

# SI2310-TP Datasheet

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DiGi Electronics Part Number	SI2310-TP-DG
Manufacturer	<a href="#">Micro Commercial Co</a>
Manufacturer Product Number	SI2310-TP
Description	MOSFET N-CH 60V 3A SOT23
Detailed Description	N-Channel 60 V 3A (Ta) 350mW (Ta) Surface Mount SOT-23

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## Purchase and inquiry

Manufacturer Product Number:

SI2310-TP

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

60 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

2V @ 250 $\mu$ A

Vgs (Max):

$\pm$ 20V

FET Feature:

-

Operating Temperature:

-55 $^{\circ}$ C ~ 150 $^{\circ}$ C (TJ)

Supplier Device Package:

SOT-23

Base Product Number:

SI2310

Manufacturer:

Micro Commercial Co

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25 $^{\circ}$ C:

3A (Ta)

Rds On (Max) @ Id, Vgs:

125mOhm @ 3A, 4.5V

Gate Charge (Qg) (Max) @ Vgs:

6 nC @ 4.5 V

Input Capacitance (Ciss) (Max) @ Vds:

247 pF @ 30 V

Power Dissipation (Max):

350mW (Ta)

Mounting Type:

Surface Mount

Package / Case:

TO-236-3, SC-59, SOT-23-3

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

**Features**

- Trench MV MOSFET Technology
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings**

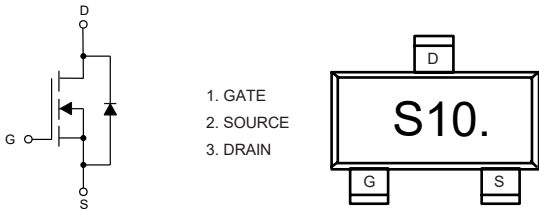
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 105°C/W Junction to Ambient (Note 2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	3
		$T_A=70^\circ\text{C}$	2.4
Pulsed Drain Current (Note 3)	$I_{DM}$	12	A
Total Power Dissipation (Note 4)	$P_D$	1.2	W

Note:

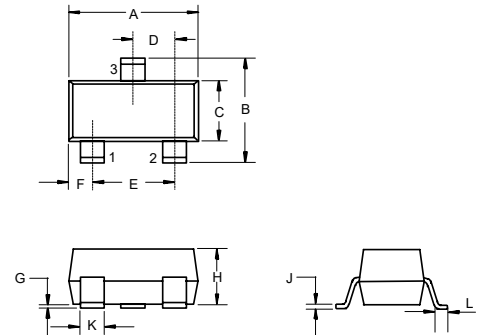
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-ambient thermal resistance.

**Internal Structure and Marking Code**



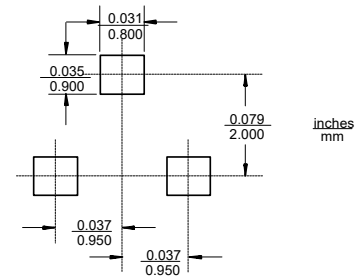
**N-Channel MOSFET**

**SOT-23**



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.110	0.120	2.80	3.04	
B	0.083	0.104	2.10	2.64	
C	0.047	0.055	1.20	1.40	
D	0.034	0.041	0.85	1.05	
E	0.067	0.083	1.70	2.10	
F	0.018	0.024	0.45	0.60	
G	0.0004	0.006	0.01	0.15	
H	0.035	0.043	0.90	1.10	
J	0.003	0.007	0.08	0.18	
K	0.012	0.020	0.30	0.51	
L	0.007	0.020	0.20	0.50	

**Suggested Solder Pad Layout**

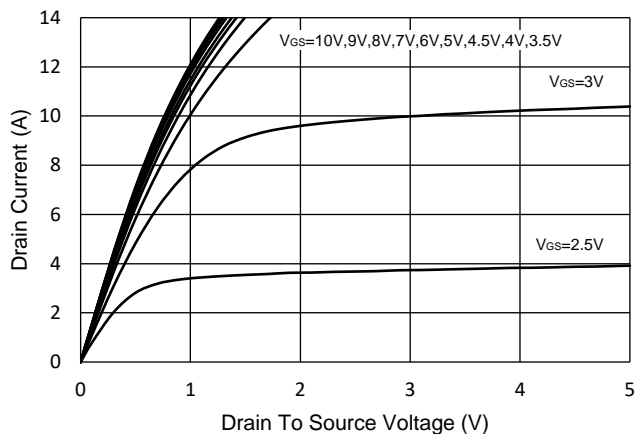


**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

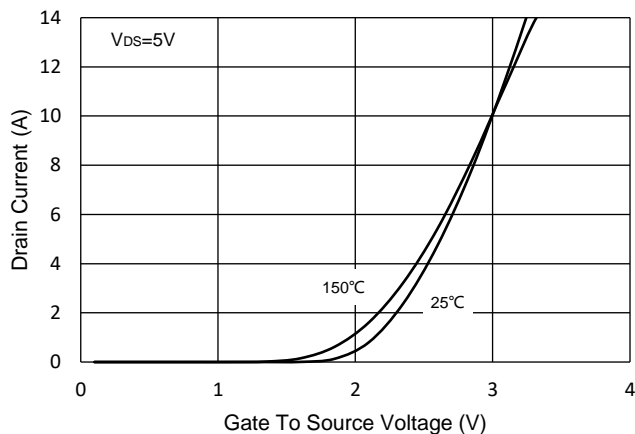
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	1.4	2.0	V
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=3A$		63	105	m $\Omega$
		$V_{GS}=4.5V, I_D=2A$		70	125	
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=3A$		8.5		S
Gate Resistance	$R_g$	f=1 MHz, Open drain		1.7		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				3	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=3A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=3A, di_F/dt=100A/\mu s$		14		ns
Reverse Recovery Charge	$Q_{rr}$			11		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, f=1MHz$		546		pF
Output Capacitance	$C_{oss}$			45		
Reverse Transfer Capacitance	$C_{rss}$			35		
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V, I_D=3A$		10		nC
Gate-Source Charge	$Q_{gs}$			1.7		
Gate-Drain Charge	$Q_{gd}$			2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=2.7\Omega, I_D=2A$		6		ns
Turn-On Rise Time	$t_r$			3		
Turn-Off Delay Time	$t_{d(off)}$			16		
Turn-Off Fall Time	$t_f$			2.5		

### Curve Characteristics

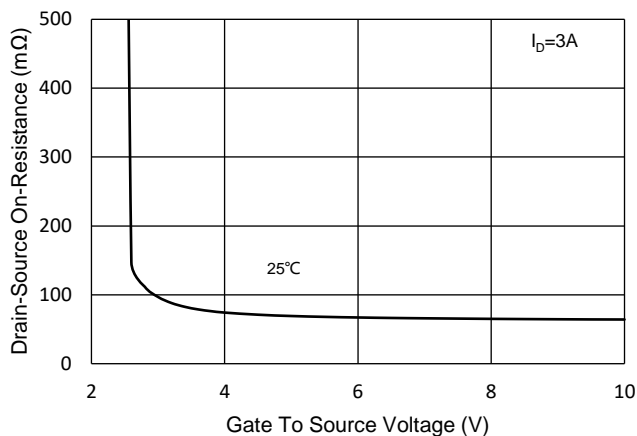
**Fig.1 - Typical Output Characteristics**



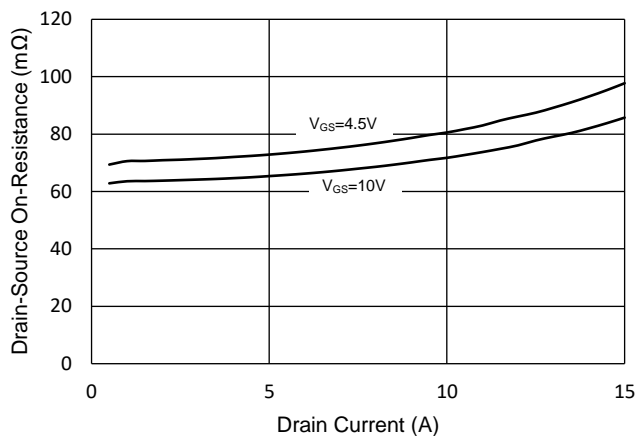
**Fig.2 - Transfer Characteristic**



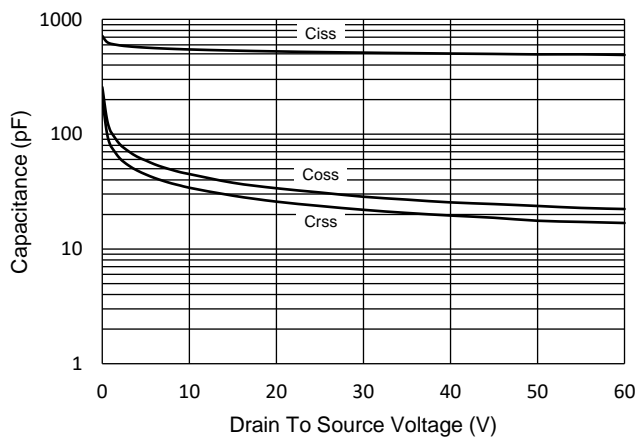
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



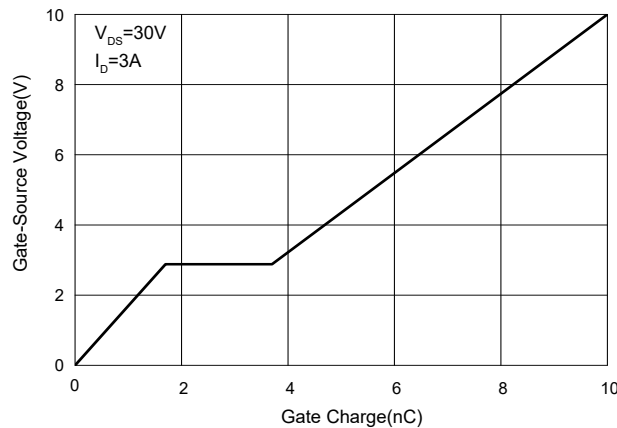
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**



**Fig. 6 - Gate Charge**



Curve Characteristics

Fig.7 - Normalized Threshold Voltage

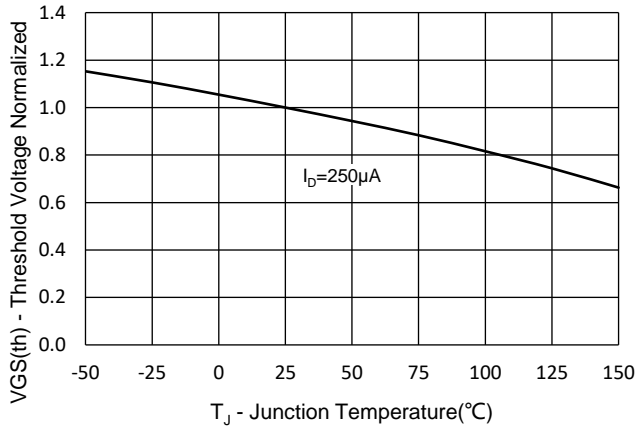


Fig.8 - Normalized On Resistance Characteristics

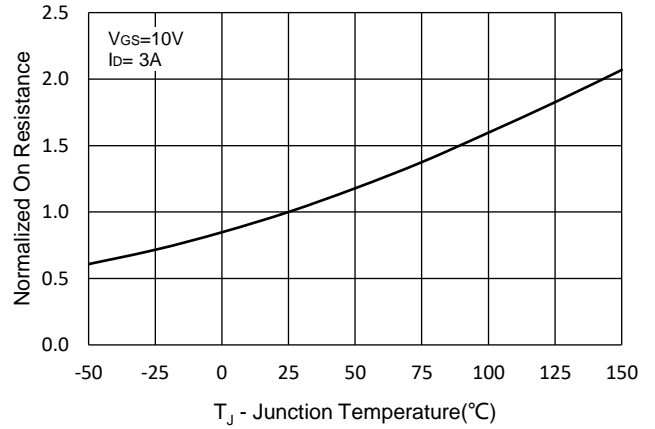


Fig.9 - I<sub>S</sub> - V<sub>SD</sub>

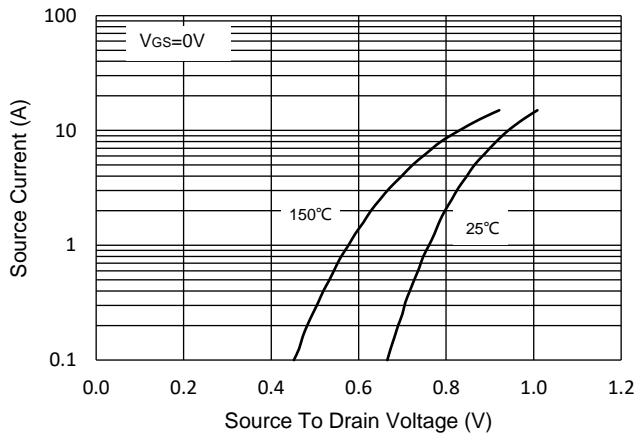


Fig.10 - Drain Current

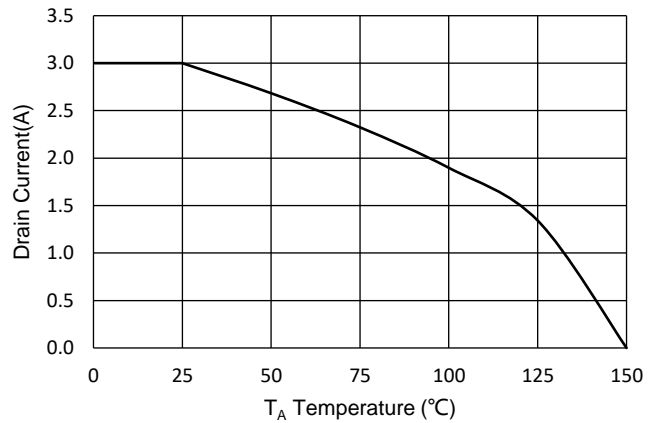
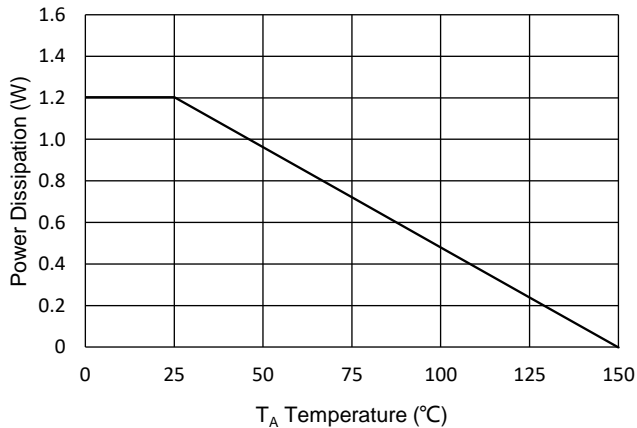


Fig.11 - PD Dissipation



### Curve Characteristics

Fig.12 - Safe Operation Area

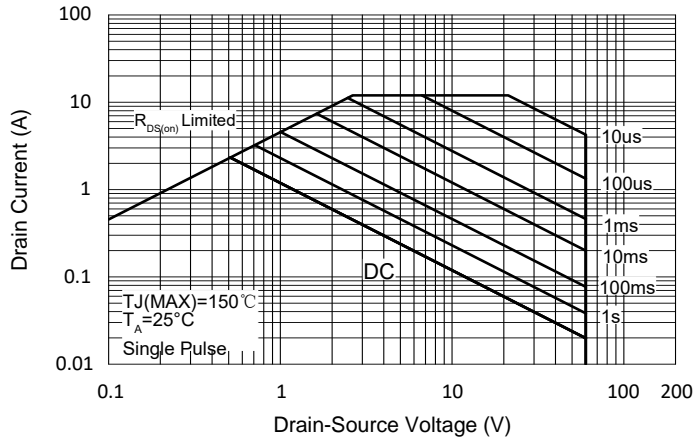
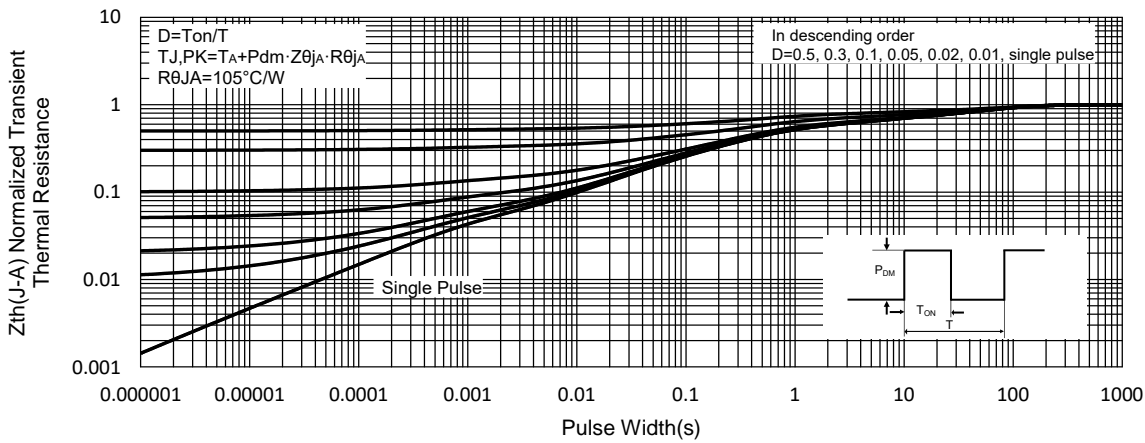


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel:3Kpcs/Reel

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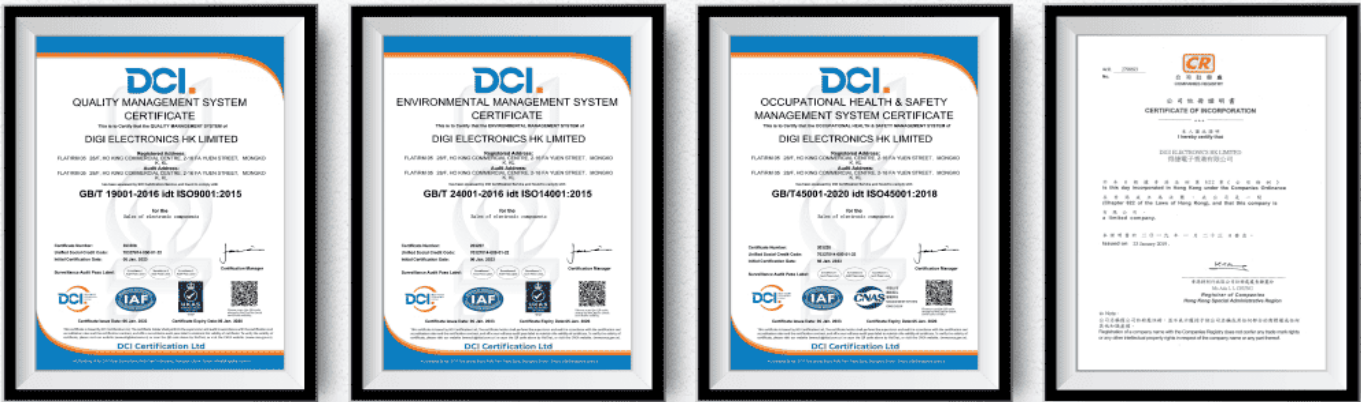
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