

12N10

Power MOSFET

12A, 100V N-CHANNEL POWER MOSFET

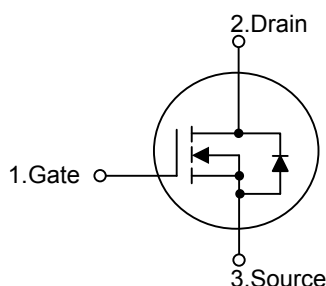
DESCRIPTION

The **12N10** is an N-channel mode power MOSFET using's advanced technology to provide customers with minimum on-state resistance for extremely high dense cell design, rugged avalanche characteristics and less critical alignment steps.

FEATURES

- * $R_{DS(on)} < 0.18\Omega$ @ $V_{GS}=10V$, $I_D=6A$
- * High switching speed
- * Low gate charge

SYMBOL

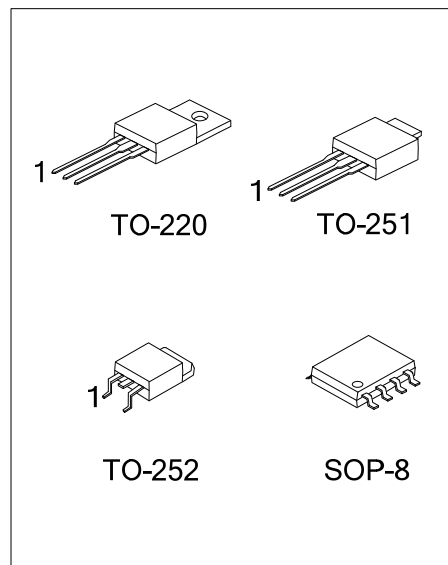


ORDERING INFORMATION

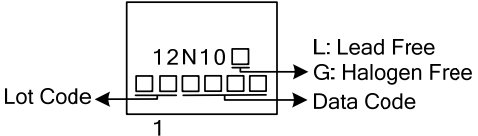
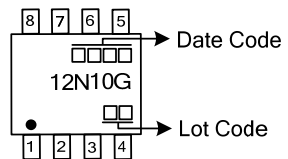
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
12N10L-TA3-T	12N10G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
12N10L-TM3-T	12N10G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
12N10L-TN3-R	12N10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
-	12N10G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

12N10L-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TM3: TO-251, TN3: TO-252 S08: SOP-8 (3) L: Lead Free, G: Halogen Free and Lead Free
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MARKING

TO-220 / TO-251 / TO-252	SOP-8
 12N10 Lot Code 1 L: Lead Free G: Halogen Free Data Code	 12N10G Date Code Lot Code

■ **ABSOLUTE MAXIMUM RATINGS**($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage ($V_{GS}=0$)			V_{DSS}	100	V
Gate-Source Voltage			V_{GSS}	± 20	V
Drain Current	Continuous	$T_C=25^{\circ}\text{C}$	I_D	12	A
		$T_C=100^{\circ}\text{C}$		8.5	A
	Pulsed (Note 2)		I_{DM}	48	A
Power Dissipation	TO-220		P_D	73	W
	TO-251/TO-252			30	
	SOP-8			5	
Avalanche Energy (Note 3)			E_{AS}	100	mJ
Junction Temperature			T_J	+150	$^{\circ}\text{C}$
Storage Temperature			T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Pulse width limited by safe operating area

3. Starting $T_J = 25^\circ\text{C}$, $I_D = 12\text{A}$, $V_{DD} = 50\text{V}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-251/TO-252		100	
	SOP-8		75 (Note)	
Junction to Case	TO-220	θ_{JC}	1.71	$^\circ\text{C/W}$
	TO-251/TO-252		4.1	
	SOP-8		25 (Note)	

Note: Device mounted on 1in² FR-4 board with 2oz. Copper, $t = 10\text{sec}$.

■ **ELECTRICAL CHARACTERISTICS** ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	100			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =Max rating, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1		3	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =6A		0.15	0.18	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		430		pF
Output Capacitance		C _{OSS}			90		pF
Reverse Transfer Capacitance		C _{RSS}			20		pF
SWITCHING PARAMETERS (Note 1,2)							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DD} =80V, I _D =12A		7.5	10	nC
Gate to Source Charge		Q _{GS}			2.5		nC
Gate to Drain Charge		Q _{GD}			3.0		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =30V, I _D =1A, R _G =9.1Ω, V _{GS} =10V (Fig. 1)		12	24	ns
Rise Time		t _R			7	14	ns
Turn-OFF Delay Time		t _{D(OFF)}			18	35	ns
Fall-Time		t _F			3	6	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				12	A
Maximum Body-Diode Pulsed Current		I _{SM}				48	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =12A, V _{GS} =0V			1.2	V

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

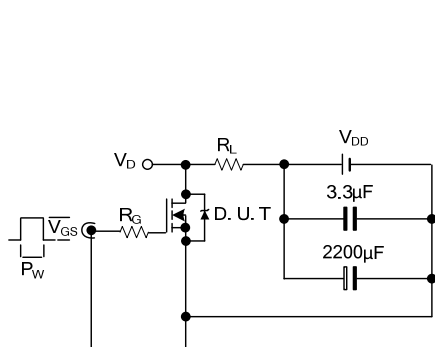


Fig. 1 Switching Times Test Circuit for Resistive Load

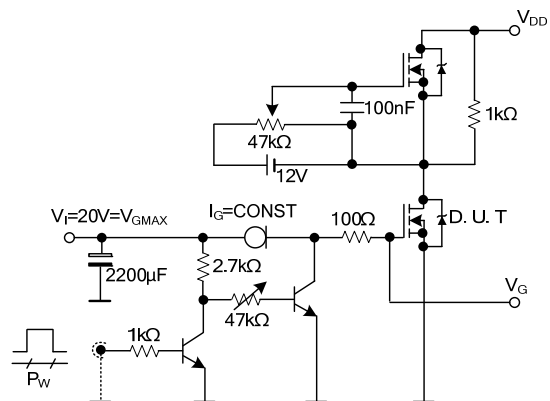


Fig. 2 Gate Charge Test Circuit

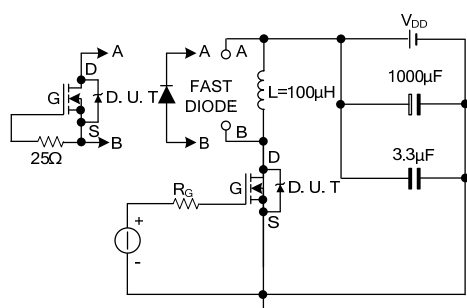


Fig. 3 Test Circuit for Inductive Load Switching and Diode Recovery Times

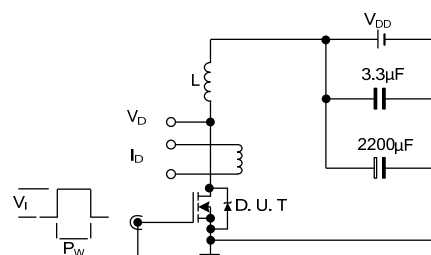


Fig. 4 Unclamped Inductive Load Test Circuit

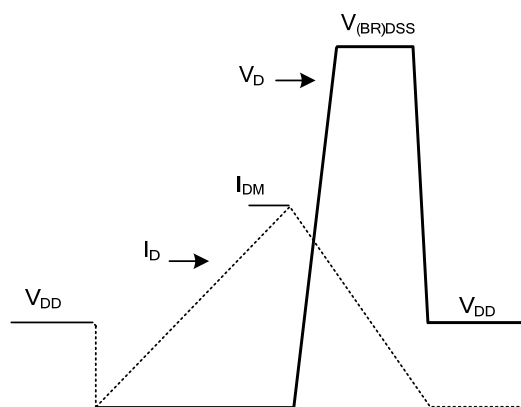
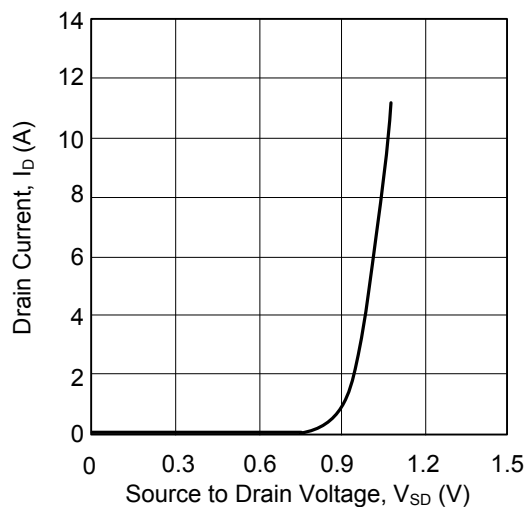


Fig. 5 Unclamped Inductive Waveform

■ TYPICAL CHARACTERISTICS

Drain Current vs. Source to Drain Voltage



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