	
Total Gate Charge	Q _g	V _{DS} =-15V, I _D =-4.2A, V _{GS} =-4.5V	-	9.2	-	nC
Gate-Source Charge	Q _{gs}		-	2.1	-	
Gate-Drain Charge	Q _{gd}		-	2.9	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} =0V, I _S =-4.2A	-	-	-1.2	V
Diode Forward current ⁽⁴⁾	I _S		-	-	-4.2	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface Mounted on FR4 Board, $t \leq 10$ sec

Test Circuit

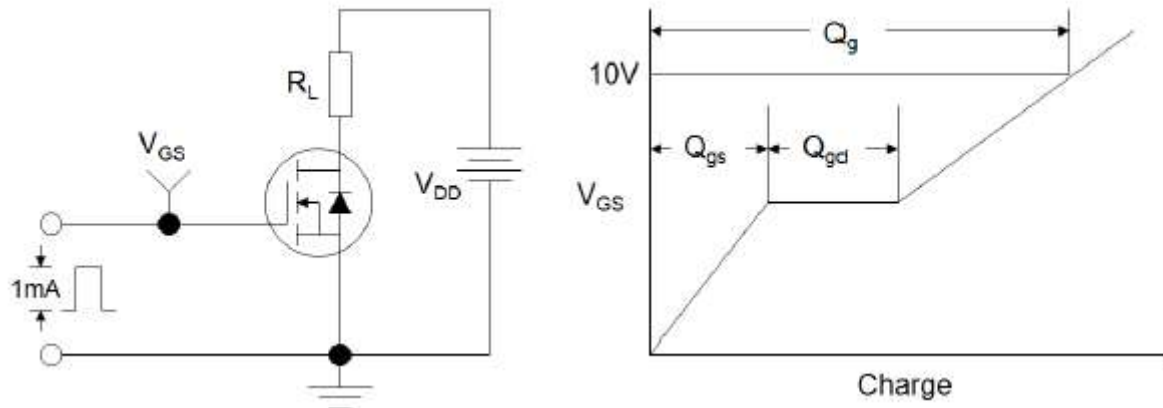


Figure1:Gate Charge Test Circuit & Waveform

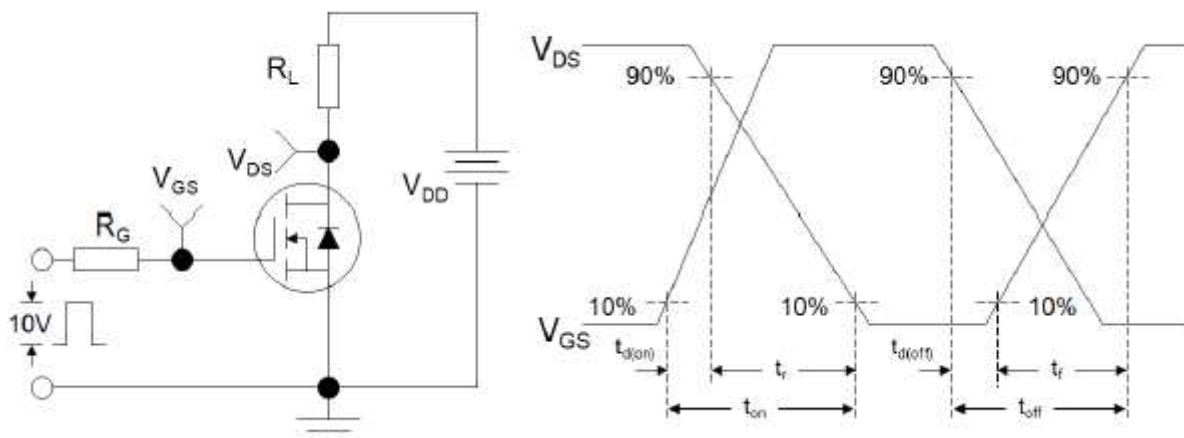


Figure 2: Resistive Switching Test Circuit & Waveforms

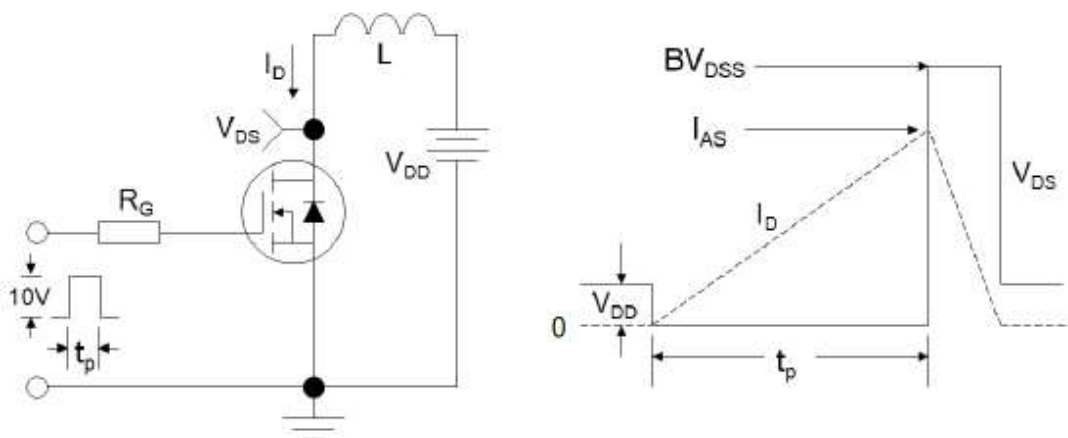


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Typical Performance Characteristics

Figure 1. Output Characteristics

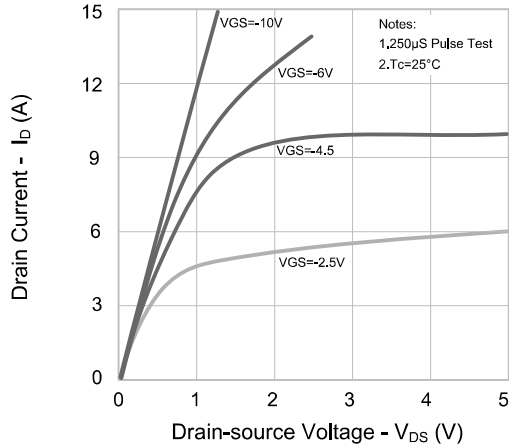


Figure 2. Transfer Characteristics

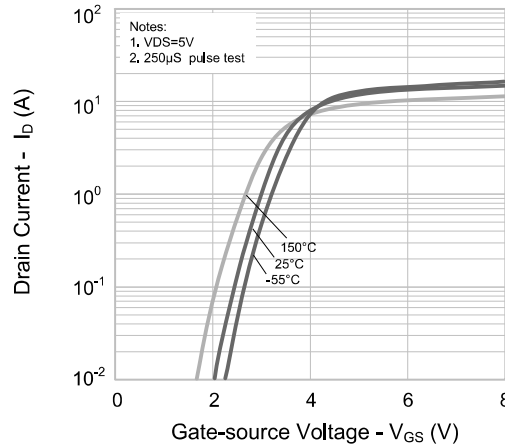


Figure 3. On-resistance vs. Drain Current

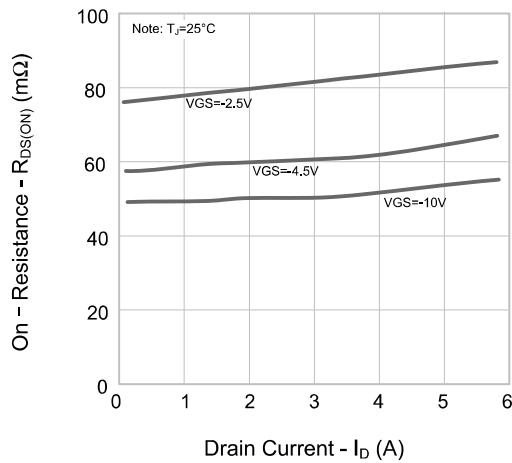


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

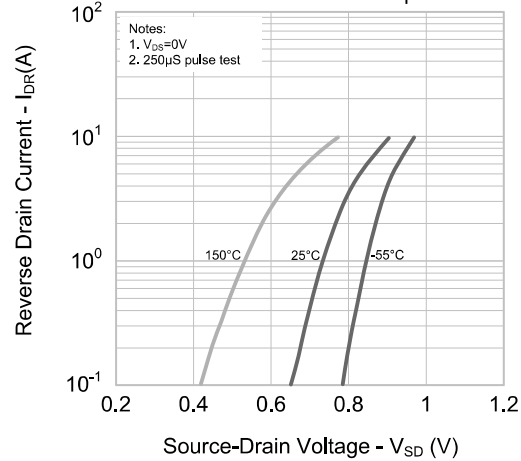


Figure 5. Capacitance Characteristics

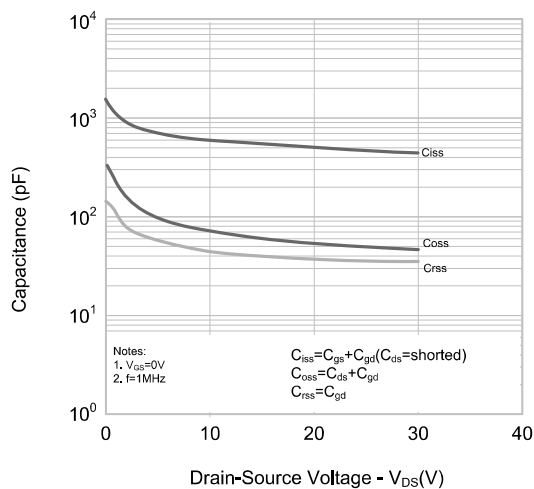
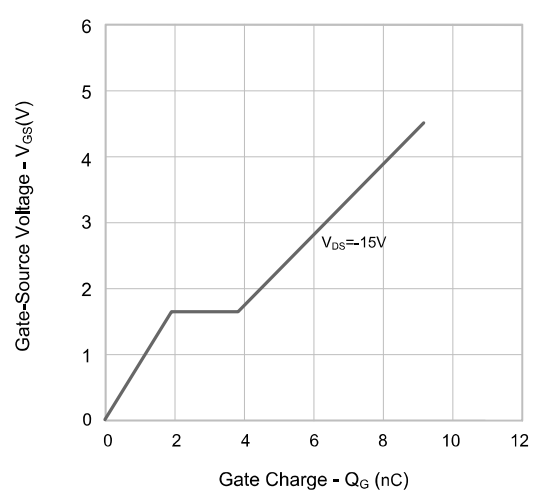


Figure 6. Gate Charge



Typical Performance Characteristics

Figure 7. Breakdown Voltage vs. Temperature Characteristics

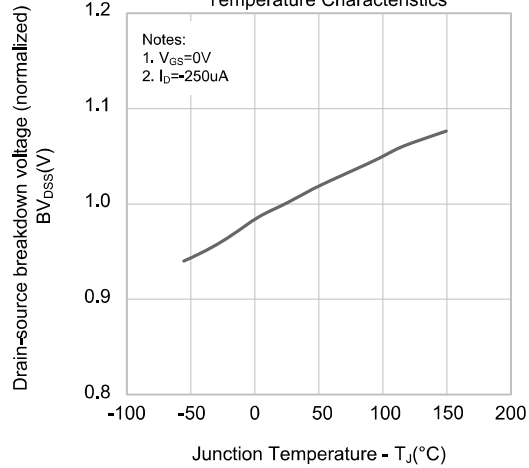


Figure 8. On-resistance vs. Temperature Characteristics

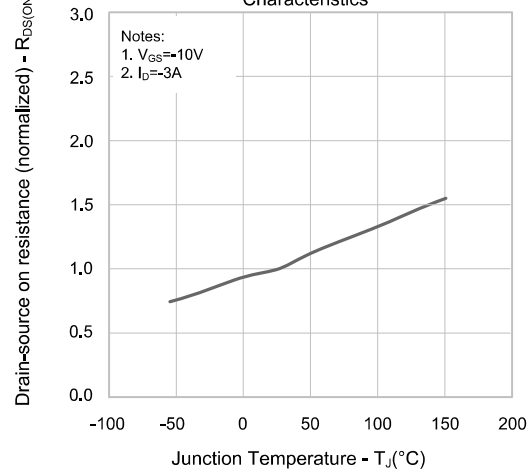
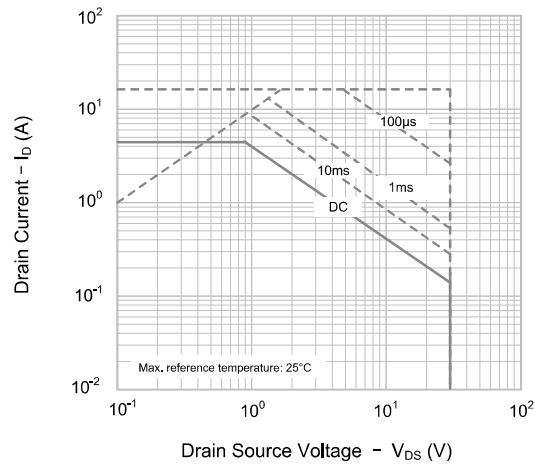
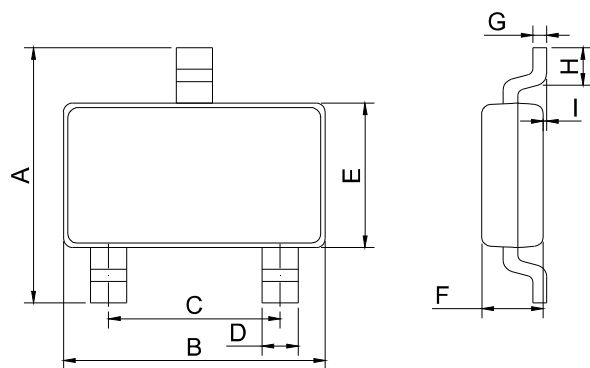


Figure 9. Max. Safe Operating Area



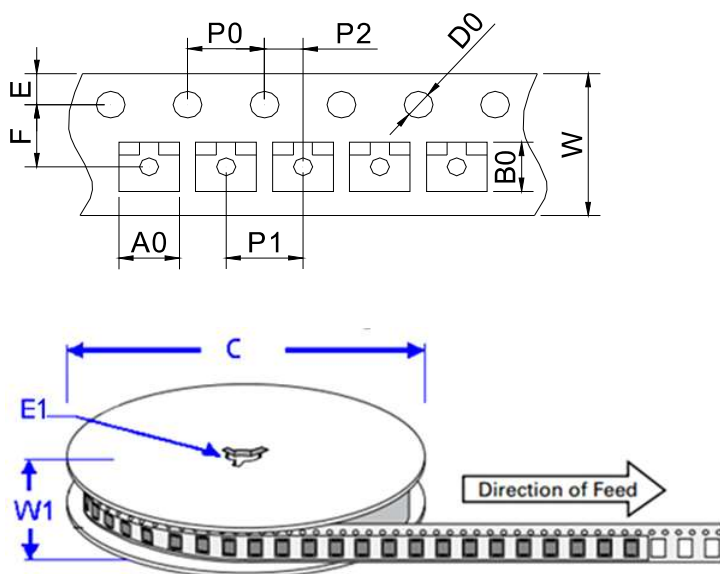
SOT-23 Package Information



SOT-23

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

Package Information-SOT-23



Ref.	Dimensions	
	Millimeters	Inches
A0	3.15 ± 0.3	0.124 ± 0.012
B0	2.77 ± 0.3	0.109 ± 0.012
C	178	7.0
D0	1.50±0.1	0.059 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3±0.3	0.524± 0.012
F	3.5 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.00 ± 0.2	0.315 ± 0.008
W1	11.5±1.0	0.453 ± 0.039