

FEATURES

The 3P10 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 5V. This device is suitable for use as a Battery protection or in other Switching application.

FEATURES

$V_{DS} = -100V$ $I_D = -3A$

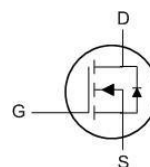
$R_{DS(ON)} < 300m\Omega$ @ $V_{GS} = -10V$

$V_{DSS} \quad -100 \text{ V}$
 $I_D \quad -3 \text{ A}$
 $R_{DS(ON)} \quad 282 \text{ m}\Omega$

3P10



Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^1$	-3	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^1$	-1.7	A
I_{DM}	Pulsed Drain Current ²	-9	A
$P_D @ T_A = 25^\circ\text{C}$	Total Power Dissipation ³	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	125	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	80	$^\circ\text{C/W}$

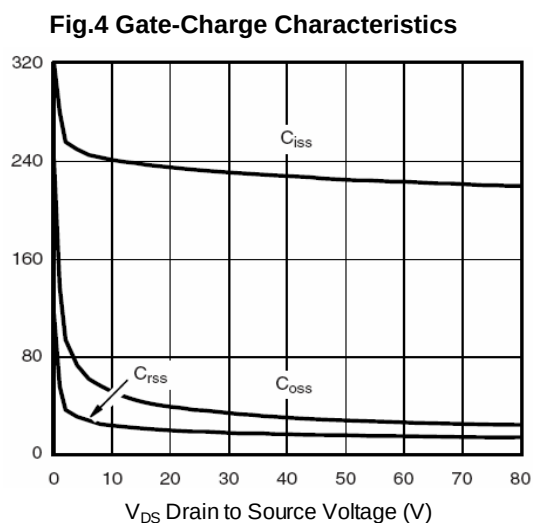
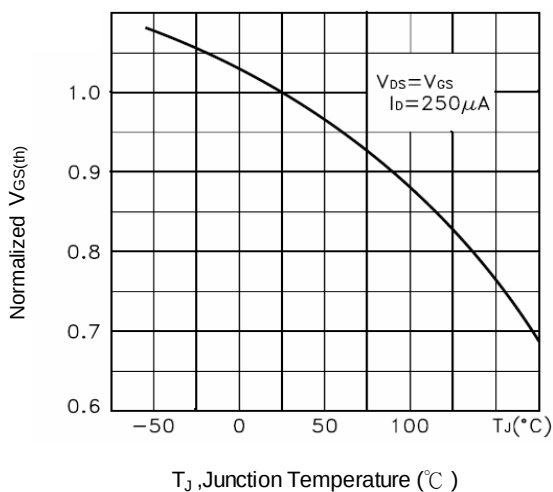
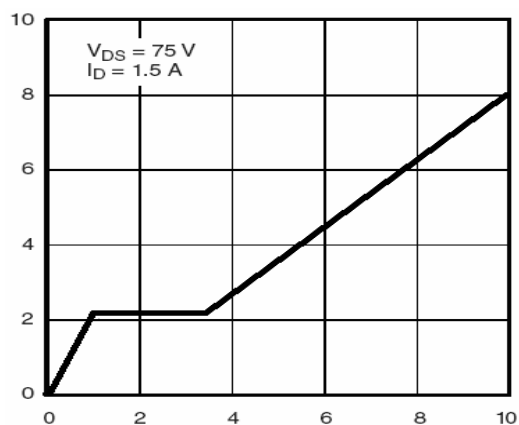
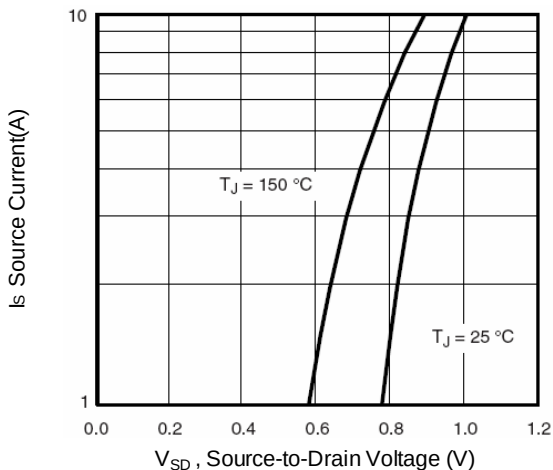
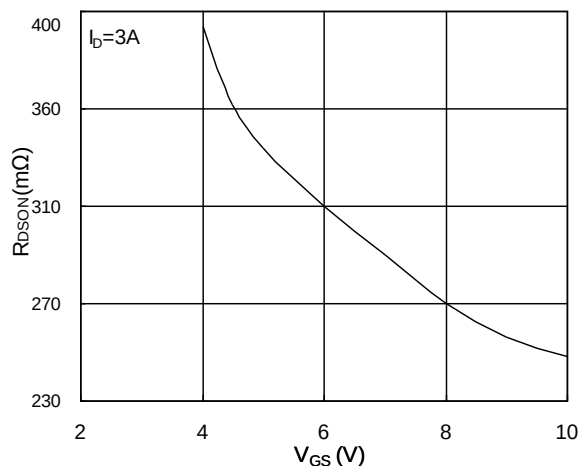
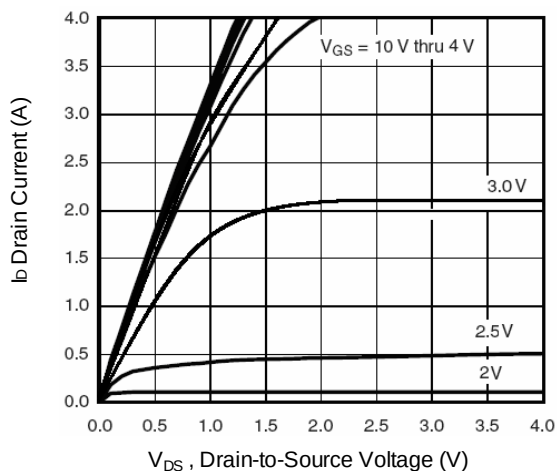
Electrical characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	---	---	V
$\Delta BVDSS/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.0624	---	$V/^\circ\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-3A$	---	282	300	m Ω
		$V_{GS}=-4.5V, I_D=-2A$	---	310	333	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1	---	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.5	---	mV/ $^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=-100V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-100V, V_{GS}=0V, T_J=100^\circ\text{C}$	---	---	100	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-0.8A$	---	3	---	S
R _g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	16	32	Ω
Q _g	Total Gate Charge (-4.5V)	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-0.5A$	---	4.5	---	nC
Q _{gs}	Gate-Source Charge		---	1.14	---	
Q _{gd}	Gate-Drain Charge		---	1.5	---	
Td(on)	Turn-On Delay Time	$V_{DD}=-50V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-0.5A$	---	17.6	---	ns
T _r	Rise Time		---	2.7	---	
Td(off)	Turn-Off Delay Time		---	4.5	---	
T _f	Fall Time		---	3	---	
Ciss	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	550	---	pF
Coss	Output Capacitance		---	56	---	
Crss	Reverse Transfer Capacitance		---	35	---	
IS	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	-3	A
ISM	Pulsed Source Current ^{2,4}		---	---	-9	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1.3	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

RATING AND CHARACTERISTIC CURVES



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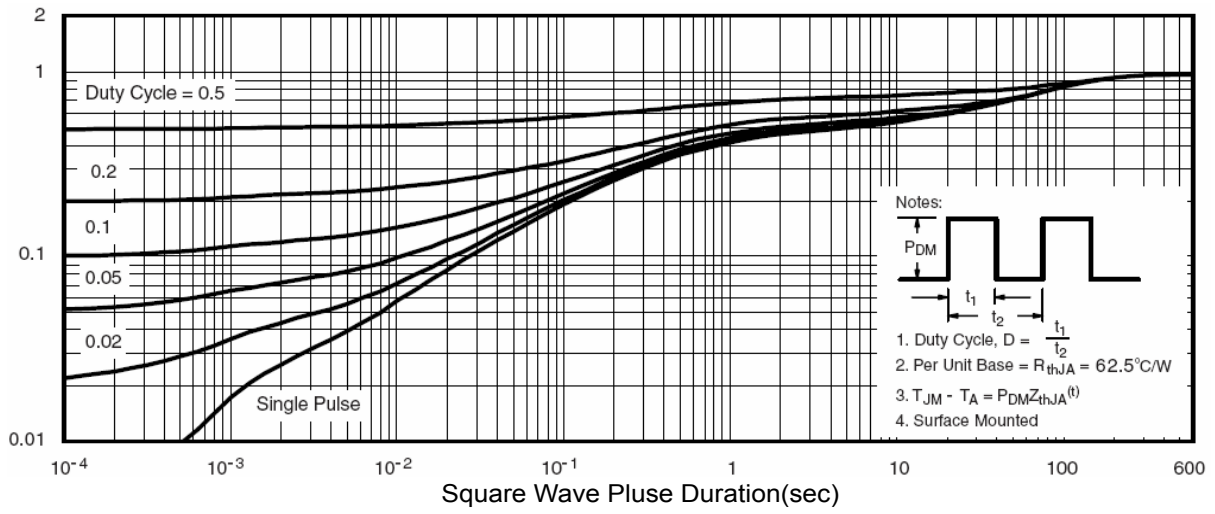


Fig.9 Normalized Maximum Transient Thermal Impedance

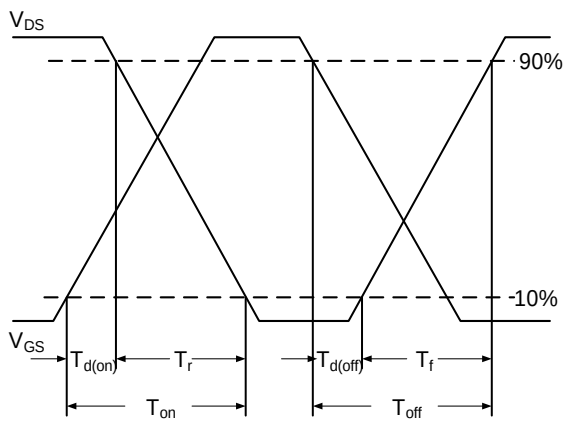


Fig.10 Switching Time Waveform

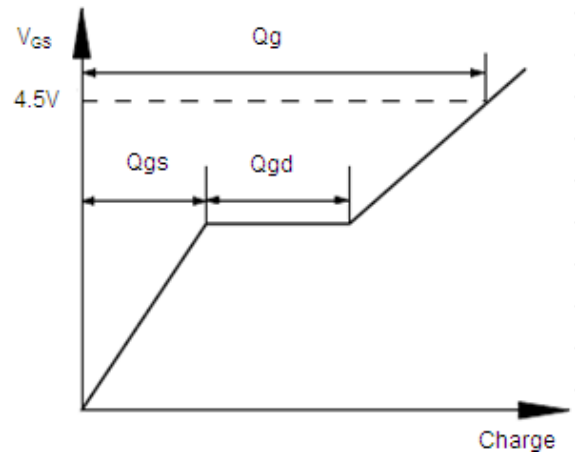
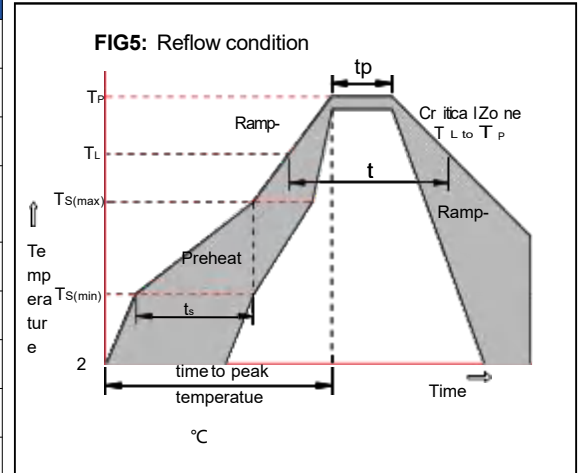


Fig.11 Gate Charge Waveform

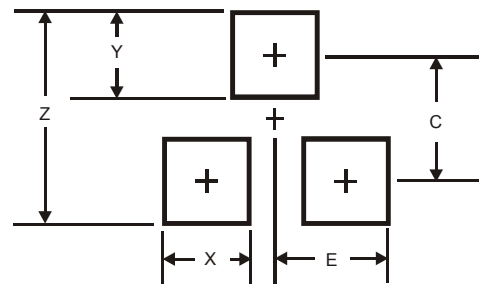
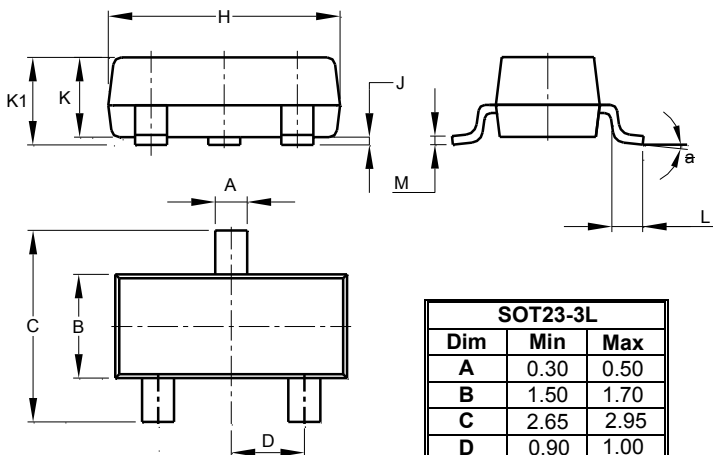
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

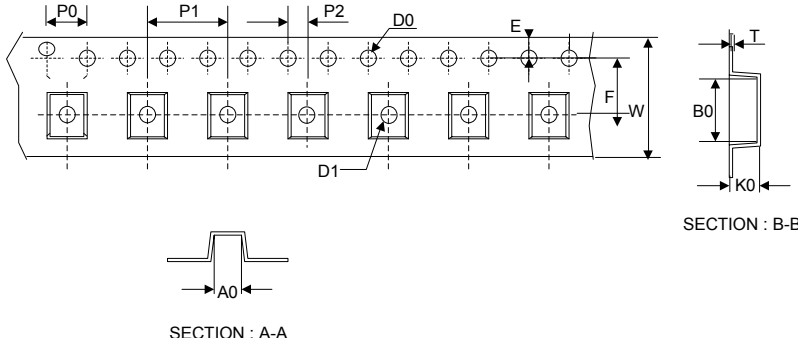
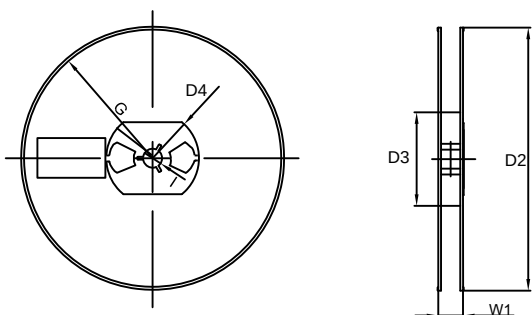


Package Dimensions & Suggested Pad Layout

SOT23-3L



Tape & reel specification

Tape		Symbol	Dimension (mm)
 SECTION : A-A SECTION : B-B		P0	4.00±0.20
		P1	4.00±0.20
		P2	2.00±0.20
		D0	1.55±0.20
		D1	1.05±0.20
		E	1.55±0.20
		F	3.60±0.20
		W	8.00±0.20
		A0	3.80±0.20
		B0	3.50±0.20
		K0	1.55±0.20
		T	0.25±0.15
		D2	178.0±5.0
		D3	55Min.
		D4	R24.0±3.0
7" Reel		G	R82.0±3.0
		I	13.0±2.0
		W1	11.0±3.0
		Quantity: 3000PCS	