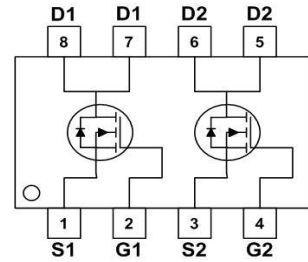




Dual N-Channel Enhancement Mode Power MOSFET

Description

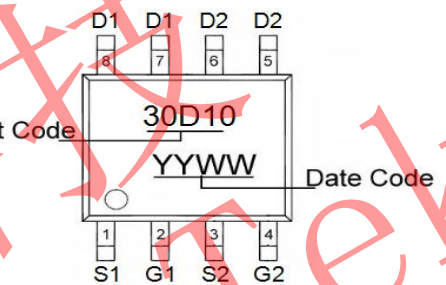
The MX30D10 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.



General Features

- ◆ $V_{DS} = 30V$, $I_D = 10A$
- ◆ $R_{DS(ON)}(Typ.) 11.5m\Omega @ V_{GS}=10V$
- ◆ $R_{DS(ON)}(Typ.) 14.5m\Omega @ V_{GS}=4.5V$
- ◆ High density cell design for ultra low Rds on
- ◆ Fully characterized Avalanche voltage and current

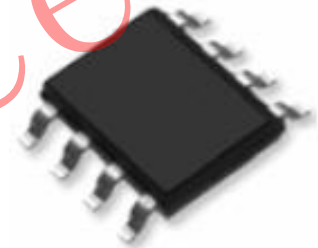
Schematic diagram



Marking and pin assignment

Application

Power switching application
Hard Switched and High Frequency Circuits
Uninterruptible Power Supply



SOP-8 top view

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	10	A
Drain Current-Continuous($T_c=70^\circ C$)	$I_D(70^\circ C)$	8	A
Pulsed Drain Current	I_{DM}	36	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient(Note 2)	$R_{\theta JA}$	85	$^\circ C/W$
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=8A$	-	11.5	13	m Ω
		$V_{GS}=4.5V, I_D=6A$	-	14.5	18	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=8A$	-	24	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	940	-	PF
Output Capacitance	C_{oss}		-	131	-	PF
Reverse Transfer Capacitance	C_{rss}		-	109	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=8A$ $V_{GEN}=4.5V, R_G=1.5\Omega$	-	4.2	-	nS
Turn-on Rise Time	t_r		-	8.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	31	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=8A,$ $V_{GS}=4.5V$	-	9.63	-	nC
Gate-Source Charge	Q_{gs}		-	3.88	-	nC
Gate-Drain Charge	Q_{gd}		-	3.44	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=1A$	-	-	1	V
Diode Forward Current (Note 2)	I_S		-	-	9	A

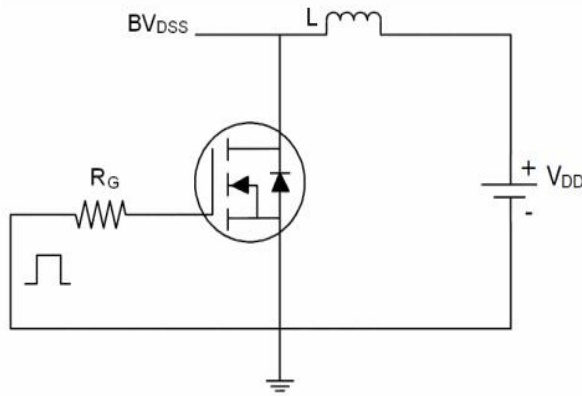
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

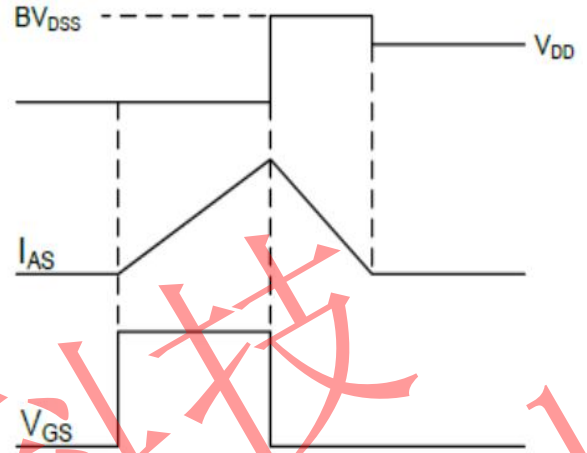


Test Circuit

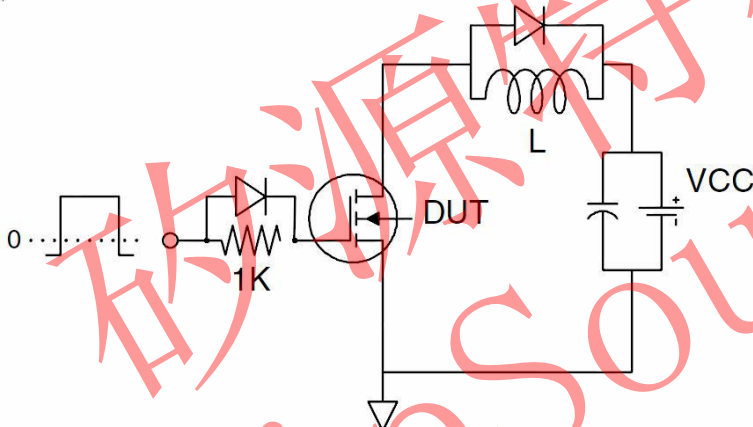
1) E_{AS} test Circuits and waveform:



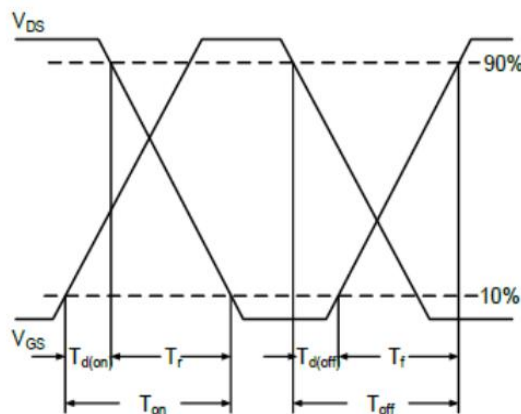
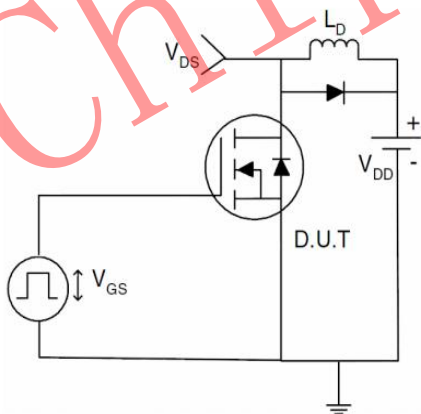
$$E_{AS} = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:





Typical Electrical and Thermal Characteristics (Curves)

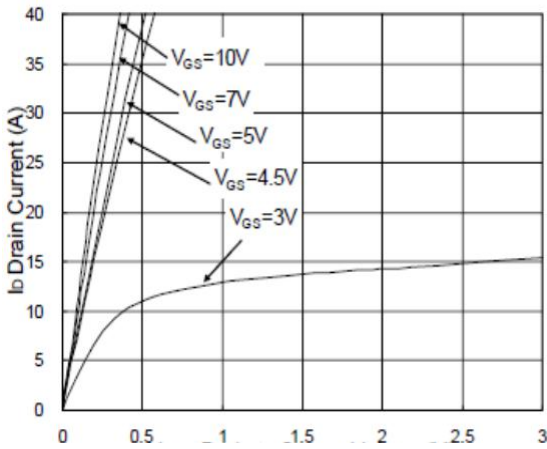


Figure 1 Output Characteristics

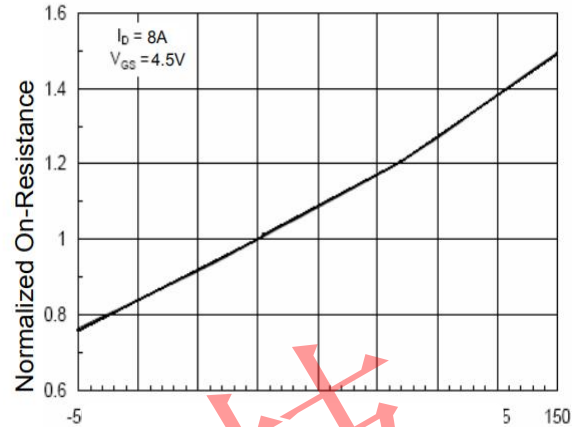


Figure 4 Rdson-Junction Temperature

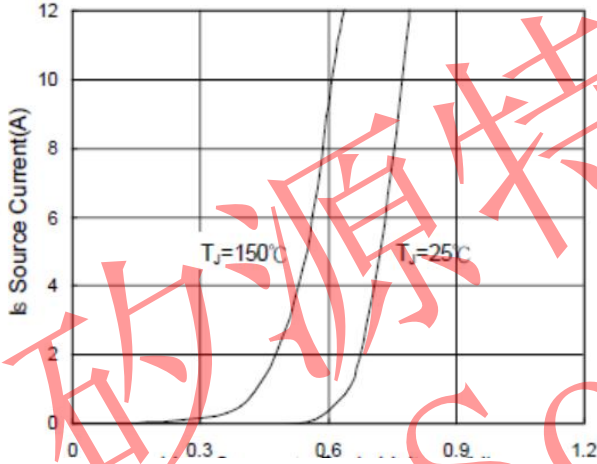


Figure 2 Transfer Characteristics

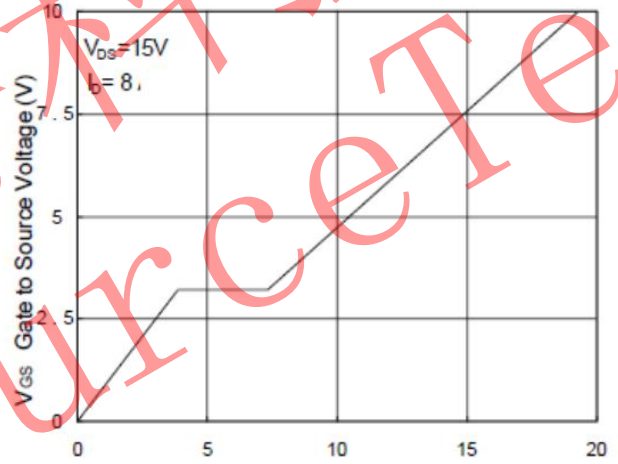


Figure 5 Gate Charge

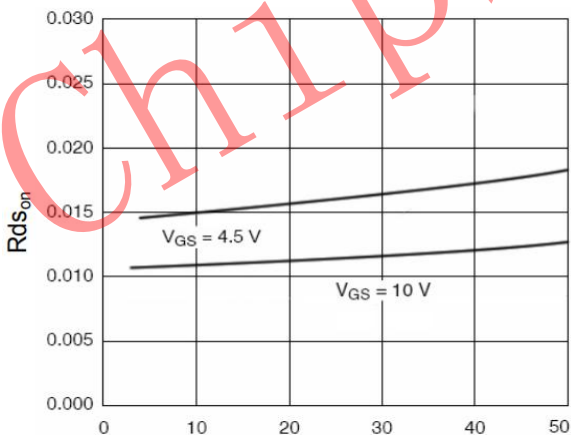


Figure 3 Rdson- Drain Current

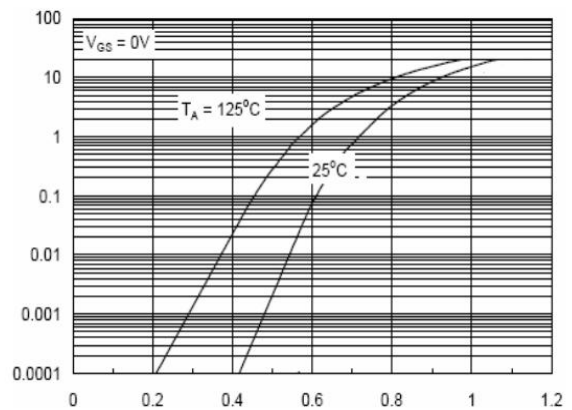
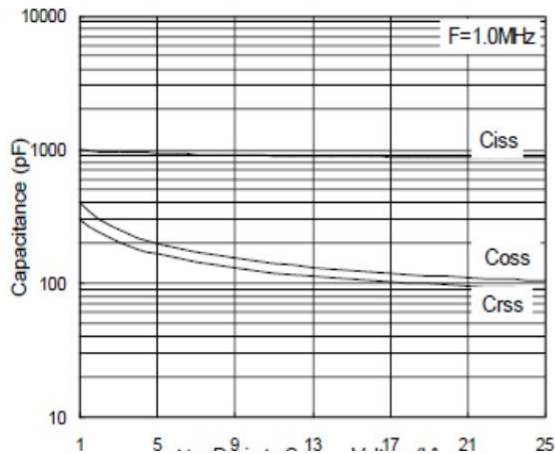
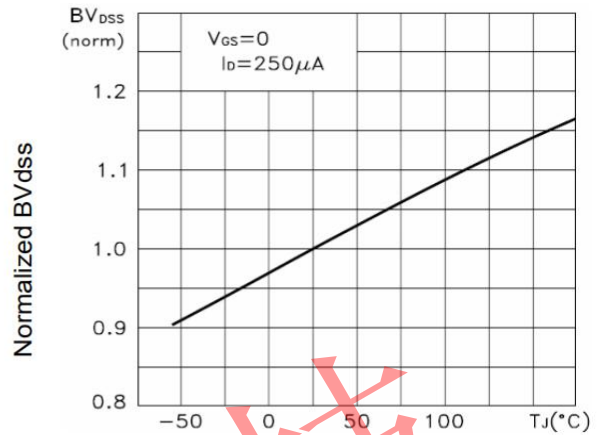


Figure 6 Source- Drain Diode Forward



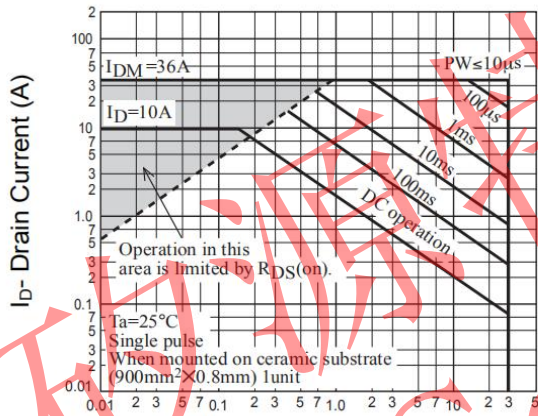
Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds



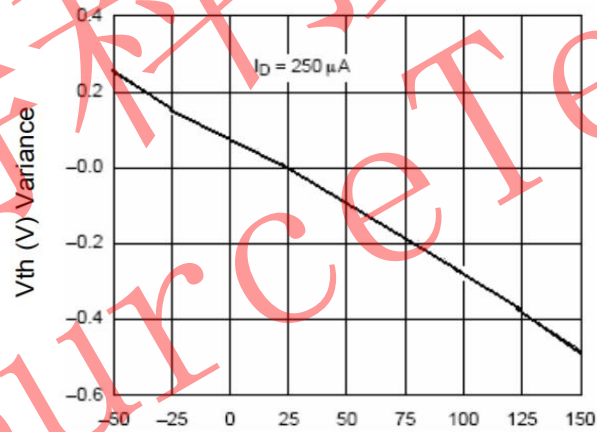
T_J-Junction Temperature(°C)

Figure 9 BV_{dss} vs Junction Temperature



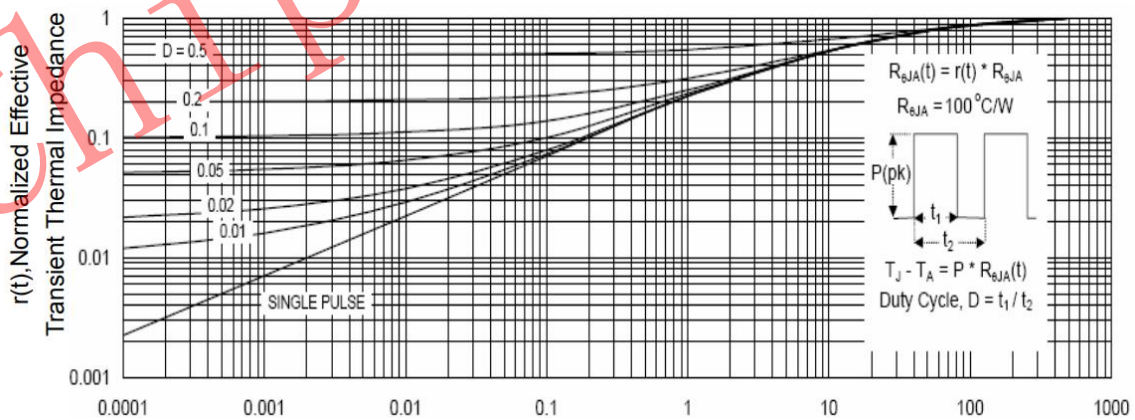
Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area



T_J-Junction Temperature(°C)

Figure 10 V_{GS(th)} vs Junction Temperature

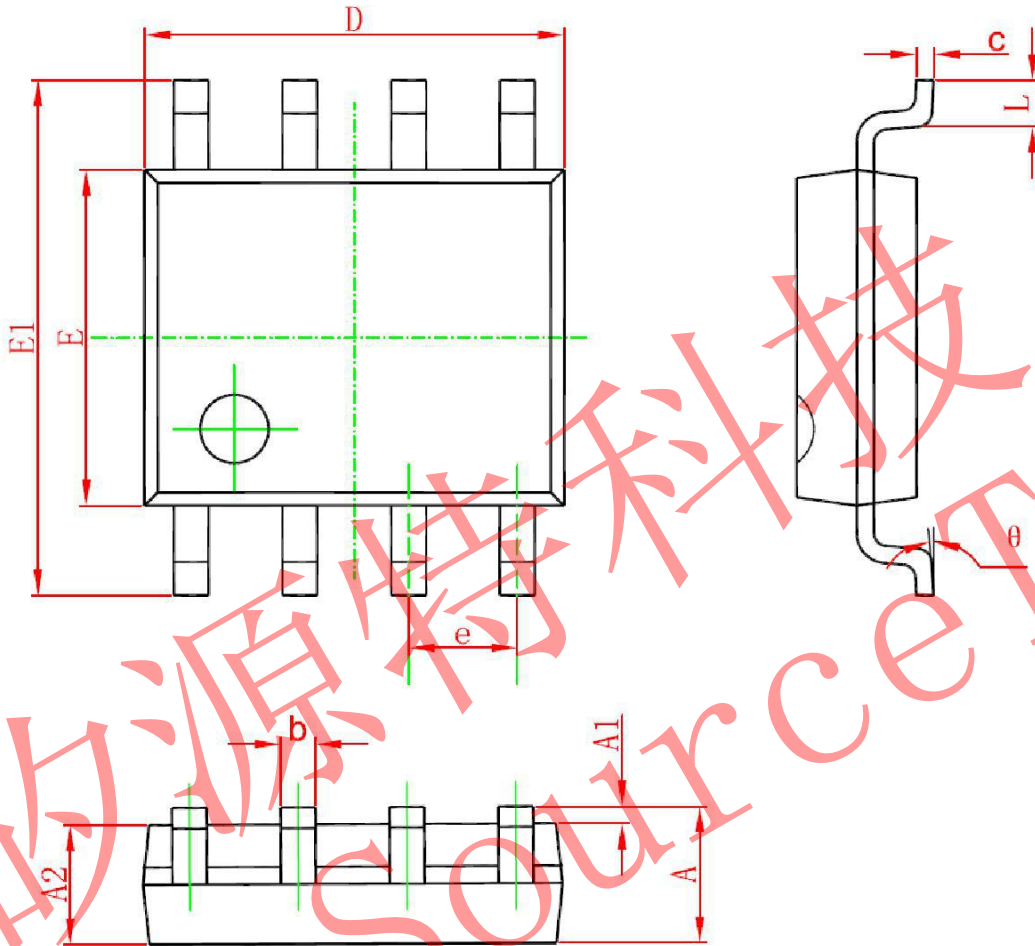


Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance



SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°