

N-Ch 30V Fast Switching MOSFETs

Product Summary



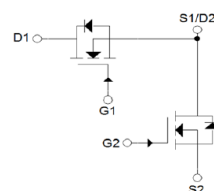
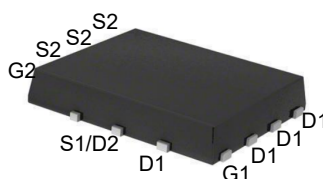
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Description

The XR30J03D is the high cell density trench N-ch MOSFETs, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The XR30J03D meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

DFN3030-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	30	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	20	A
I_{DM}	Pulsed Drain Current ²	90	A
EAS	Single Pulse Avalanche Energy ³	39	mJ
I_{AS}	Avalanche Current	30	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ⁴	15	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	85	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.034	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=7A$	---	7	9	$m\Omega$
		$V_{GS}=4.5V$, $I_D=4A$	---	10	13	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.5	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-3.84	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	1.04	2.1	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=7A$	---	8.4	---	nC
Q_{gs}	Gate-Source Charge		---	3.1	---	
Q_{gd}	Gate-Drain Charge		---	2.8	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=3.3\Omega$ $I_D=7A$	---	2.4	---	ns
T_r	Rise Time		---	72.0	---	
$T_{d(off)}$	Turn-Off Delay Time		---	36.0	---	
T_f	Fall Time		---	14.4	---	
C_{iss}	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1MHz$	---	816	---	pF
C_{oss}	Output Capacitance		---	107.8	---	
C_{rss}	Reverse Transfer Capacitance		---	82.6	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	30	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	30	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=20A$
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Performance Characteristics

Figure1: Output Characteristics

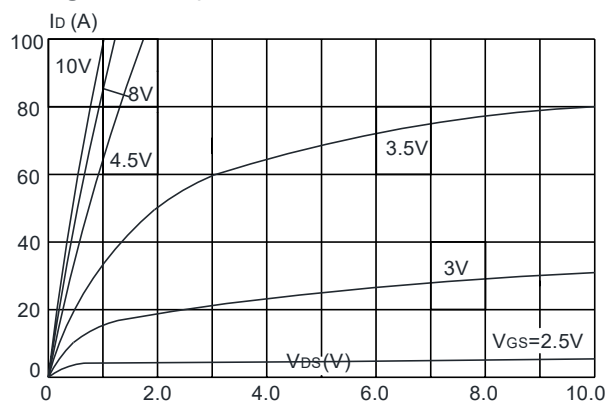


Figure 2: Typical Transfer Characteristics

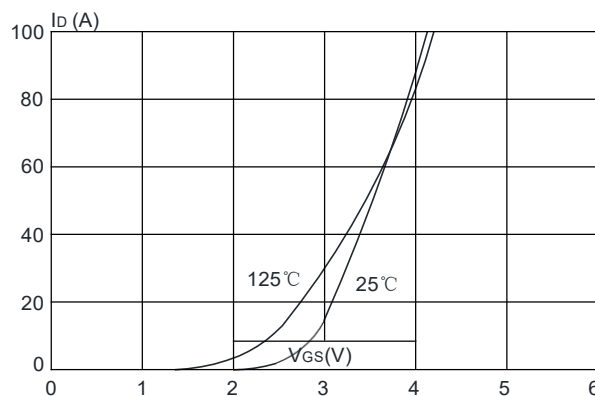


Figure 3: On-resistance vs. Drain Current

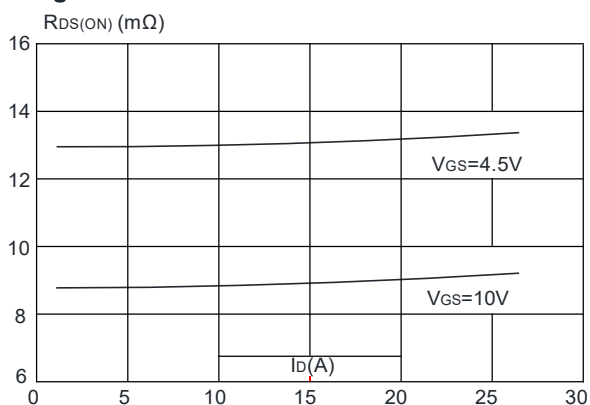


Figure 4: Body Diode Characteristics

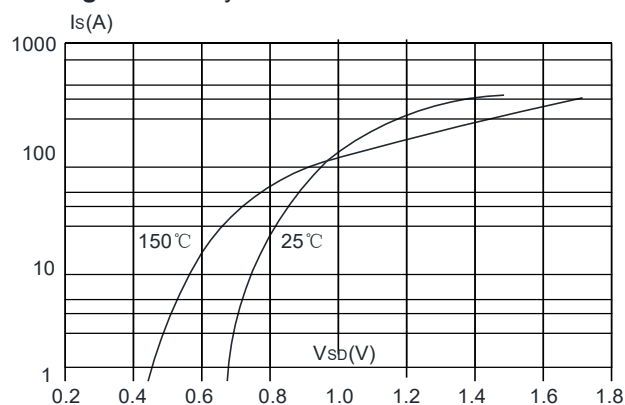


Figure 5: Gate Charge Characteristics

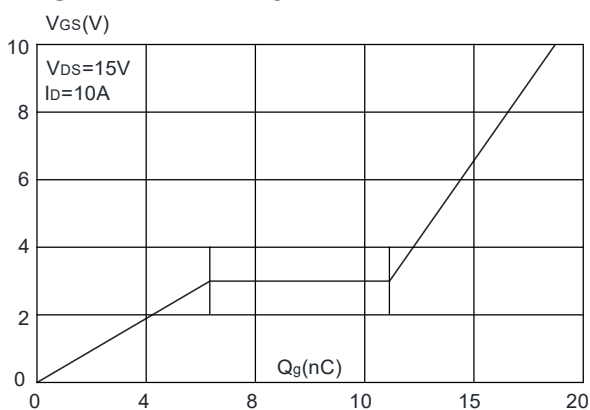
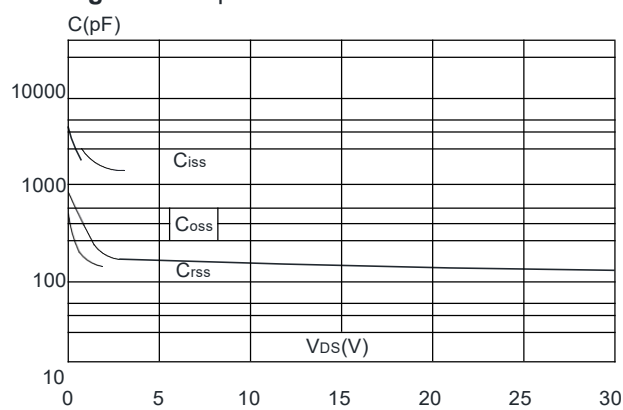


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

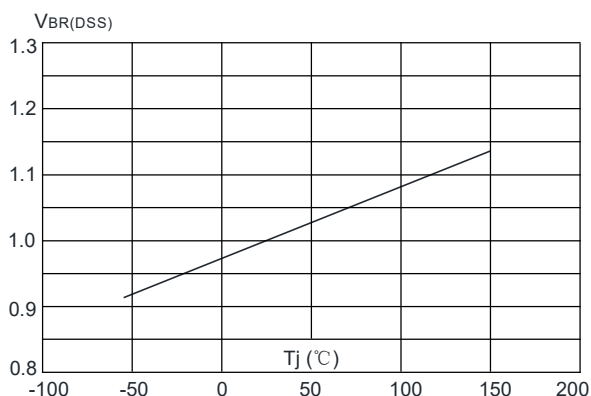


Figure 8: Normalized on Resistance vs. Junction Temperature

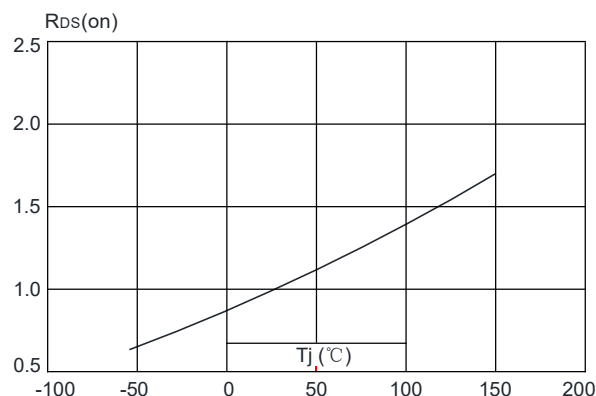


Figure 9: Maximum Safe Operating Area

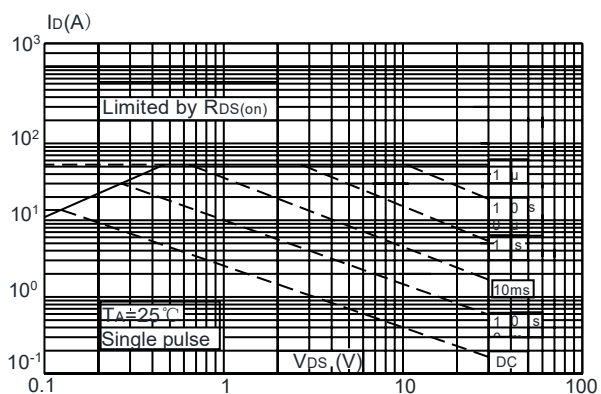


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

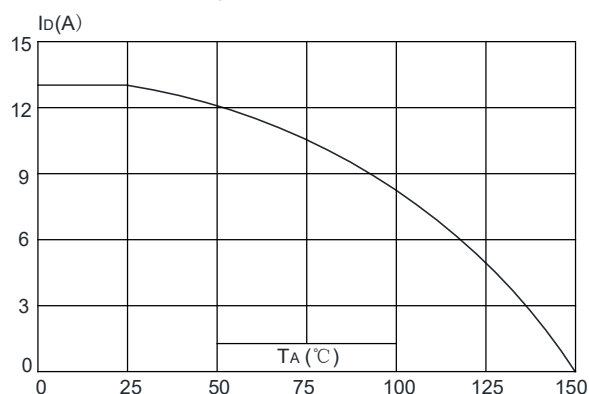
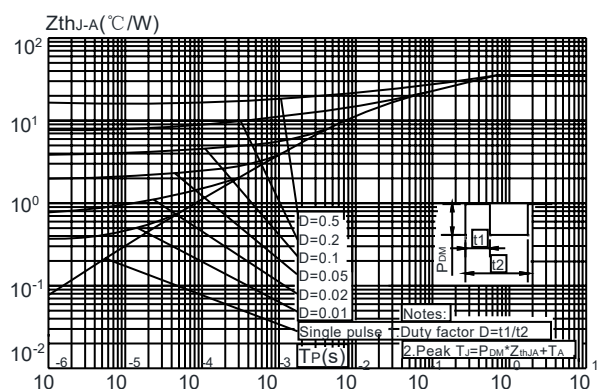


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

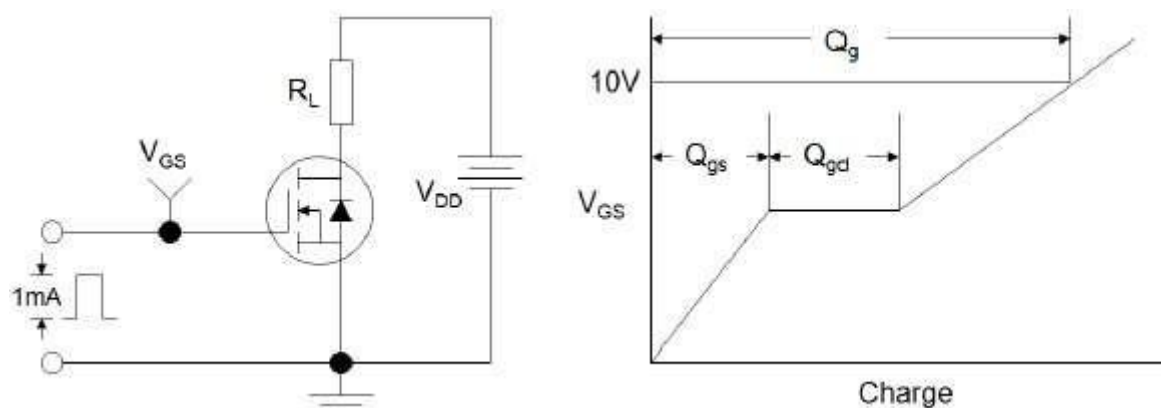


Figure1:Gate Charge Test Circuit & Waveform

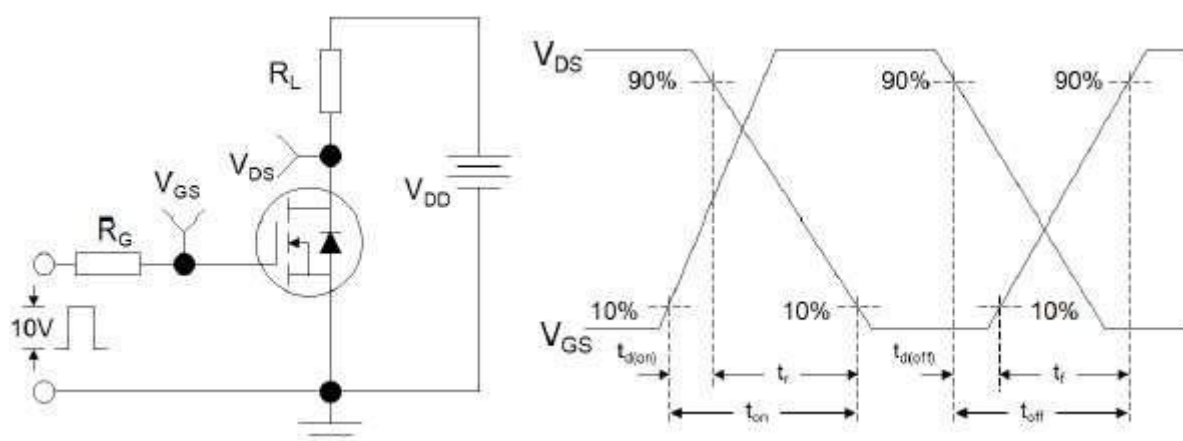


Figure 2: Resistive Switching Test Circuit & Waveforms

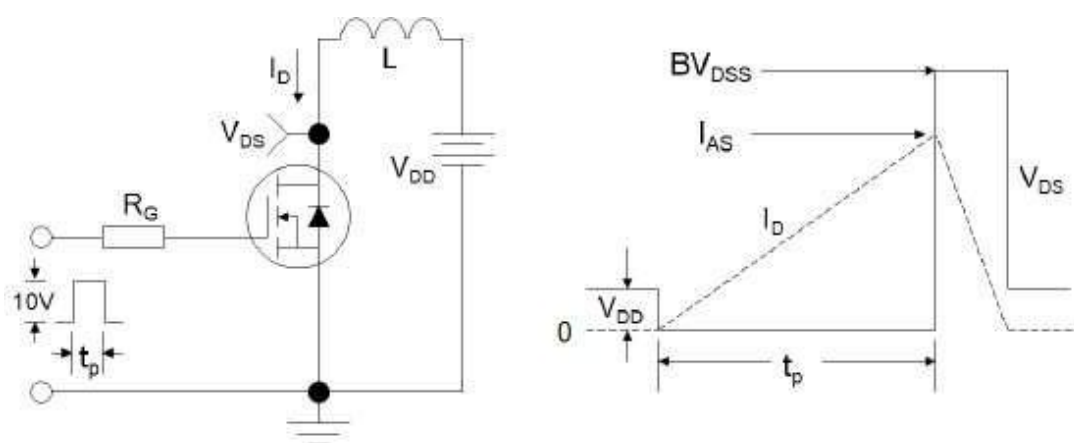
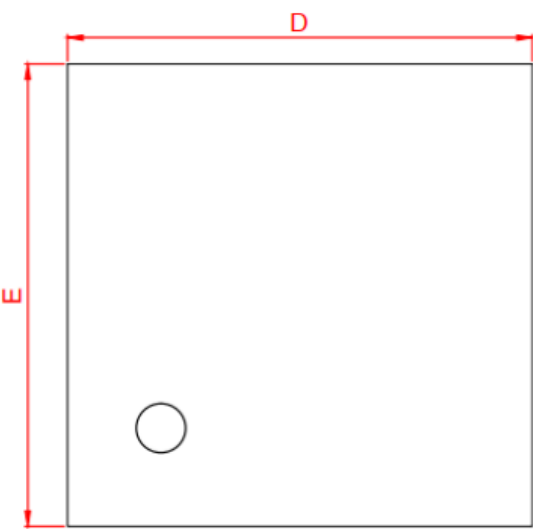


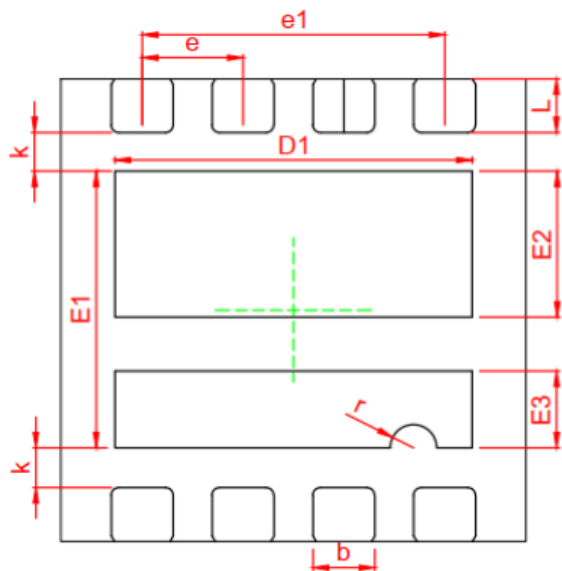
Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



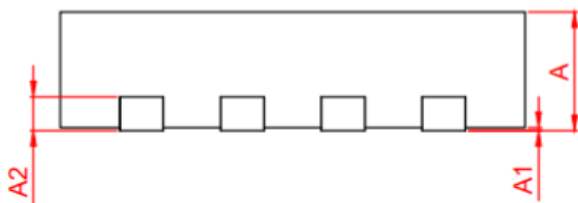
Package Mechanical Data-DFN3030-8L-Single



TOP VIEW



BOTTOM VIEW



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
* A1	0.00	0.02	0.05
* b	0.35	0.40	0.40
* A2	0.203 BSC		
* D	2.95	3.00	3.05
* E	2.95	3.00	3.05
* D1	2.25	2.30	2.35
* E1	1.70	1.80	1.90
* E2	0.90	0.95	1.00
* E3	0.45	0.50	0.55
* e	0.65 BSC		
* e1	1.95 BSC		
* k	0.20	0.25	0.30
* L	0.30	0.35	0.40
r	0.15 REF		