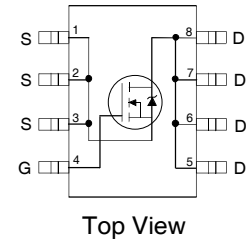## Applications

- High Frequency Point-of-Load Synchronous Buck Converter for Applications in Networking & Computing Systems.
- Lead-Free

Top View

Benefits

- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Low Gate Charge
- Fully Characterized Avalanche Voltage and Current

Features

- $V_{DS (V)}$ =30V

- I_D = 13 A (V_{GS} = 10V)

- $R_{DS(ON)}$ ＜ 9.1mΩ (V_{GS}=10V)

- $R_{DS(ON)}$ ＜ 12.5 mΩ (V_{GS}=4.5V)

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	13.6	
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	11	A
I_{DM}	Pulsed Drain Current ①	100	
P_D @T_A = 25°C	Power Dissipation ④	2.5	W
P_D @T_A = 70°C	Power Dissipation ④	1.6	
	Linear Derating Factor	0.02	W/°C
T_J	Operating Junction and	-55 to + 155	°C
T_{STG}	Storage Temperature Range		

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤		20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④⑤		50	

Static @ T$_J$ = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV$_{DSS}$	Drain-to-Source Breakdown Voltage	30			V	V$_{GS}$ = 0V, I$_D$ = 250µA
ΔBV$_{DSS}$/ΔT$_J$	Breakdown Voltage Temp. Coefficient		0.025		V/°C	Reference to 25°C, I$_D$ = 1mA
R$_{DS(on)}$	Static Drain-to-Source On-Resistance		7.0	9.1	mΩ	V$_{GS}$ = 10V, I$_D$ = 13A ③
			9.5	12.5		V$_{GS}$ = 4.5V, I$_D$ = 10A ③
V$_{GS(th)}$	Gate Threshold Voltage	1.0			V	V$_{DS}$ = V$_{GS}$, I$_D$ = 250µA
ΔV$_{GS(th)}$	Gate Threshold Voltage Coefficient		- 4.9		mV/°C	
I$_{DSS}$	Drain-to-Source Leakage Current			1.0	µA	V$_{DS}$ = 24V, V$_{GS}$ = 0V
				150		V$_{DS}$ = 24V, V$_{GS}$ = 0V, T$_J$ = 125°C
I$_{GSS}$	Gate-to-Source Forward Leakage			100	nA	V$_{GS}$ = 20V
	Gate-to-Source Reverse Leakage			-100		V$_{GS}$ = -20V
gfs	Forward Transconductance	22			S	V$_{DS}$ = 15V, I$_D$ = 10A
Q$_g$	Total Gate Charge		9.3	14		
Q$_{gs1}$	Pre-Vth Gate-to-Source Charge		2.5			V$_{DS}$ = 15V
Q$_{gs2}$	Post-Vth Gate-to-Source Charge		0.8		nC	V$_{GS}$ = 4.5V
Q$_{gd}$	Gate-to-Drain Charge		2.9			I$_D$ = 10A
Q$_{godr}$	Gate Charge Overdrive		3.1			See Fig. 16
Q$_{sw}$	Switch Charge (Q$_{gs2}$ + Q$_{gd}$)		3.7			
Q$_{oss}$	Output Charge		6.1		nC	V$_{DS}$ = 10V, V$_{GS}$ = 0V
t$_{d(on)}$	Turn-On Delay Time		6.3			V$_{DD}$ = 15V, V$_{GS}$ = 4.5V ③
t$_r$	Rise Time		2.7			I$_D$ = 10A
t$_{d(off)}$	Turn-Off Delay Time		9.7		ns	Clamped Inductive Load
t$_f$	Fall Time		7.3			
C$_{iss}$	Input Capacitance		1010			V$_{GS}$ = 0V
C$_{oss}$	Output Capacitance		360		pF	V$_{DS}$ = 15V
C$_{rss}$	Reverse Transfer Capacitance		110			ƒ = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E$_{AS}$	Single Pulse Avalanche Energy ②⑥		44	mJ
I$_{AR}$	Avalanche Current ①		10	A

Diode Characteristics

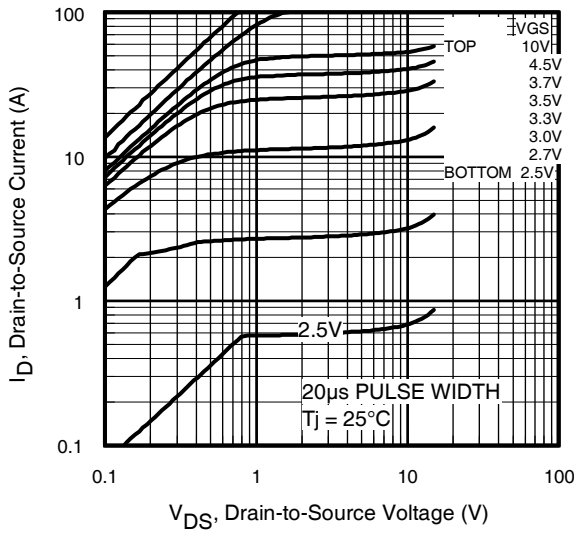|	Parameter	Min.	Typ.	Max.	Units	Conditions
I$_S$	Continuous Source Current (Body Diode)			3.1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I$_{SM}$	Pulsed Source Current (Body Diode) ①⑥			100		
V$_{SD}$	Diode Forward Voltage			1.0	V	T$_J$ = 25°C, I$_S$ = 10A, V$_{GS}$ = 0V ③
t$_{rr}$	Reverse Recovery Time		28	42	ns	T$_J$ = 25°C, I$_F$ = 10A, V$_{DD}$ = 20V
Q$_{rr}$	Reverse Recovery Charge		23	35	nC	di/dt = 100A/µs ③

Fig 1. Typical Output Characteristics
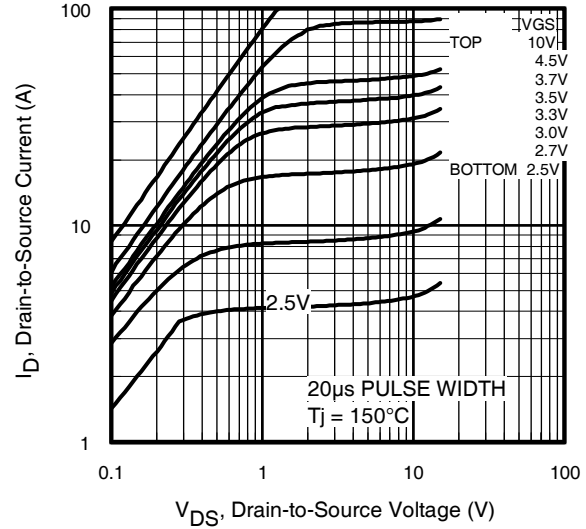
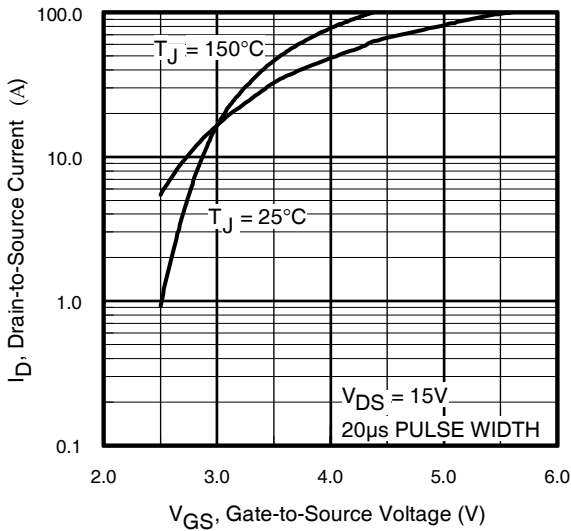**Fig 2.** Typical Output Characteristics

Fig 3. Typical Transfer Characteristics
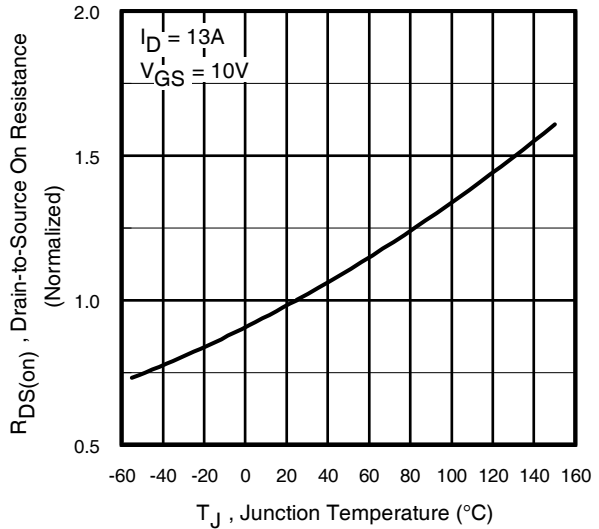
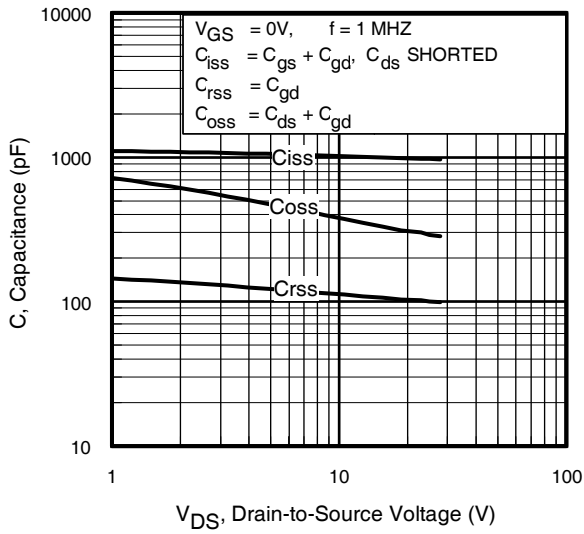**Fig 4.** Normalized On-Resistance
Vs. Temperature

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage
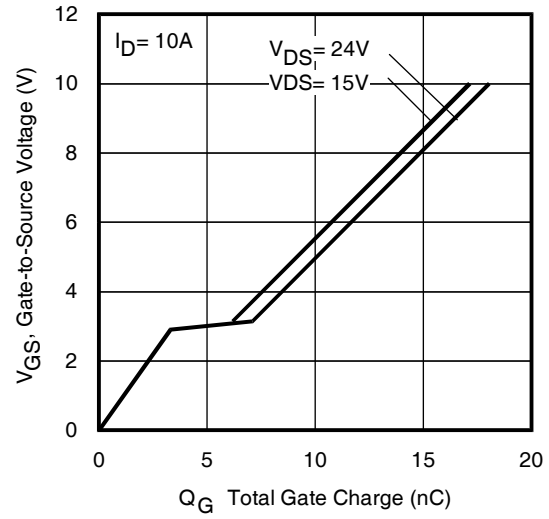

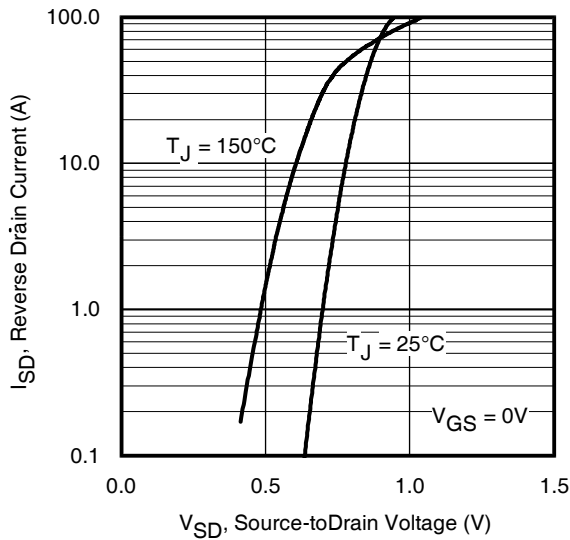**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

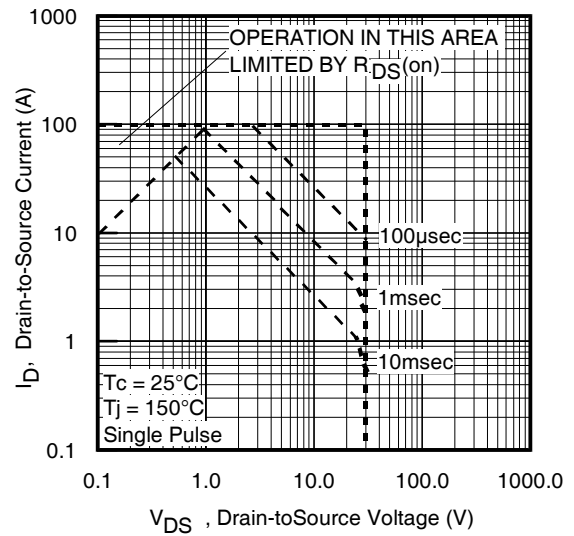**Fig 7.** Typical Source-Drain Diode Forward Voltage
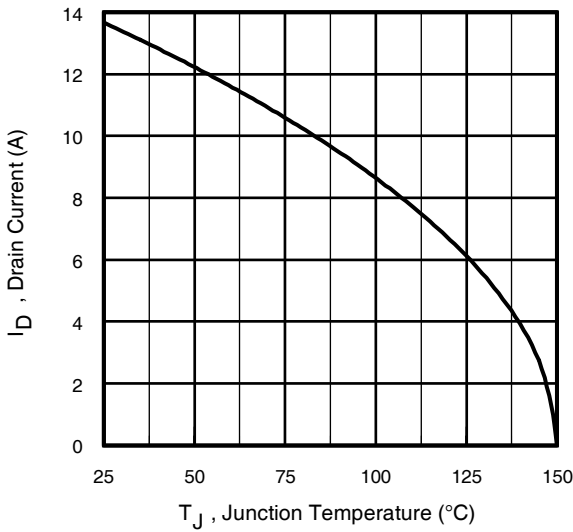

Fig 8. Maximum Safe Operating Area
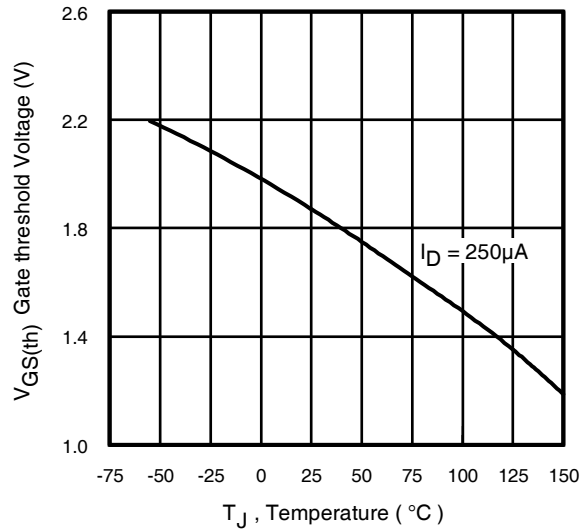
Fig 9. Maximum Drain Current Vs. Case Temperature

Fig 10. Threshold Voltage Vs. Temperature

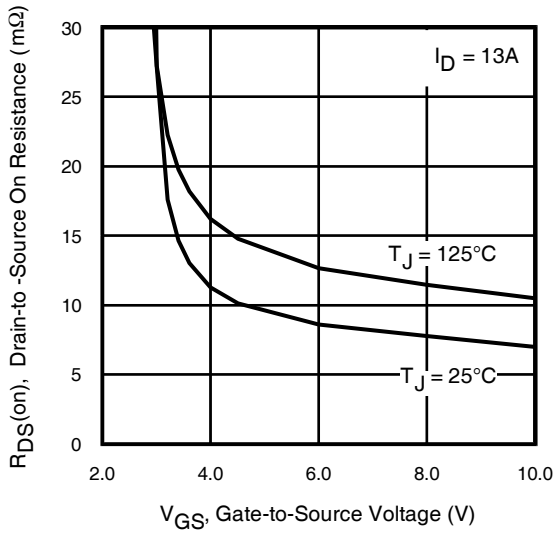**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

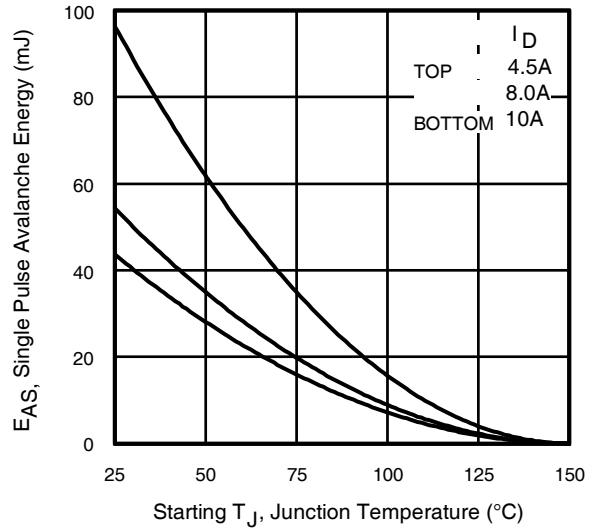**Fig 12.** On-Resistance Vs. Gate Voltage

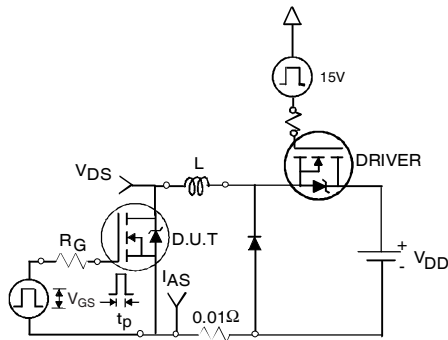
Fig 13c. Maximum Avalanche Energy Vs. Drain Current
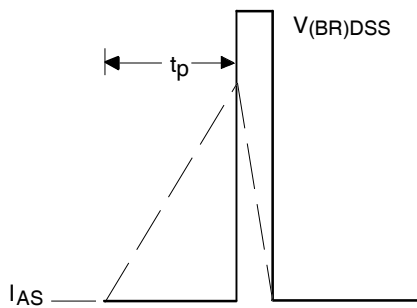

Fig 13a. Unclamped Inductive Test Circuit

Fig 14a. Switching Time Test Circuit

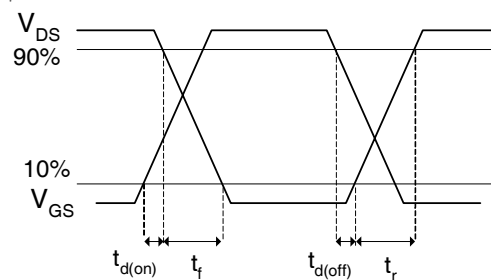**Fig 13b.** Unclamped Inductive Waveforms
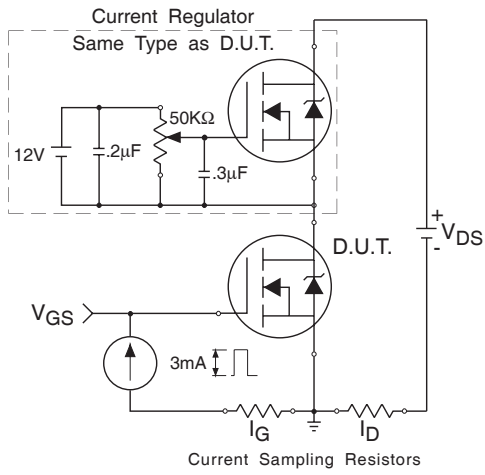

Fig 14b. Switching Time Waveforms

Fig 15. Gate Charge Test Circuit

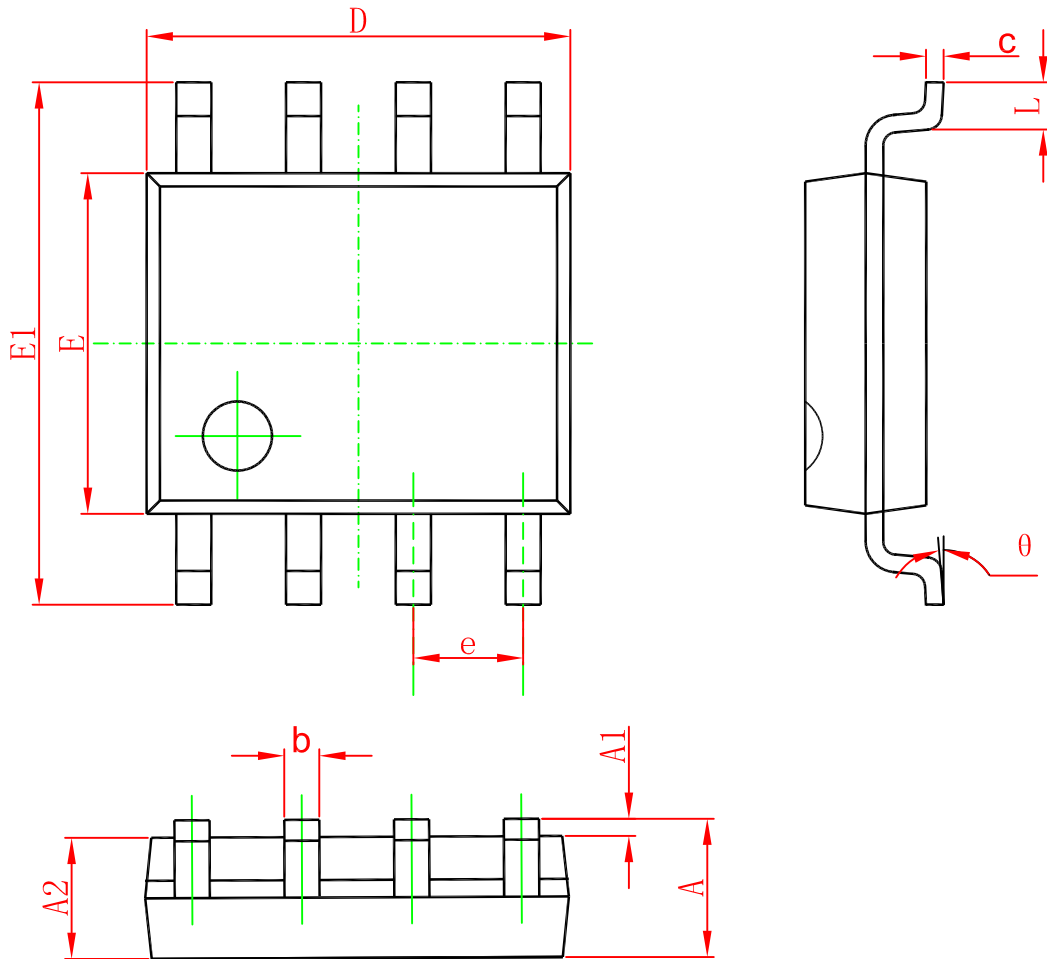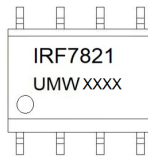**Fig 16.** Gate Charge Waveform

Package Mechanical Data SOP-8

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°

Marking

```
IRF7821
UMW XXXX
```

Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRF7821TR	SOP-8	3000	Tape and reel

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DMN1017UCP3-7 EFC2J004NUZTDG P85W28HP2F-7071 DMN1053UCP4-7 NTE2384 DMC2700UDMQ-7 DMN2080UCB4-7

DMN61D9UWQ-13 US6M2GTR DMN31D5UDJ-7 DMP22D4UFO-7B IPS60R3K4CEAKMA1 DMN1006UCA6-7 DMN16M9UCA6-7

STF5N65M6 IRF40H233XTMA1 STU5N65M6 DMN6022SSD-13 DMN13M9UCA6-7 DMTH10H4M6SPS-13 IPS60R360PFD7SAKMA1

DMN2990UFB-7B SSM3K35CT,L3F IPLK60R1K0PFD7ATMA1 2N7002W-G MCAC30N06Y-TP IPWS65R035CFD7AXKSA1

MCQ7328-TP SSM3J143TU,LXHF PJMF280N65E1_T0_00201 PJMF380N65E1_T0_00201 PJMF280N60E1_T0_00201

PJMF600N65E1_T0_00201 PJMF900N65E1_T0_00201 PJMF900N60E1_T0_00201