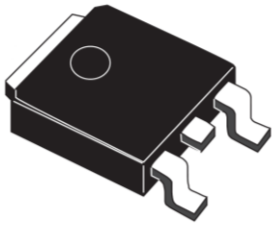
TX1S30N06L

Silicon N-Channel Power MOSFET

V_{DSS}	60	V
I_D	30	A
$P_D(T_C=25℃)$	80	W
$R_{DS(ON)(type)}$	26	mΩ

TO-252



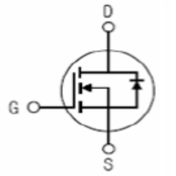
General Description :

TX1S30N06L the silicon N-channel Enhanced VDMOSFETS, is obtained by the self-aligned trench Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-252, which accords with the RoHS standard.

Features :

- Fast Switching
- Low Gate Charge and R_{dson}
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Inner Equivalent Principium Chart



Applications :

- Power switch circuit of adaptor and charger.

Absolute (Tc= 25℃ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current	30	A
	Continuous Drain Current T_C = 100 °C	21.6	A
$I_{DM}{}^{a1}$	Pulsed Drain Current	96.0	A
V_{GS}	Gate-to-Source Voltage	±20	V
dv/dt ^{a3}	Peak Diode Recovery dv/dt	7.5	V/ns
P_D	Power Dissipation	80	W
	Derating Factor above 25°C	0.53	W/℃
T_J , T_{stg}	Operating Junction and Storage Temperature Range	175 , –55 to 175	℃
T_L	MaximumTemperature for Soldering	300	℃

Electrical Characteristics (Tc= 25℃ unless otherwise specified)：

OFF Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	60	72	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=250uA,Reference25℃	--	0.05	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=60V,V_{GS}= 0V,T_a=25℃	--	--	1	μA
		V_{DS} =48V, V_{GS}= 0V,T_a=125℃	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	10	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-10	μA

ON Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=30A	--	26	38	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.8	2.5	V
Pulse width tp≤380μs,δ≤2%						

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=18A	--	17	--	S
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=25V f=1.0MHz	--	1200	--	pF
C_{oss}	Output Capacitance		--	120	--	
C_{rss}	Reverse Transfer Capacitance		--	70	--	

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D=2.0A,V_{DD}=325V V_{GS}=10V,R_G=9.1Ω	--	10	--	ns
t_r	Rise Time		--	18	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	35	--	
t_f	Fall Time		--	8	--	
Q_g	Total Gate Charge	I_D=2.0A,V_{DD}=325V V_{GS}=10V	--	13	--	nC
Q_{gs}	Gate to Source Charge		--	6.8	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	4.0	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	30	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	96	A
V_{SD}	Diode Forward Voltage	I_S=30A,V_{GS}=0V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S=30A,T_j = 25°C dI_F/dt=100A/us,V_{GS}=0V	--	53	--	ns
Q_{rr}	Reverse Recovery Charge		--	86	--	nC
Pulse width tp≤380μs,δ≤2%						

Symbol	Parameter	Typ.	Units
$R_{θJC}$	Junction-to-Case	3.57	℃/W
$R_{θJA}$	Junction-to-Ambient	62	℃/W

[a1] : Repetitive rating; pulse width limited by maximum junction temperature

[a2] : I_{SD} =30A,di/dt≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Test Circuit and Waveform

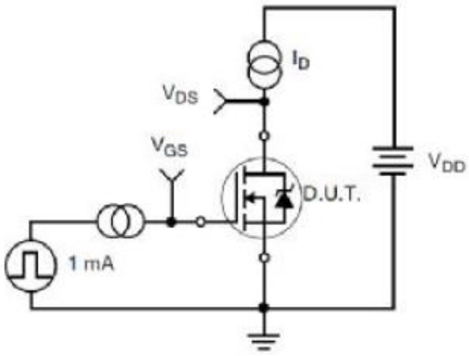


Figure 17. Gate Charge Test Circuit

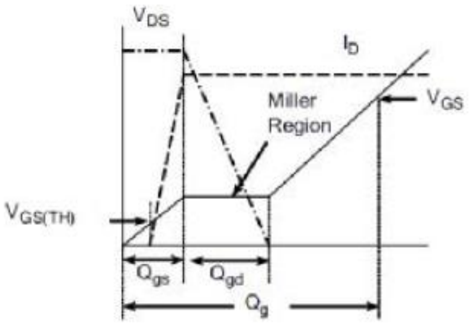


Figure 18. Gate Charge Waveform

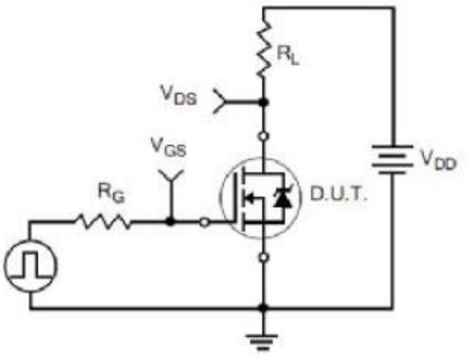


Figure 19. Resistive Switching Test Circuit

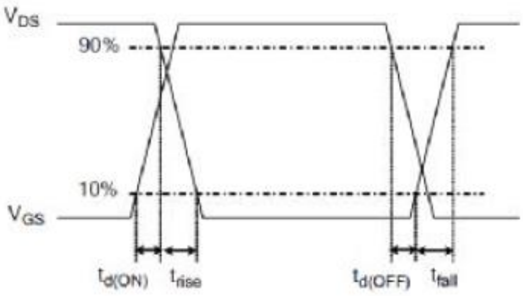


Figure 20. Resistive Switching Waveforms

Characteristics Curve :

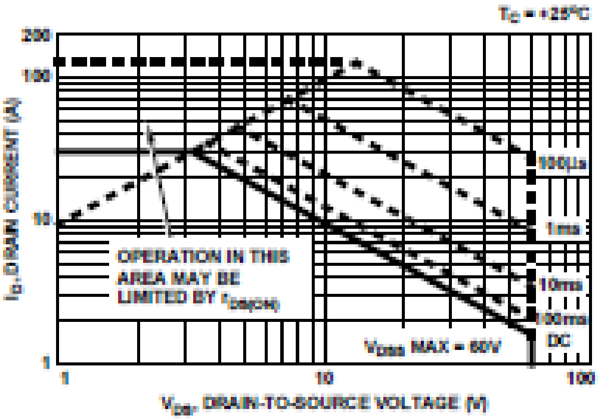


FIGURE 1. SAFE OPERATING AREA CURVE

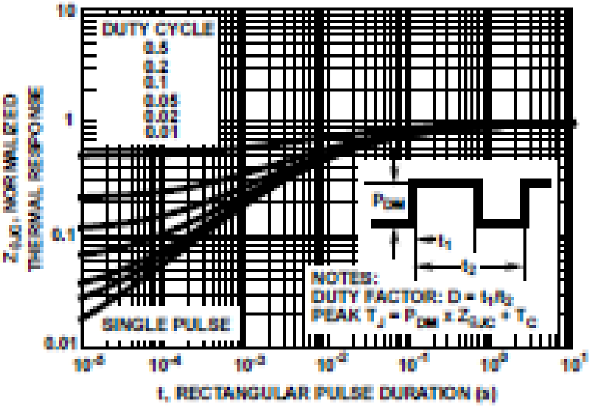


FIGURE 2. NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

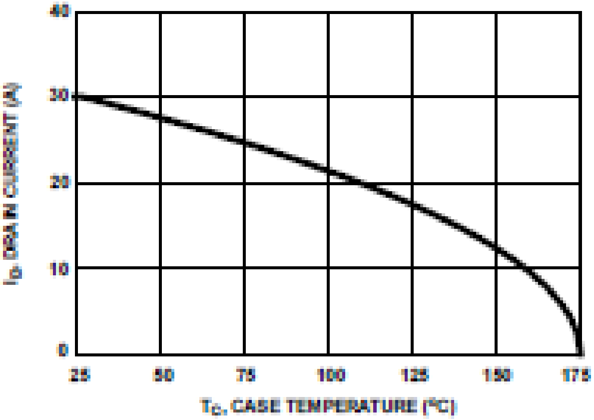


FIGURE 3. MAXIMUM CONTINUOUS DRAIN CURRENT vs TEMPERATURE

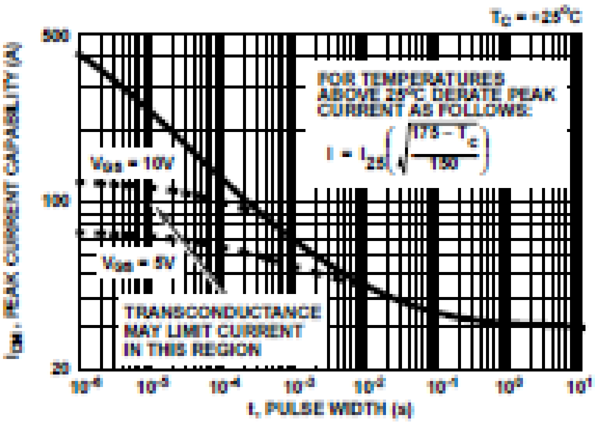


FIGURE 4. PEAK CURRENT CAPABILITY

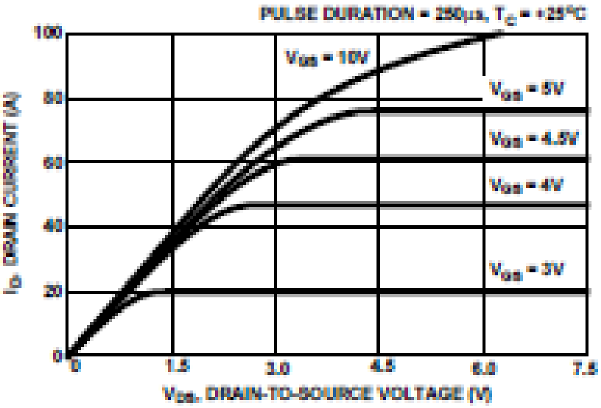


FIGURE 5. TYPICAL SATURATION CHARACTERISTICS

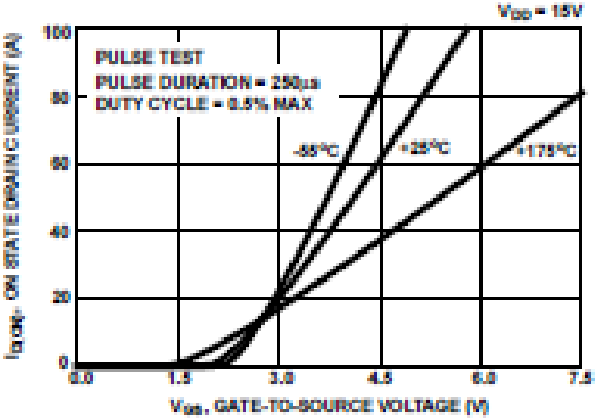


FIGURE 6. TYPICAL TRANSFER CHARACTERISTICS

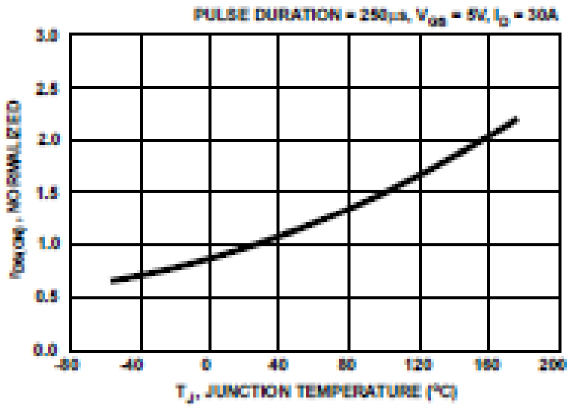


FIGURE 7. NORMALIZED $r_{DS(ON)}$ vs JUNCTION TEMPERATURE

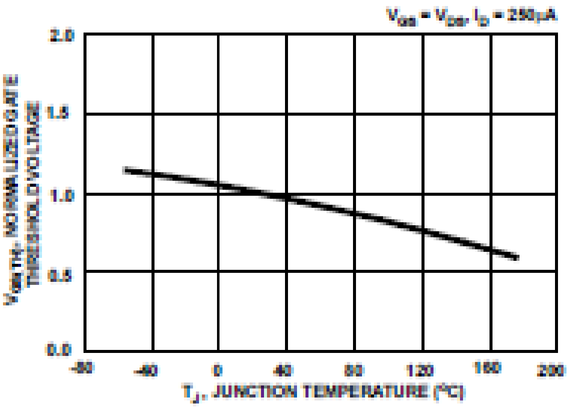


FIGURE 8. NORMALIZED GATE THRESHOLD VOLTAGE vs TEMPERATURE

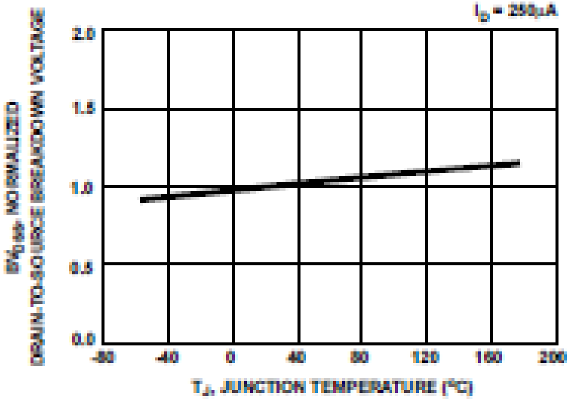


FIGURE 9. NORMALIZED DRAIN SOURCE BREAKDOWN VOLTAGE vs TEMPERATURE

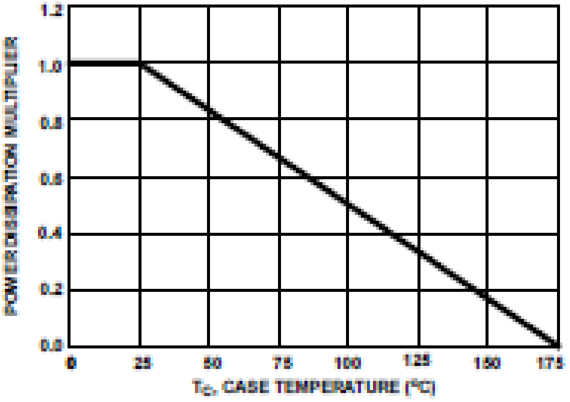


FIGURE 10. NORMALIZED POWER DISSIPATION vs TEMPERATURE DERATING CURVE

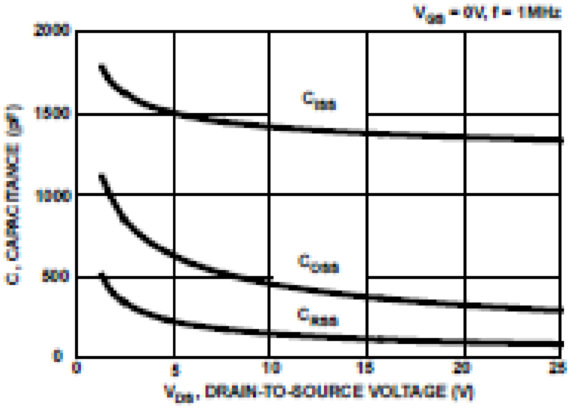


FIGURE 11. TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

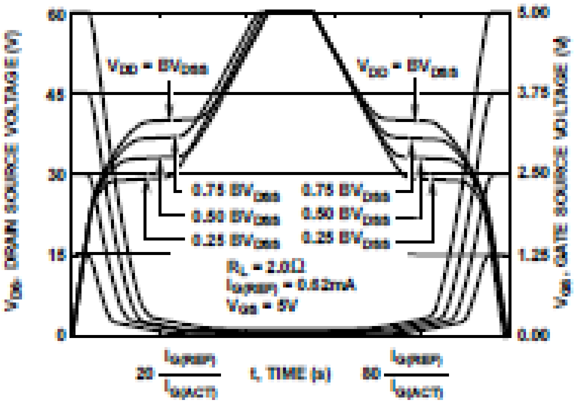
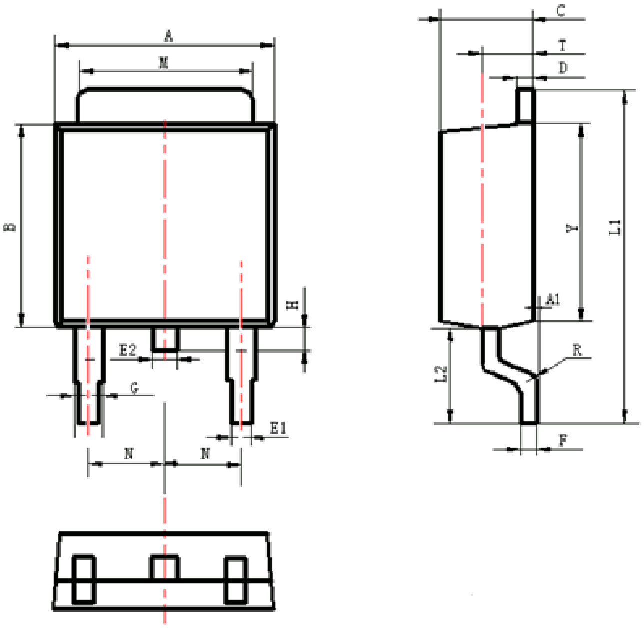


FIGURE 12. NORMALIZED SWITCHING WAVEFORMS FOR CONSTANT GATE CURRENT. REFER TO HARRIS APPLICATION NOTES AN7254 AND AN7260

Package Information



Items	**Values(mm)**	
	MIN	MAX
A	6.30	6.90
A1	0	0.16
B	5.70	6.30
C	2.10	2.50
D	0.30	0.70
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.40	1.00
M	5.10	5.50
N	2.09	2.49
R	0.3	
T	1.40	1.60
Y	5.10	6.30

TO-252 Package