N-Channel Trench Power MOSFET

General Description

The CSP30N75 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

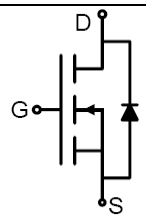
Features

- V_{DS} = 30V,ID =12A
  $R_{DS(ON)}$ < 11 mΩ @ V_{GS} =10V
  $R_{DS(ON)}$ < 16 mΩ @ V_{GS} =4.5V
- High density cell design for ultra low Rdson
- Lead free product is acquired

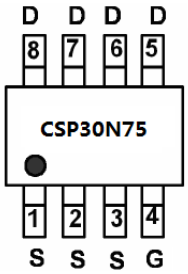
Application

- Battery protection
- Load switch
- Power management

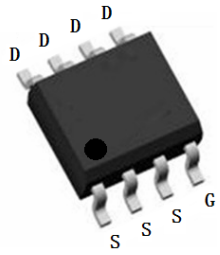
100% UIS TESTED!



Schematic Diagram



Marking and pin Assignment



SOP-8 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
CSP30N75	CSP30N75	SOP-8	Ø330mm	12mm	2500 units

Table 1. Absolute Maximum Ratings (T_A=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	30	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	V
I_D	Drain Current-Continuous(T_C=25℃) (Note 1)	12	A
	Drain Current-Continuous(T_C=100℃)	7.5	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 2)	48	A
P_D	Maximum Power Dissipation	3.5	W
E_{AS}	Avalanche energy (Note 3)	144	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	36	℃/W

Table 3. Electrical Characteristics (TA=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30	34		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.5	2.5	V
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=10A		15		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=12A		7.5	11	mΩ
		V_{GS}=4.5V, I_D=5A		11	16	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		1600		pF
C_{oss}	Output Capacitance			280		pF
C_{rss}	Reverse Transfer Capacitance			195		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V,f=1.0MHz		2.3		Ω
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω,R_{GEN}=3Ω		9		nS
t_r	Turn-on Rise Time			26		nS
$t_{d(off)}$	Turn-Off Delay Time			35		nS
t_f	Turn-Off Fall Time			8		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=25V, I_D=12A		35		nC
Q_{gs}	Gate-Source Charge			6		nC
Q_{gd}	Gate-Drain Charge			11		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				12	A
V_{SD}	Forward on Voltage	V_{GS}=0V,I_S=10A			1.2	V

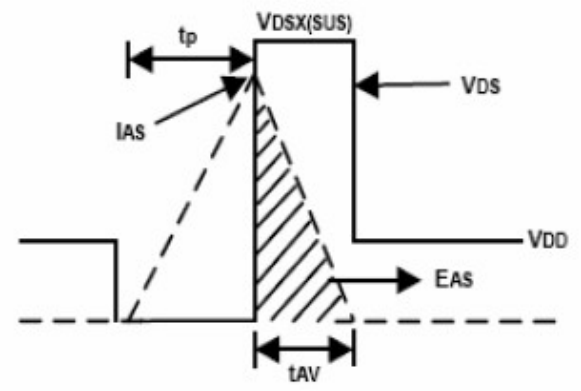
Notes 1.The maximum current rating is package limited.

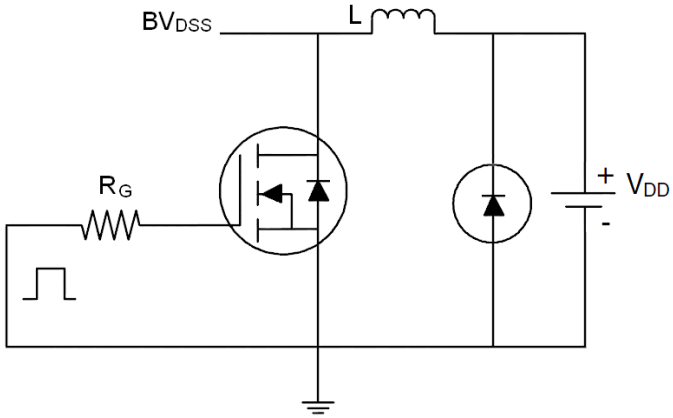
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: T_J=25℃,VDD=15V,V_G=10V, RG=25Ω,

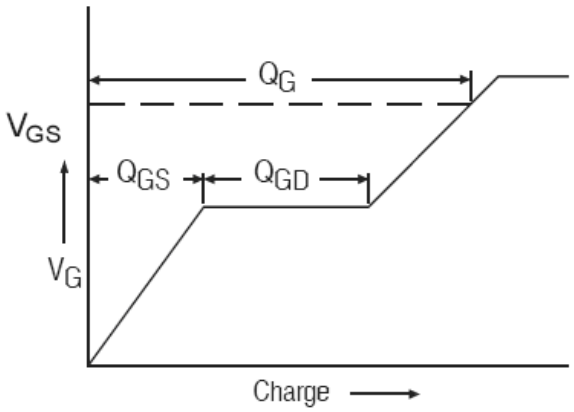
Test Circuit

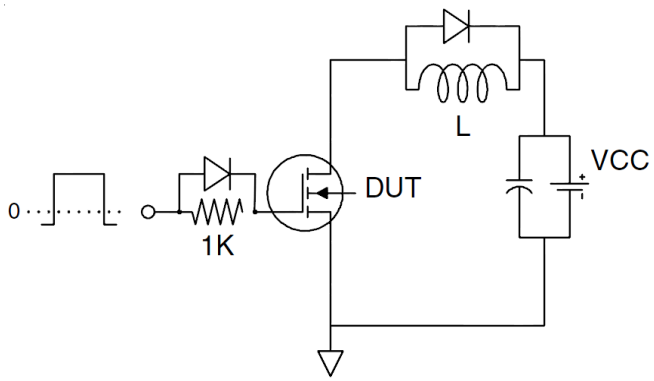
1) E_{AS} Test Circuits



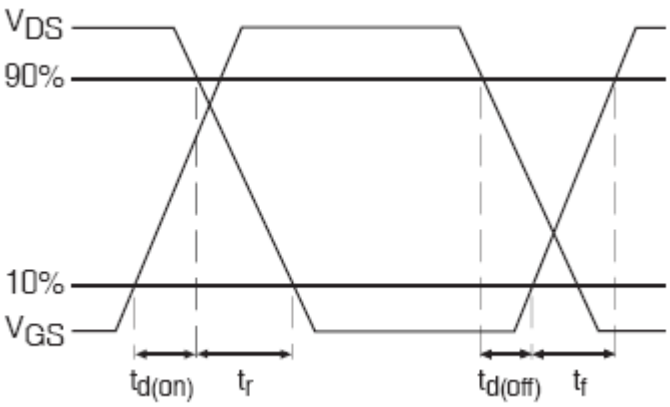


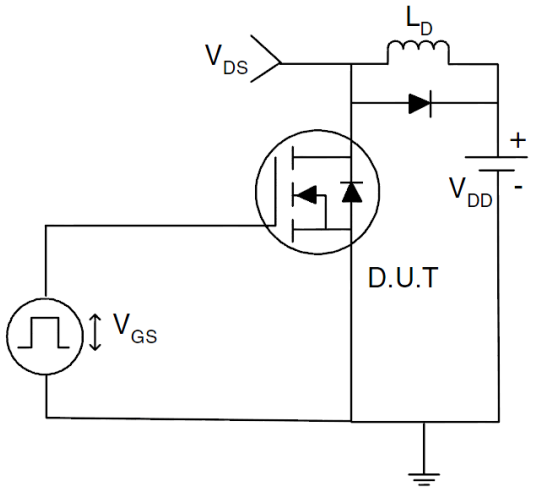
2) Gate Charge Test Circuit:





3) Switch Time Test Circuit:





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure 1. Output Characteristics

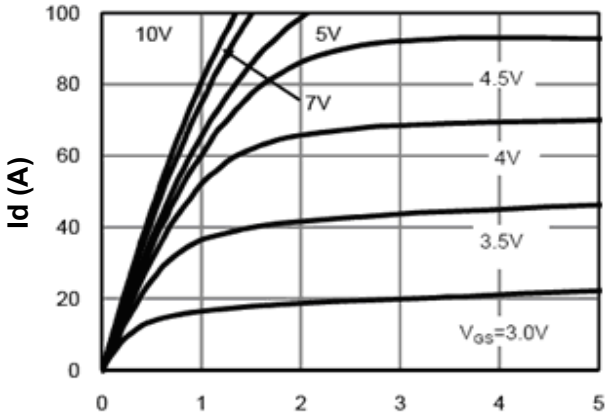


Figure 2. Transfer Characteristics

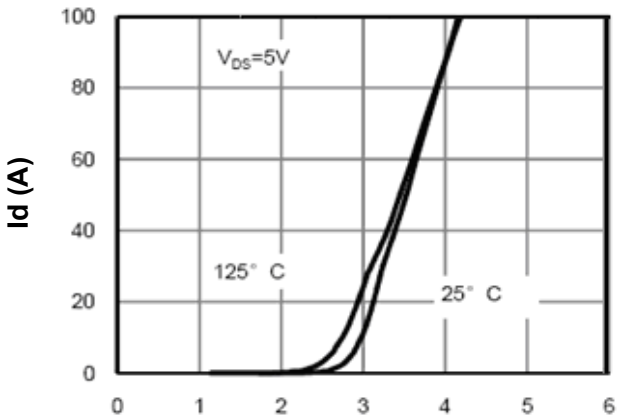


Figure 3. Max BV_{DSS} vs Junction Temperature

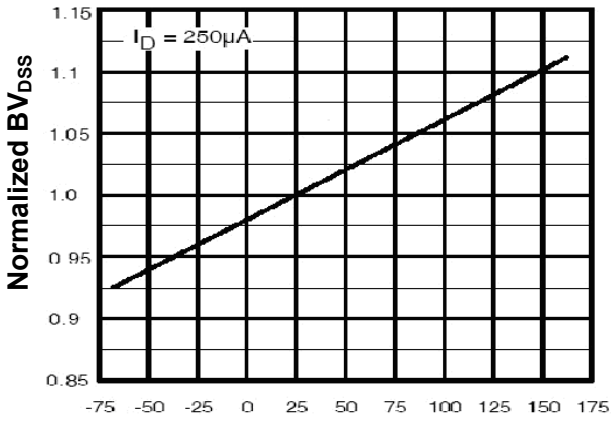


Figure 4. Drain Current

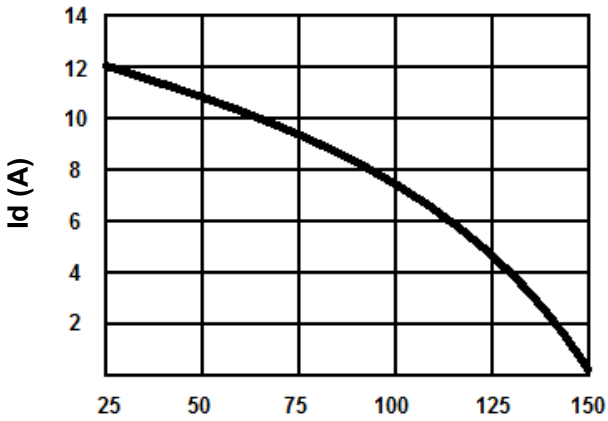


Figure 5. $V_{GS(th)}$ vs Junction Temperature

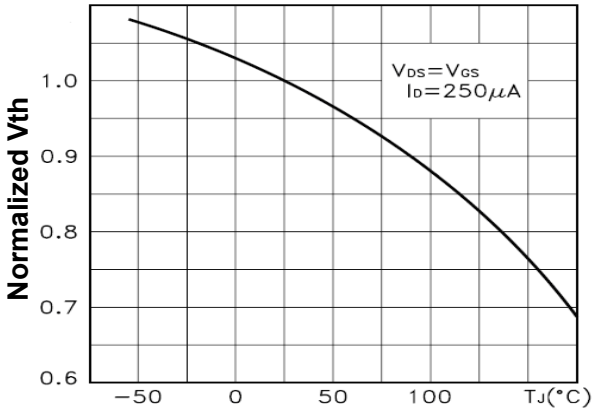


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

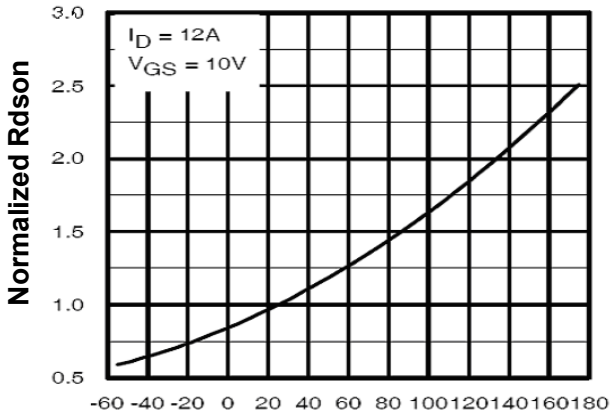


Figure 7. Gate Charge Waveforms

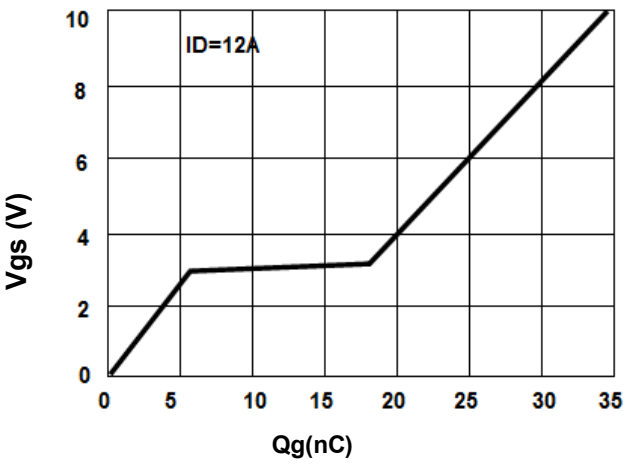


Figure 8. Capacitance

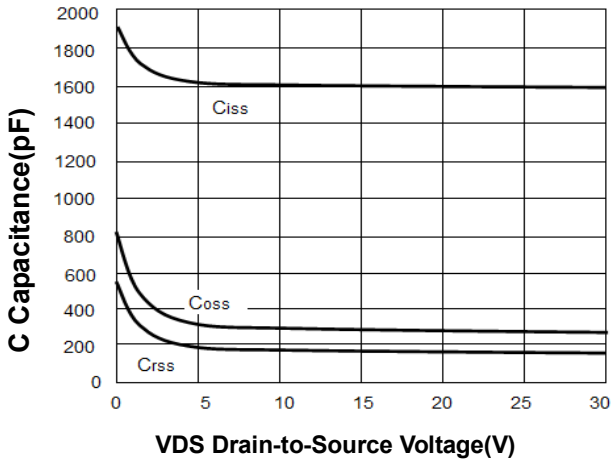


Figure 9. Body-Diode Characteristics

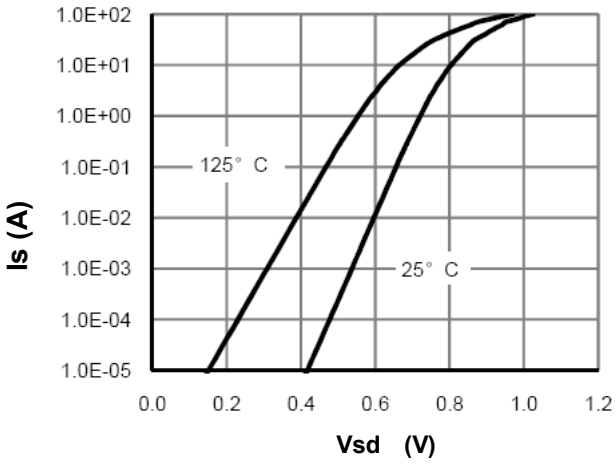


Figure 10. Maximum Safe Operating Area

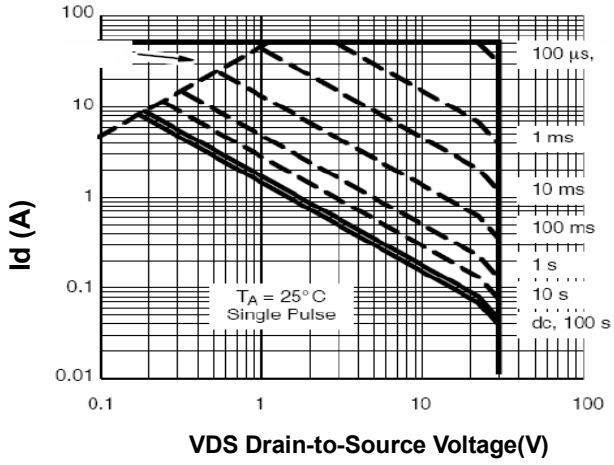
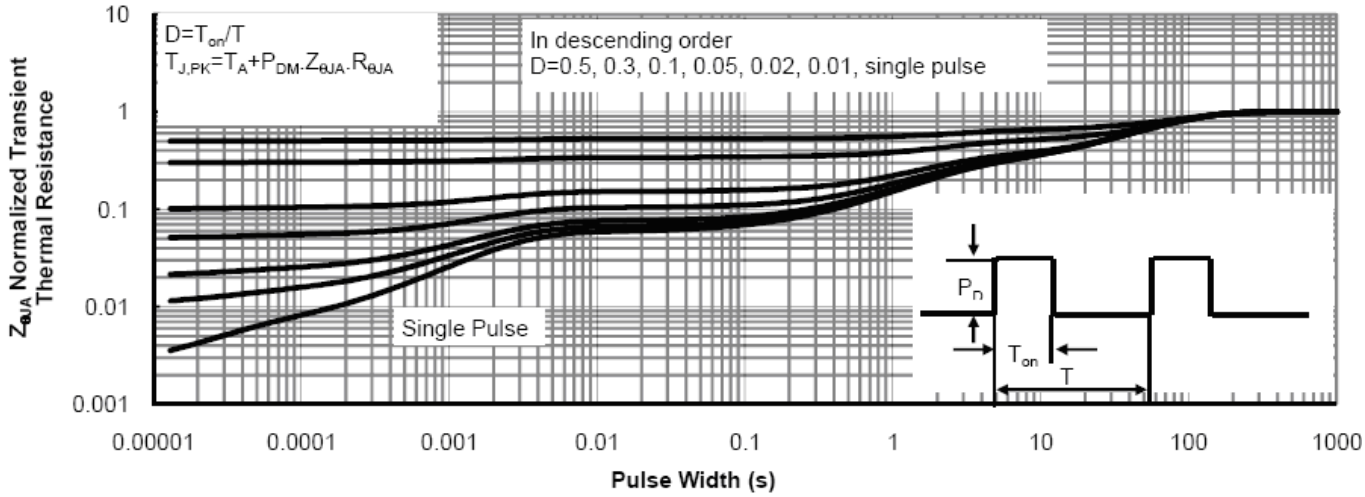
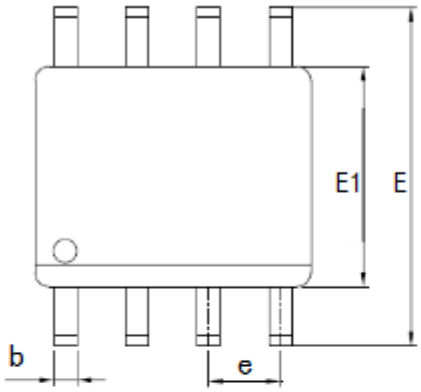
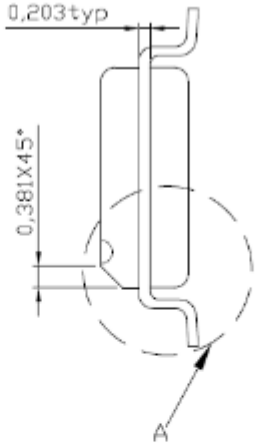


Figure 11. Normalized Maximum Transient Thermal Impedance

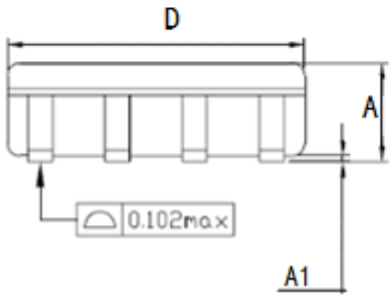


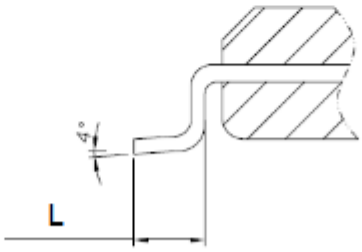
SOP-8 Package Information





COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.1	0.15	0.2
b	0.346	0.406	0.466
D	4.8	4.89	4.98
E	5.75	6.00	6.25
E1	3.81	3.90	3.99
e	1.27TYP		
L	0.406	0.838	1.27





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