

DTP12N65/DTP12N65F/DTK12N65

www.din-tek.jp 650V 12A 0.58Ω N-ch Power MOSFET

Description

DT2 MOS is DIN-TEK 2nd generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.



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Features

- Typ.R_{DS(on)}=0.58Ω@V_{GS}=10V
- 100% avalanche tested
- RoHS Compliant



Applications

- SMPS
- Charger
- DC-DC

Absolute Maximum Ratings (Tc=25°C)

Parameter	Symbol	DTP12N65/DTK12N65	DTP12N65F	Unit
Drain-source voltage	Vdss	65	50	V
Gate-source voltage	V _{GS}	±;	30	V
Continuous drain current	ID	1	2	А
Pulsed drain current ¹	IDM	4	8	А
Avalanche energy, single pulse ²	Eas	605		mJ
Power dissipation	PD	156	65	W
Derate above 25°C		1.25	0.5	W/°C
Operating junction temperature	Tj	-55~150		°C
Storage temperature	T _{stg}	-55~150		°C
Continuous diode forward current	ls	12		А
Diode pulse current ¹	I _{Spulse}	4	8	А

Thermal Characteristic

Thermal resistance, junction-to-case	R _{θJC}	0.8	2	°C/W
Thermal resistance,junction-to-ambient	Reja	62.5	62.5	°C/W

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Electrical Characteristics of MOSFET

					Тур.	Max.	
Drain-source break down voltage	BV _{DSS}	I _D =250uA, V _{GS} =0V	Tc=25℃	650	-	-	V
Gate threshold voltage	V _{GS(th)}	ID=250uA, VDS=VGS	T J=25 ℃	2.0	-	4.0	V
Drain-source leakage current	Idss	V_{DS} =650V, V_{GS} =0V	T J=25 ℃	-	-	1	μA
		V_{DS} =520V, V_{GS} =0V	TJ=125℃	-	-	100	μA
Gate-source leakage current, forward	Igssf	$V_{DS}=0V$, $V_{GS}=30V$	T J=25 ℃	-	-	100	nA
Gate-source leakage current, reverse	Igssr	$V_{DS}=0V$, $V_{GS}=-30V$	T J=25 ℃	-	-	-100	nA
Drain-source on-state resistance ³	RDS(ON)	V _{GS} =10V, I _D =6A	T J=25 ℃	-	0.58	0.74	Ω

Dynamic Characteristics of MOSFET (Tc=25°C)

•			Min.	Typ.	Max.	
Input capacitance	Ciss		-	2010	-	pF
Output capacitance	Coss	f=1MHz, V _{DS} =25V, V _{GS} =0V	-	161	-	pF
Reverse transfer capacitance	Crss		-	18.5	-	pF
Gate to source charge	Q _{gs}	V _{DD} =320V	-	10.8	-	nC
Gate to drain charge	Q _{gd}	I _D =12A	-	14.4	-	nC
Total gate charge	Qg	V _{GS} = 0 to10V	-	44.7	-	nC

Switching Characteristics of MOSFET (Tc=25°C)

			Min.	Тур.	Max.	
Turn-on delay time	t _{d on}		-	29	-	ns
Rise time	tr	V _{DS} =320V, I _D =12A,	-	33	-	ns
Turn-off delay time	t _{d off}	$R_G=25\Omega$, $V_{GS}=0$ to 10V	-	143	-	ns
Fall time	t _f		-	47	-	ns

Characteristics of Body Diode (Tc=25°C)

			Min.	Тур.	Max.	
Forward voltage	Vsd	I _{SD} =12A, V _{GS} =0V	-	-	1.4	V
Reverse recovery time	trr	trr VDS=320V, IS=12A, VGS=0V	-	364	-	ns
Reverse recovery current	Irr		-	37	-	А
Recovery charge	Qrr	di/dt=100A/ds	-	6.8	-	μC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$ =150°C.

2. The E_{AS} data shows Max. rating . The test condition is V_{DD} =50V, V_{GS} =10V, L=10mH, I_{AS} =11A,Tc=25°C.

3. The data tested by pulsed , pulse width \leq 300us , duty cycle \leq 2%.

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TYPICAL CHARACTERISTICS



Figure 3.Static Drain-Source On Resistance





Figure 4. Typical Body Diode Transfer Characteristics



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Figure 8. Gate Charge Characteristics



Figure 10. Transient Thermal Response Curve (TO-220/TO-263)







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Test Circuit

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Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



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Mechanical Dimensions for TO-220F



М

COMMON DIMENSIONS

SYMPOL	М	М
STIMBUL	MIN	MAX
А	9.95	10.36
В	2.95	3.55
С	1.25	1.6
D	12.64	13.5
E	0.40	0.60
F	2.80	3.80
G	1.14	1.58
Н	2.44	2.64
I	4.88	5.26
J	4.50	4.90
K	2.34	2.80
L	6.48	6.90
М	15.40	16.07
N	2.66	3.50
0	0.40	0.64
Р	0.70	0.94

Mechanical Dimensions for TO-220





SVMPOL	М	М
STINDUL	MIN	MAX
Α	4.30	4.70
A1	2.30	2.82
b	0.70	0.94
b1	1.17	1.41
С	0.30	0.64
c1	1.17	1.44
D	9.70	10.20
E	8.50	9.30
E1	12.00	12.50
е	2.44	2.64
e1	4.88	5.26
F	2.60	2.94
L	13.00	14.00
L1	3.385	4.20
Ø	3.74	3.95



Package Information

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Mechanical Dimensions for TO-263

COMMON DIMENSIONS





CVMPOL	Μ	М
STINDUL	MIN	MAX
А	4.45	4.65
A1	0	0.15
A2	2.50	2.70
b	0.75	0.96
b1	0.71	0.92
b2	1.21	1.41
b3	1.17	1.37
С	0.33	0.52
c1	0.28	0.48
c2	1.21	1.41
D	9.10	9.30
D2	7.21	7.62
E	9.90	10.10
E1	9.90	10.30
E2	7.34	7.74
е	2.50	2.60
Н	15.30	15.70
L	2.34	2.74
L1	1.06	1.47
L2	1.40	1.60
L3	0.25	0.26

Ordering Information

Part	Package	Packing method
DTP12N65F	TO-220F	Tube
DTP12N65	TO-220	Tube
DTK12N65	TO-263	Tape and Reel

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