

## DESCRIPTION

The MX30D04 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. It can be used in a wide variety of applications.

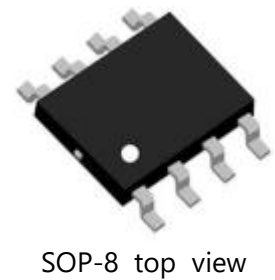
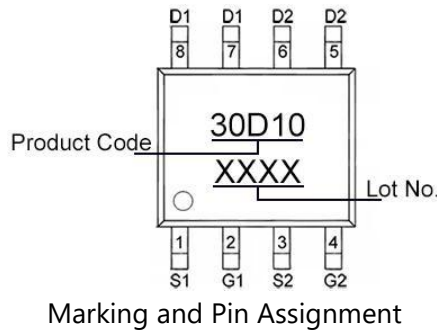
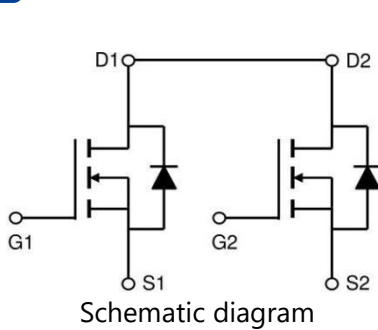
## GENERAL FEATURES

- $V_{DS}=30V$ ,  $I_D=10A$   
 $R_{DS(ON)}(Typ.)=16m\Omega$  @  $V_{GS}=4.5V$   
 $R_{DS(ON)}(Typ.)=11m\Omega$  @  $V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

## APPLICATION

- Load switch
- PWM applications
- Power management

## PINOUT



## ORDERING INFORMATION

Part Number	Storage Temperature	Package	Devices Per Reel
MX30D10	-55°C to 150°C	SOP-8	-

## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	10	A
Drain Current-Continuous ( $T_A=70^\circ C$ )	$I_D$	7	A
Pulsed Drain Current <sup>(Note1)</sup>	$I_{DM}$	28	A
Maximum Power Dissipation	$P_D$	2	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$

## THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient <sup>(Note2)</sup>	$R_{\theta JA}$	62.5	$^\circ C/W$
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Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.



**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
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**Off Characteristics**

Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA

**On Characteristics** (Note 3)

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4A$	-	16	18	m $\Omega$
		$V_{GS}=10V, I_D=6A$	-	11	13	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=8A$	-	24	-	S

**Dynamic Characteristics** (Note 4)

Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	840	-	pF
Output Capacitance	$C_{oss}$		-	120	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	85	-	pF

**Switching Characteristics**

Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=2A,$ $R_L=1\Omega,$ $V_{GS}=10V, R_G=3\Omega$	-	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	$Q_g$	$V_{DS}=15V, I_D=6A,$ $V_{GS}=10V$	-	14	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.4	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3	-	nC

**Drain-Source Diode Characteristics**

Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	2.5	A

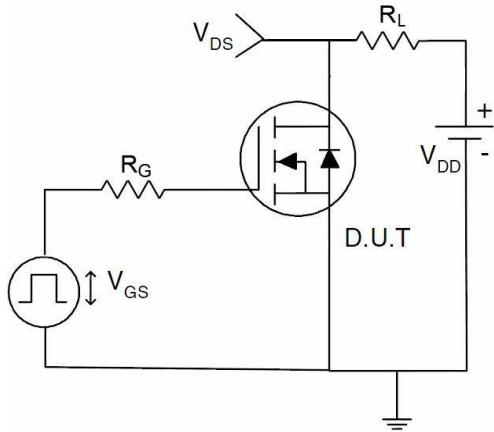
Note 2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

Note 3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

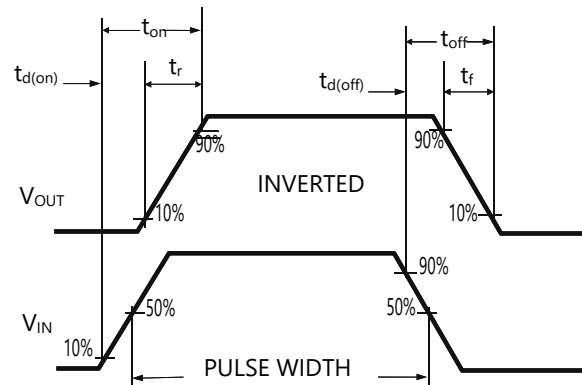
Note 4. Guaranteed by design, not subject to product.

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

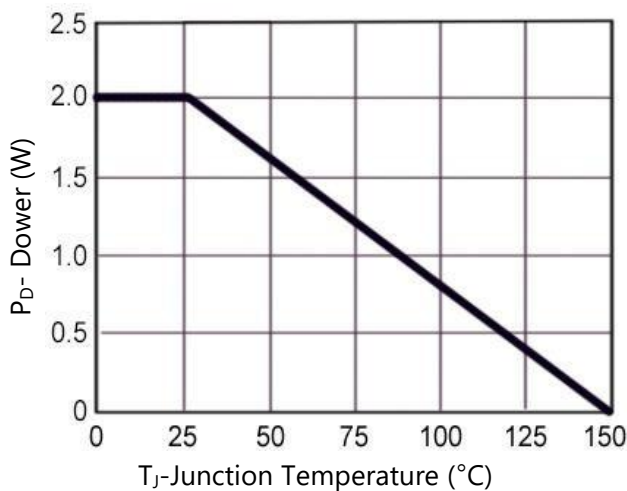
**Figure 1. Switching Test Circuit**



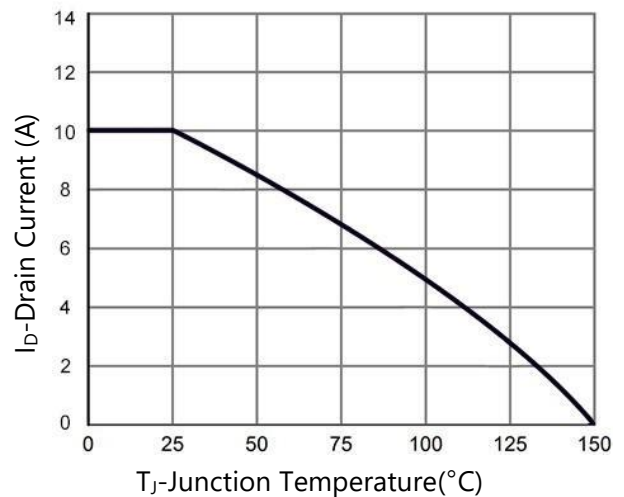
**Figure 2. Switching Waveform**



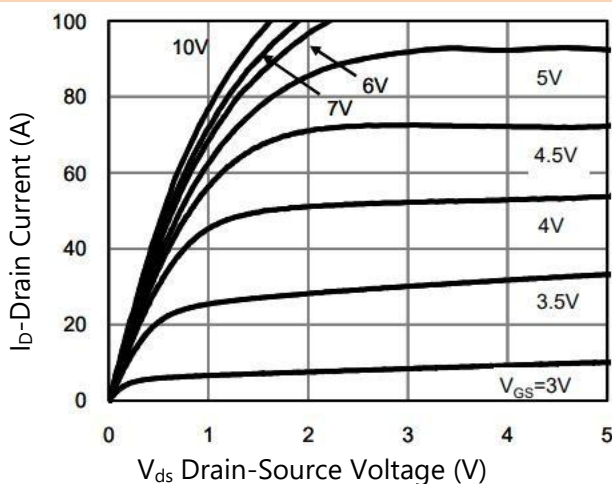
**Figure 3. Power Dissipation**



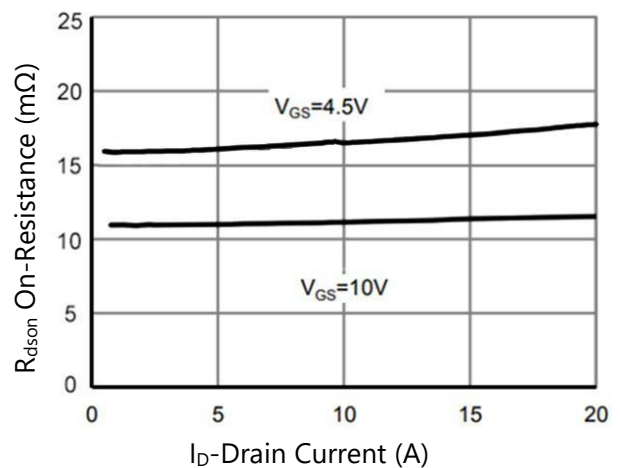
**Figure 4. Drain Current**



**Figure 5. Output Characteristics**



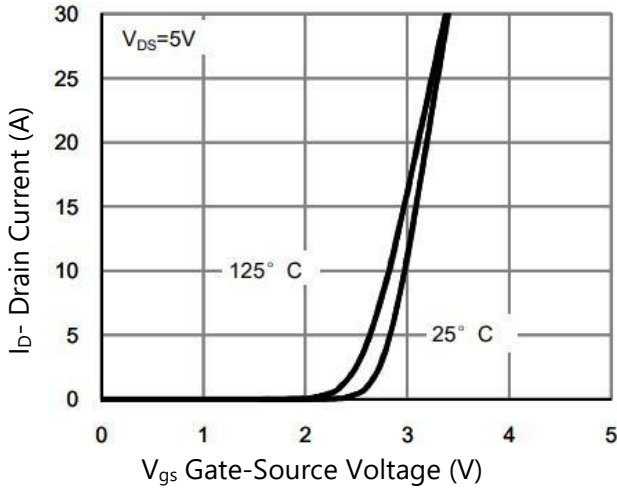
**Figure 6. R<sub>ds(on)</sub> vs Drain Current**



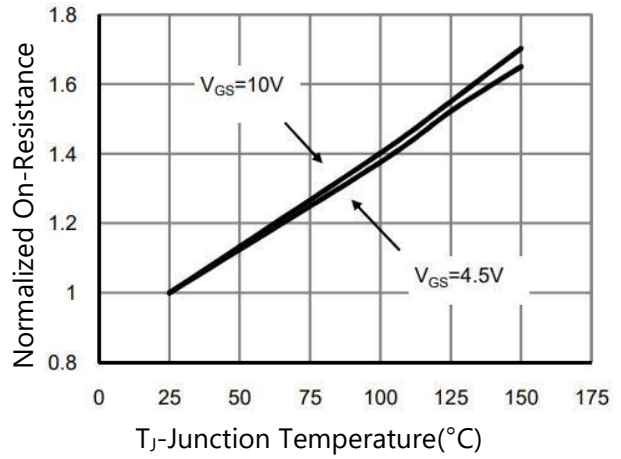


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

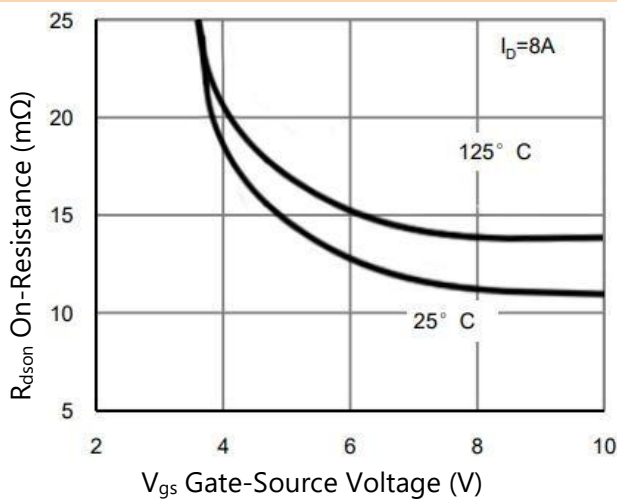
**Figure 7. Transfer Characteristics**



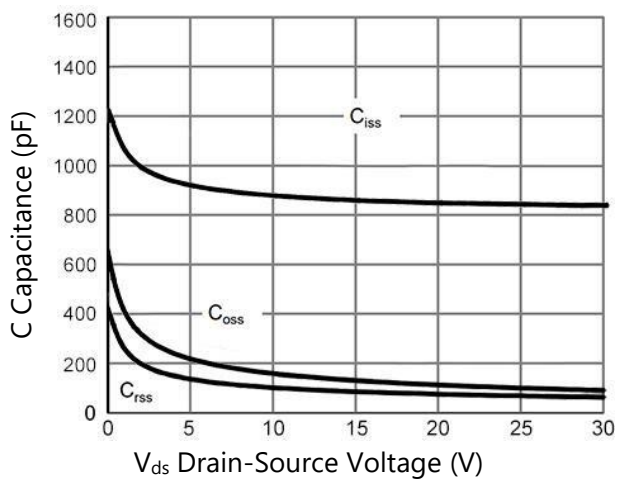
**Figure 8. R<sub>dson</sub> vs Junction Temperature**



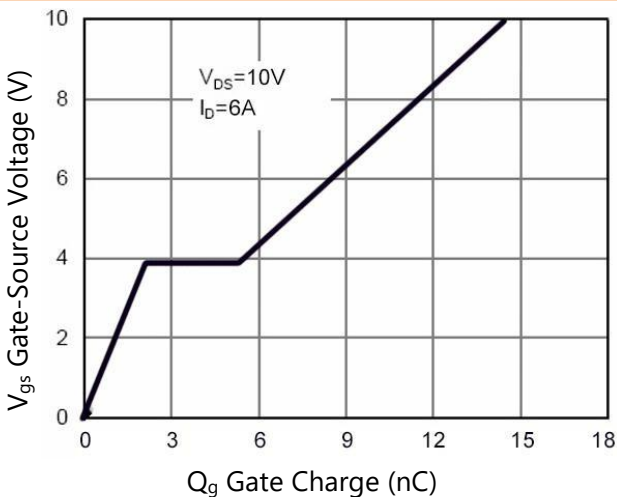
**Figure 9. R<sub>dson</sub> vs V<sub>GS</sub>**



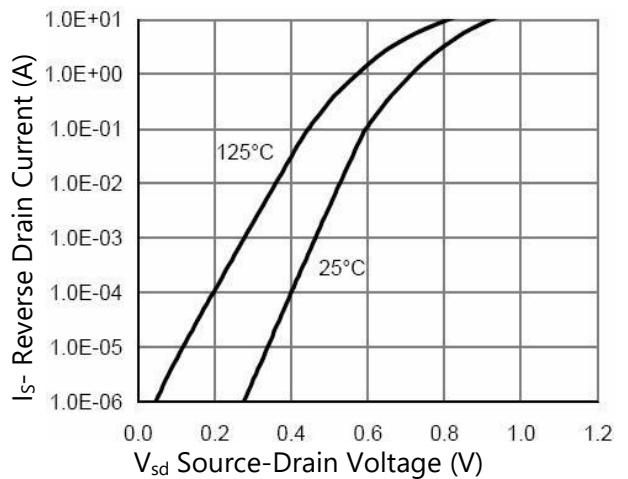
**Figure 10. Capacitance vs V<sub>ds</sub>**



**Figure 11. Gate Charge**



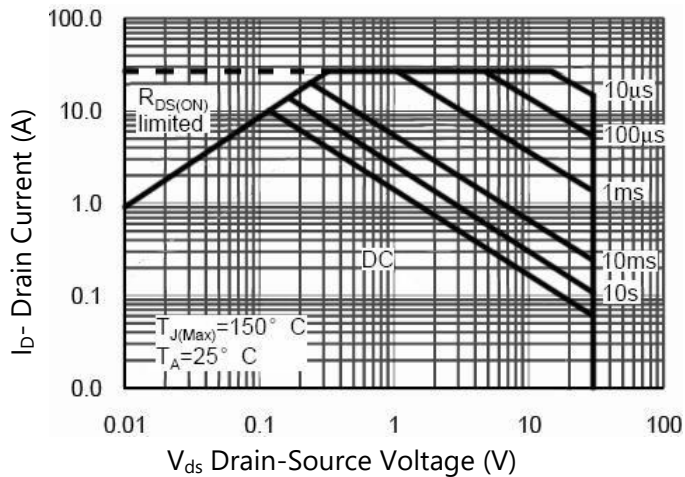
**Figure 12. Source-Drain Diode Forward**



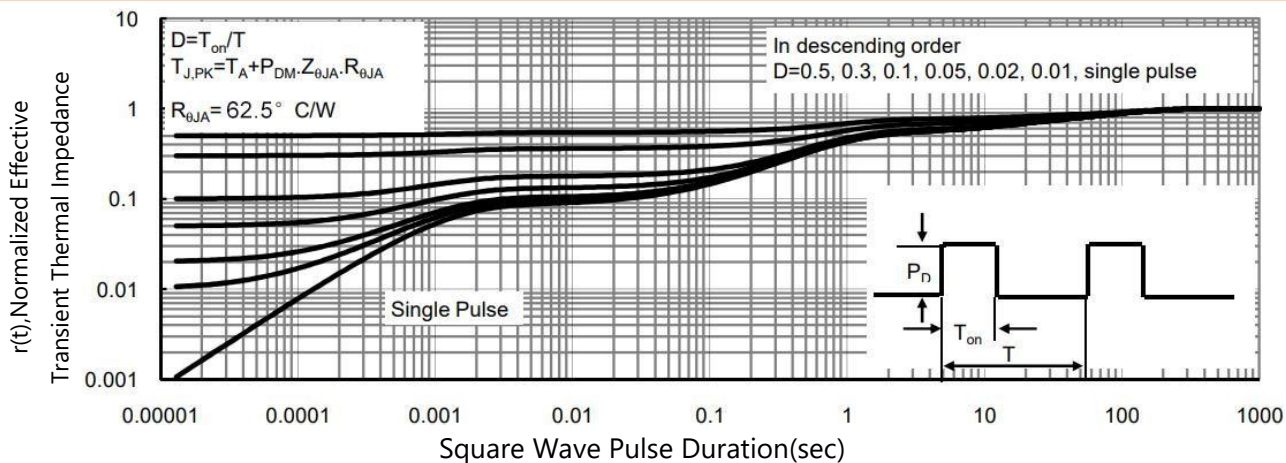


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

**Figure 13. Safe Operation Area**

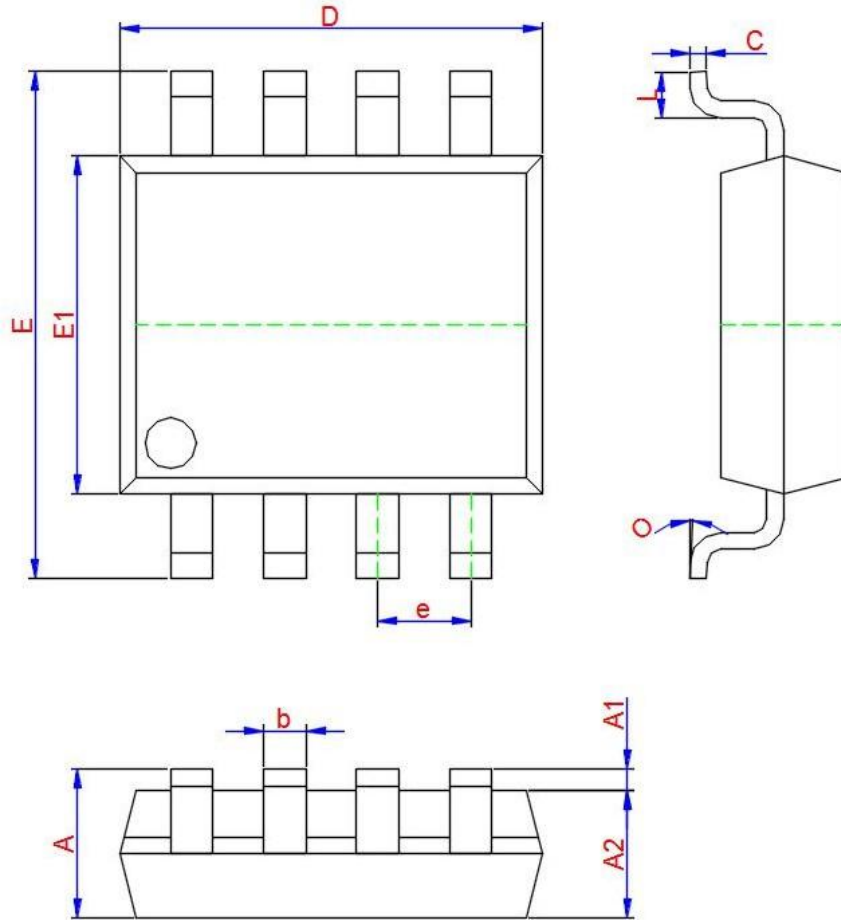


**Figure 14. Normalized Maximum Transient Thermal Impedance**



PACKAGE INFORMATION

SOP-8



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	1.350	1.550	1.750
A1	0.100	0.175	0.250
A2	1.350	1.450	1.550
b	0.330	0.420	0.510
c	0.170	0.210	0.250
D	4.700	4.900	5.100
e	1.270 TYP.		
E	5.800	6.000	6.200
E1	3.750	3.900	4.050
L	0.400	0.835	1.270
O	0°	4°	8°