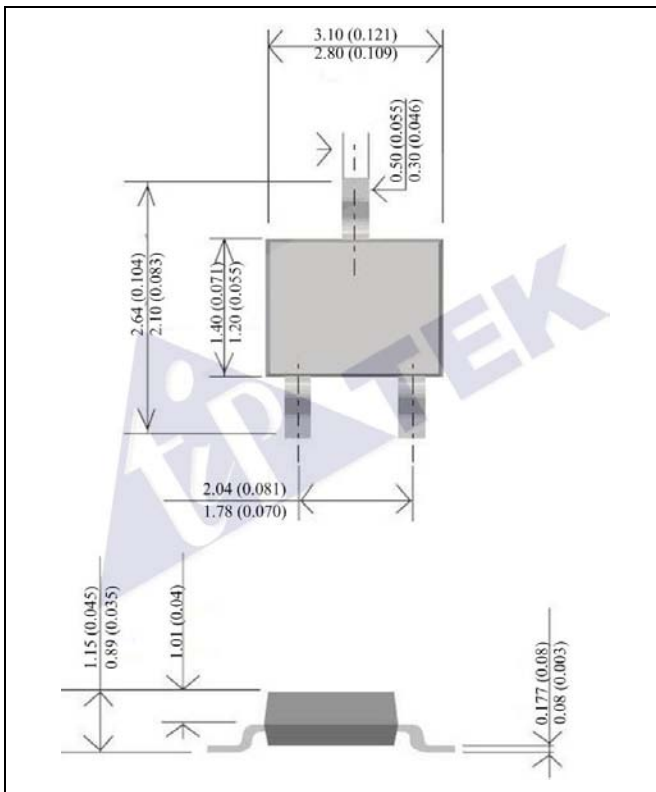


## P-CHANNEL ENHANCEMENT-MODE MOSFET



CASE : SOT-23

DIMENSIONS IN MILLIMETERS AND (INCHES)

### FEATURES

- ADVANCED TRENCH PROCESS TECHNOLOGY
- HIGH DENSITY CELL DESIGN FOR ULTRA LOW ON-RESISTANCE
- FULLY CHARACTERIZED AVALANCHE VOLTAGE AND CURRENT
- IMPROVED SHOOT-THROUGH FOM
- BOTH NORMAL AND PB FREE PRODUCT  
ARE AVAILABLE :NORMAL : 80~95% SN, 5~20% PB  
PB FREE: 99% SN ABOVE

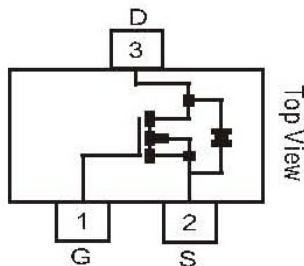
### MECHANICAL DATA

- WE DECLARE THAT THE MATERIAL OF PRODUCT COMPLIANCE WITH ROHS REUIREMENTS.
- Pb Free: TP2301PR  
Halogen Free: TP2301PR-H

### ABSOLUTE MAXIMUM RATINGS

RATINGS AT 25°C AMBIENT TEMPERATURE UNLESS OTHERWISE SPECIFIED.			
PATING	SYMBOL	TP2301PR	UNITS
DRAIN-SOURCE VOLTAGE	$V_{DS}$	-20	V
GATE-SOURCE VOLTAGE	$V_{GS}$	$\pm 8$	V
MAXIMUM DRAIN CURRENT-CONTINUE	$I_D$	-2.3	A
MAXIMUM POWER DISSIPATION DERATING @ $T_A = 25^\circ\text{C}$	$P_D$	0.9	W
OPERATING AND STORAGE JUNCTION TEMPERATURE RANGE	$T_J; T_{STG}$	- 55 TO +150	$^\circ\text{C}$
THERMAL RESISTANCE, JUNCTION-TO-AMBIENT (NOTE1)	$R_{\theta JA}$	140	$^\circ\text{C}/\text{W}$

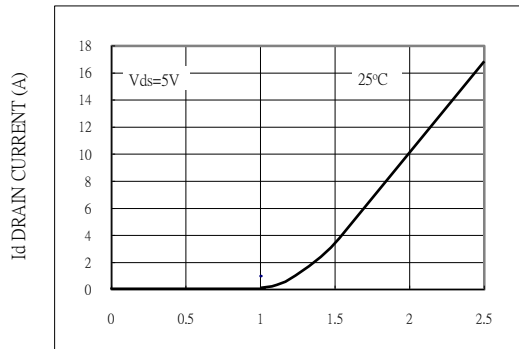
NOTE:1. 1-in<sup>2</sup> 2oz Cu PCB board



**ELECTRICAL CHARACTERISTICS**

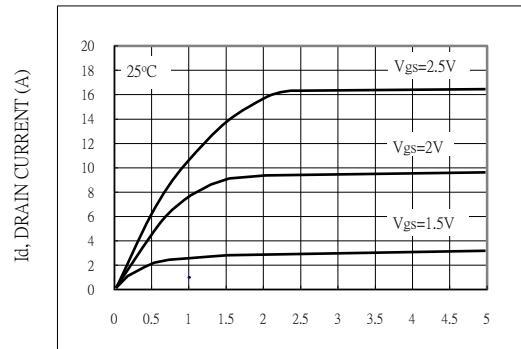
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
<b>STATIC</b>						
DRAIN-SOURCE BREAKDOWN VOLTAGE	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
DRAIN-SOURCE ON-STATE RESISTANCE	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-2.8A$	-	69	100	$m\Omega$
DRAIN-SOURCE ON-STATE RESISTANCE	$R_{DS(on)}$	$V_{GS}=-2.5V, I_D=-2.0A$	-	83	150	$m\Omega$
GATE THRESHOLD VOLTAGE	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-	-0.95	V
ZERO GATE VOLTAGE DRAIN CURRENT	$I_{DSS}$	$V_{DS}=-9.6V, V_{GS}=0V$	-	-	-1	$\mu A$
GATE BODY LEAKAGE	$I_{GSS}$	$V_{GS}=\pm 8V, V_{DS}=0V$	-	-	$\pm 100$	nA
FORWARD TRANSCONDUCTANCE	$g_{fs}$	$V_{DS}=-5V, I_D=-4.0A$	-	6.5	-	S
<b>DYNAMIC</b>						
TOTAL GATE CHARGE	$Q_g$	$V_{DS}=-6V, I_D=-2.8A$ $V_{GS}=-4.5V$	-	15.23	-	nC
GATE-SOURCE CHARGE	$Q_{gs}$		-	5.49	-	
GATE-DRAIN CHARGE	$Q_{gd}$		-	2.74	-	
TURN-ON DELAY TIME	$t_{d(on)}$	$V_{DD}=-6V, R_L=6\Omega$ $I_D=-1A, V_{GEN}=-4.5V$ $R_G=6\Omega$	-	17.28	-	ns
TURN-ON RISE TIME	$t_r$		-	3.73	-	
TURN-OFF DELAY TIME	$t_{d(off)}$		-	36.05	-	
TURN-OFF FALL TIME	$t_f$		-	6.19	-	
INPUT CAPACITANCE	$C_{iss}$	$V_{DS}=-6V, V_{GS}=0V$ $f=1.0MHz$	-	882.51	-	pF
OUTPUT CAPACITANCE	$C_{oss}$		-	145.54	-	
REVERSE TRANSFER CAPACITANCE	$C_{rss}$		-	97.26	-	
<b>SOURCE-DRAIN DIODE</b>						
MAX. DIODE FORWARD CURRENT	$I_S$	-	-	-	-2.4	A
DIODE FORWARD VOLTAGE	$V_{SD}$	$I_S=-0.75A, V_{GS}=0V$	-	-0.8	-1.2	V

**NOTE: Pulse Test: Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $\leq 2.0\%$ .**



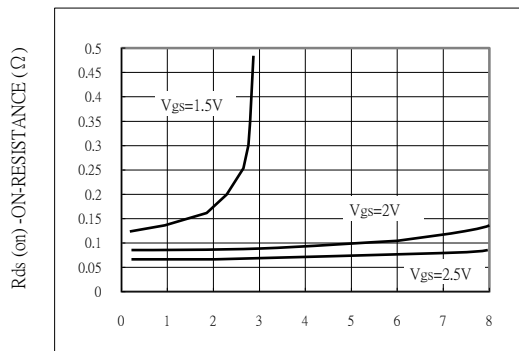
Vgs, GATE-TO-SOURCE VOLTAGE (V)

**Fig.1-TRANSFER CHARACTERISTICS**



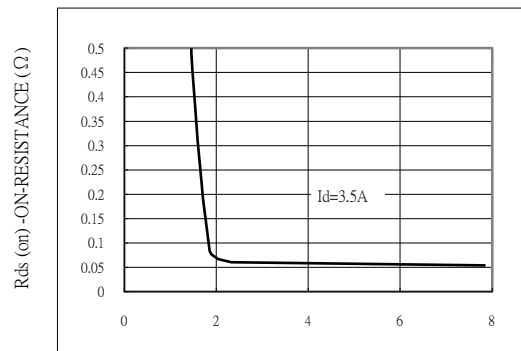
Vds, DRAIN-TO-SOURCE VOLTAGE (V)

**Fig.2-ON-REGION CHARACTERISTICS**



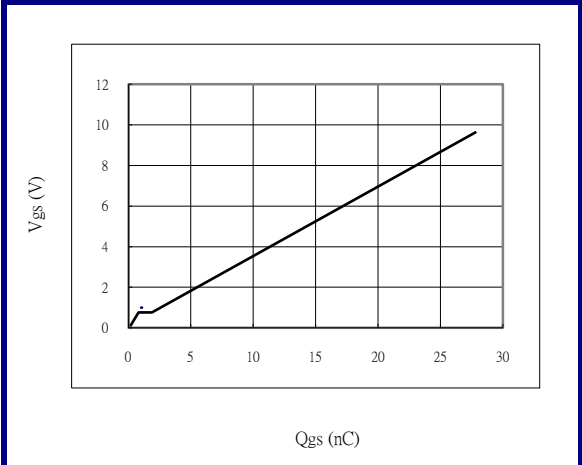
Id-DRAIN CURRENT

**Fig.3- ON-RESISTANCE VERSUS DRAIN CURRENT**

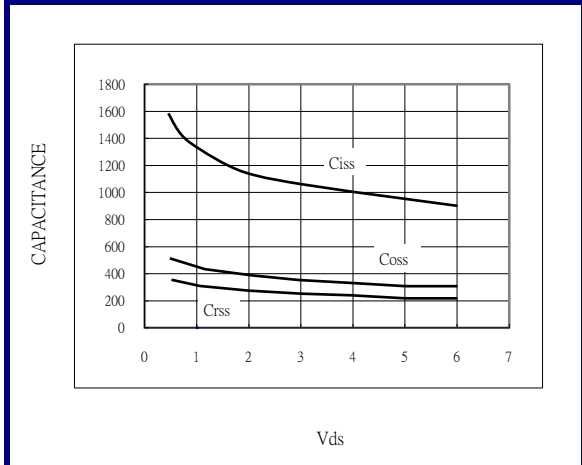


Vgs, GATE-TO-SOURCE VOLTAGE (V)

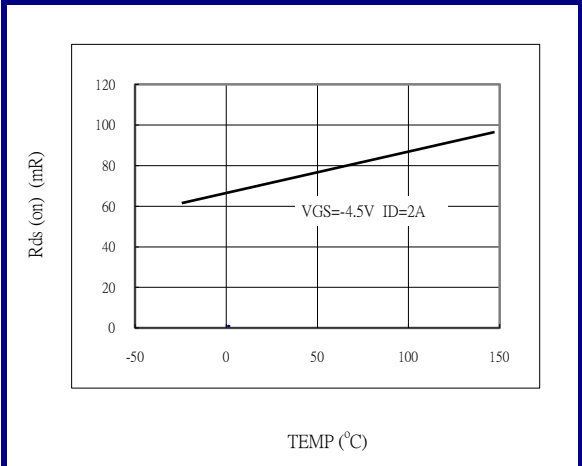
**Fig.4-ON-RESISTANCE VS GATE-TO-SOURCE VOLTAGE**



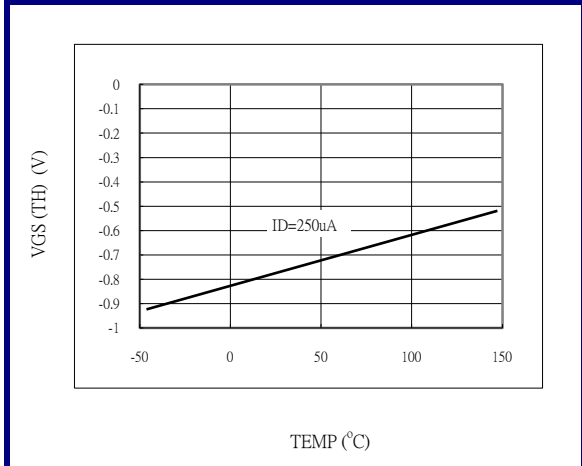
**Fig.5-GATE GHARGE**



**Fig.6-CAPACITANCE**



**Fig.7- ON-RESISTANCE VS. JUNCTION TEMPERATURE**



**Fig.8-VTH VS. JUNCTION TEMPERATURE**