迅瑞创芯
cenrokersing

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

TF20N03

Description

The TF20N03 TO-252 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

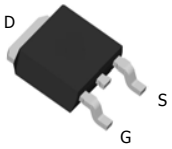
VDSS	RDS(ON) @10V (typ)	ID
30V	14 mΩ	20A

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

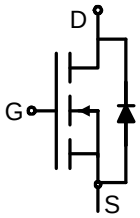
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

TO-252



Equivalent Circuit



MARKING

Y :year code W :week code

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30 V	
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	20	A
Drain Current-Pulsed (Note 1)	I_{DM}	50	A
Maximum Power Dissipation	P_D	30	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	3.5	℃/W

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Electrical Characteristics (T_A=25℃unless otherwise noted)

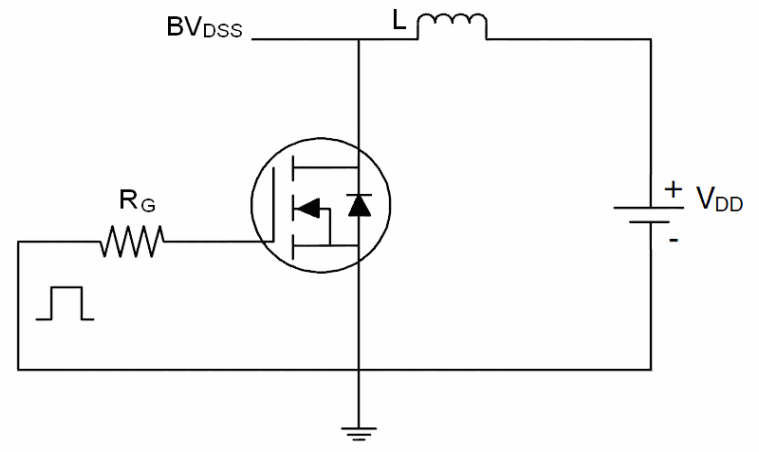
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	32	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=28V, V_{GS}=0V	-	-	500	nA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1	1.45	2.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=15 A		14	18	mΩ
		V_{GS}=4.5V, I_D=10A		18	26	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=10A		10		S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	1165	-	PF
Output Capacitance	C_{oss}		-	142	-	PF
Reverse Transfer Capacitance	C_{rss}		-	99	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V,I_D=1.0A V_{GS}=10V,R_G=6.0Ω	-	11.7	-	nS
Turn-on Rise Time	t_r		-	5.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	18	-	nS
Turn-Off Fall Time	t_f		-	6.0	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=5A, V_{GS}=10V	-	11	-	nC
Gate-Source Charge	Q_{gs}		-	2.2	-	nC
Gate-Drain Charge	Q_{gd}		-	4.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A	-	-	12	V
Diode Forward Current (Note 2)	I_S		-	-	10	A

Notes:

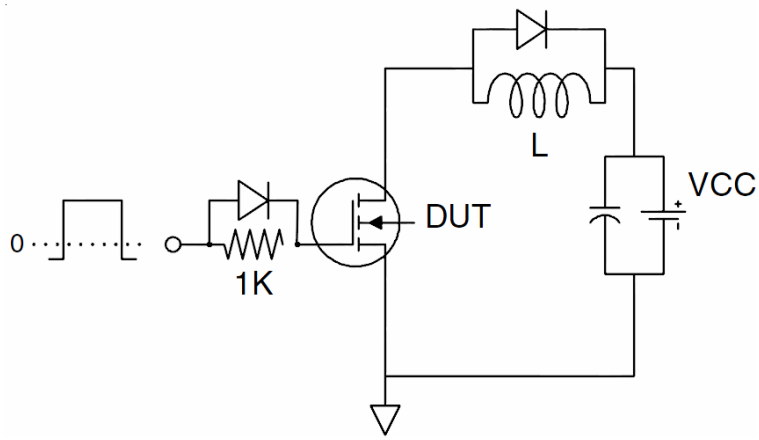
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Test circuit

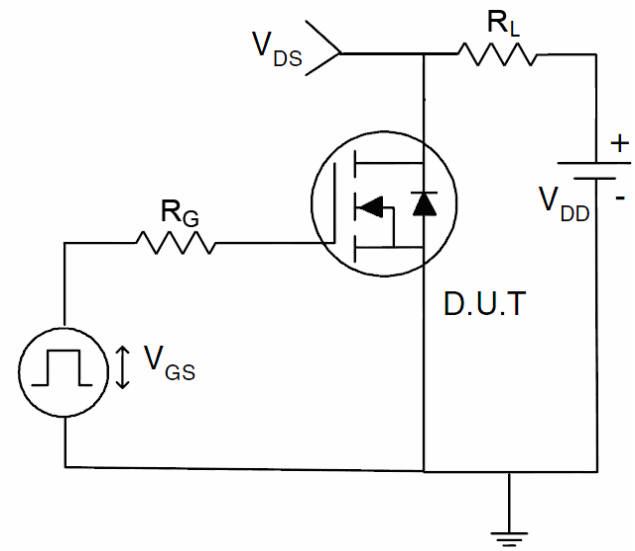
1）E_{AS} test Circuits



2）Gate charge test Circuit:



3）Switch Time Test Circuit：



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Typical Electrical and Thermal Characteristics (Curves)

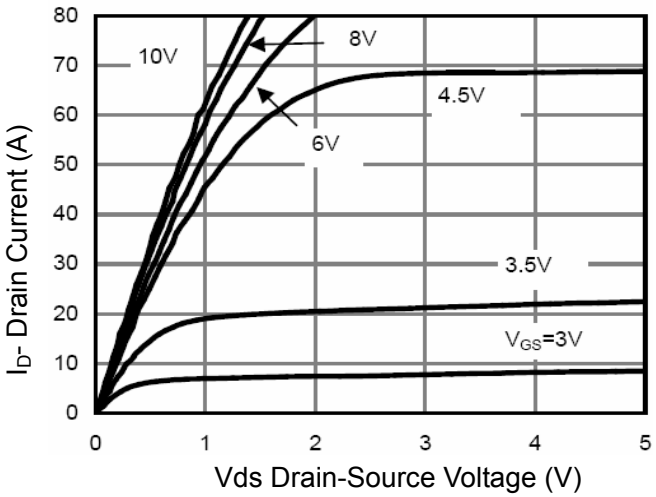

Figure 1 Output Characteristics

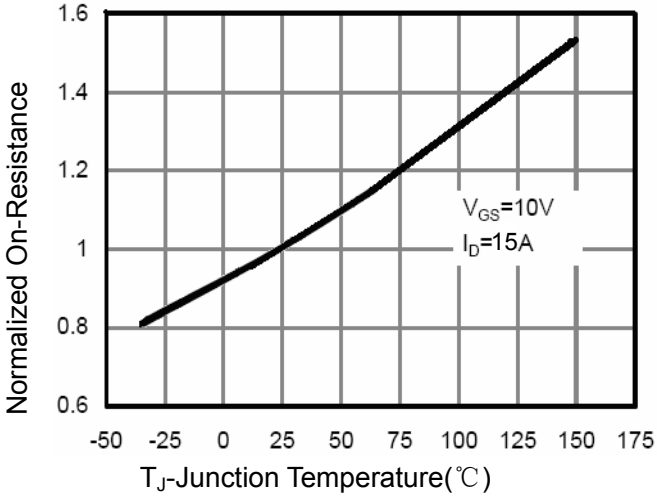

Figure 4 Rdson-Junction Temperature

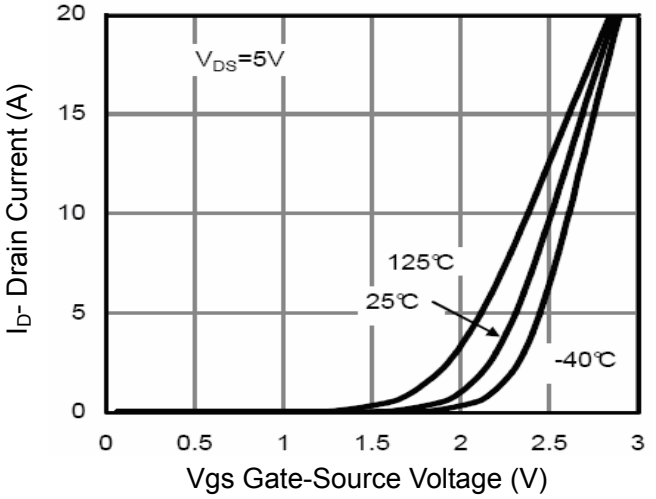

Figure 2 Transfer Characteristics

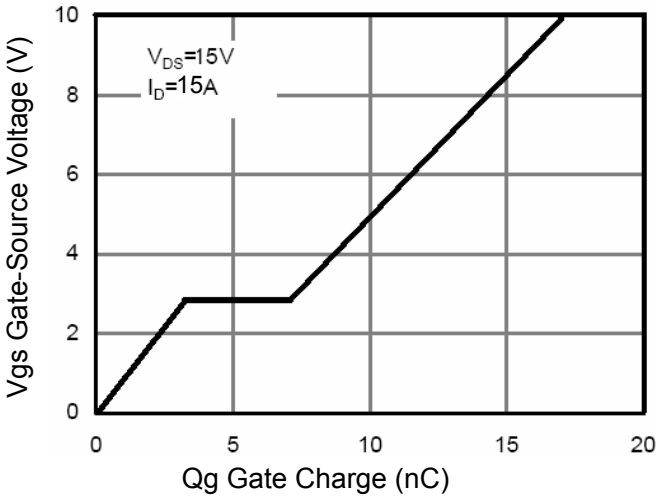

Figure 5 Gate Charge

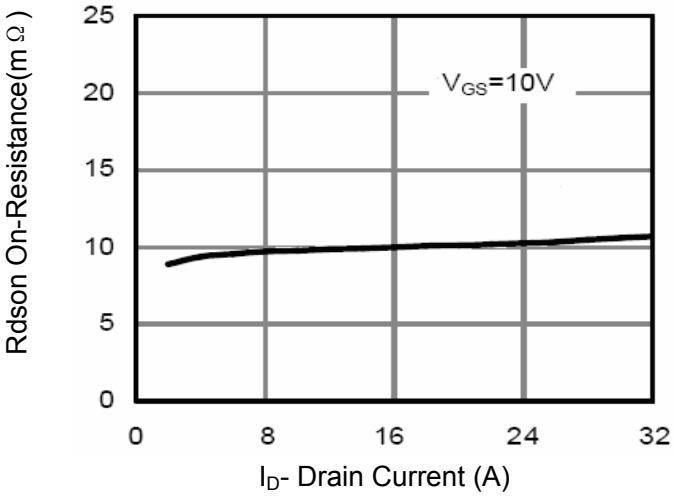

Figure 3 Rdson- Drain Current

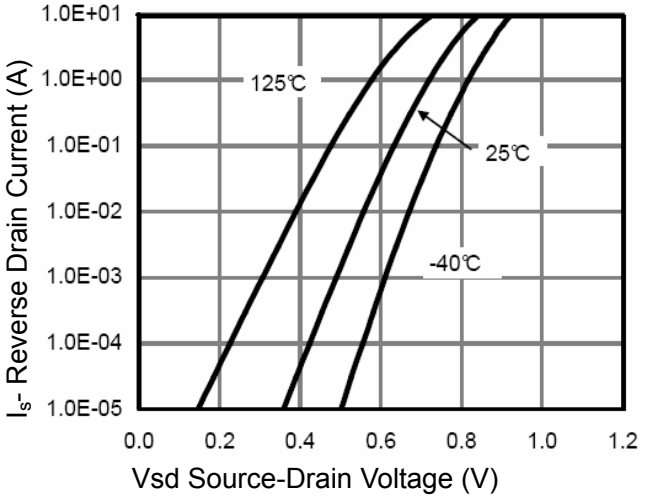

Figure 6 Source- Drain Diode Forward

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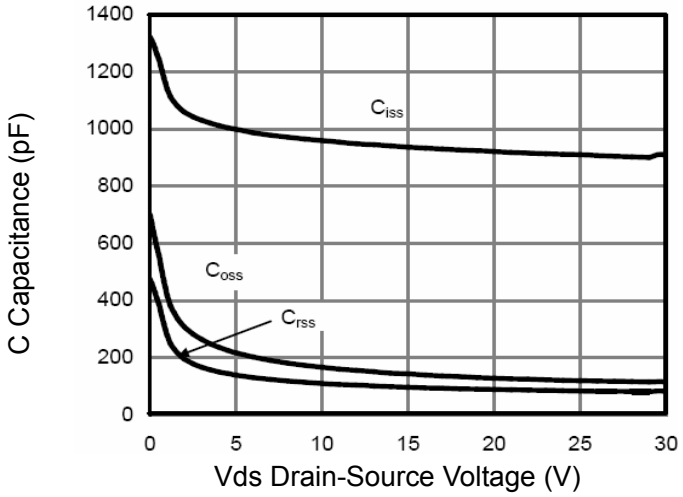


Figure 7 Capacitance vs Vds

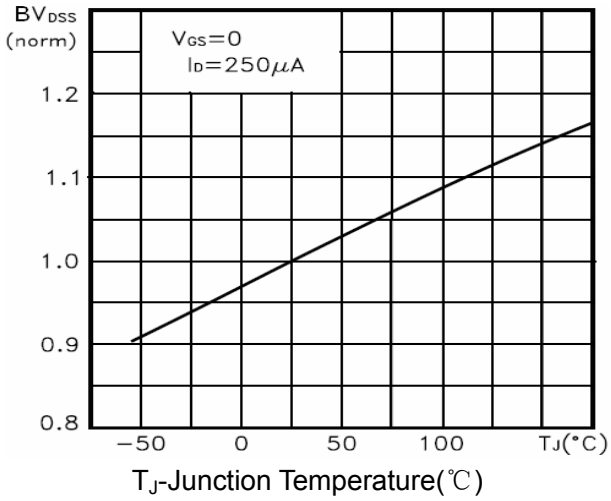


Figure 9 BV_{DSS} vs Junction Temperature

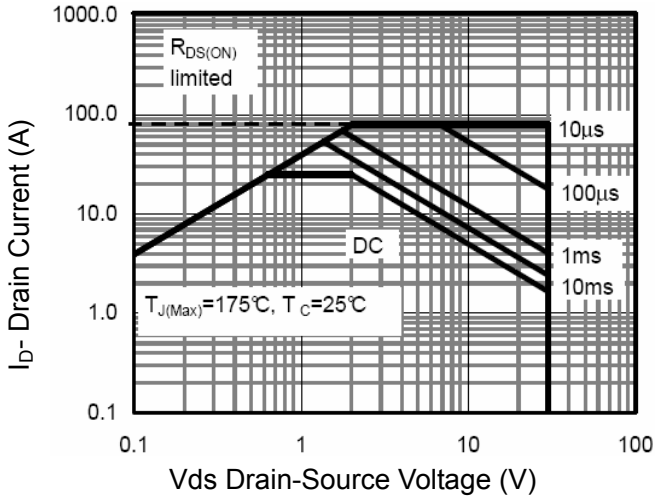


Figure 8 Safe Operation Area

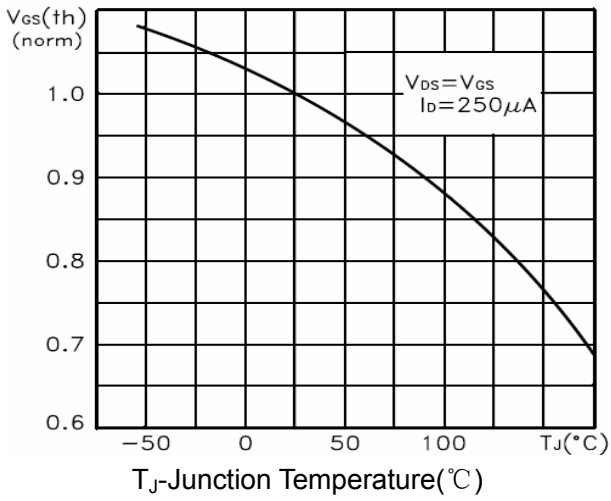


Figure 10 $V_{GS(th)}$ vs Junction Temperature

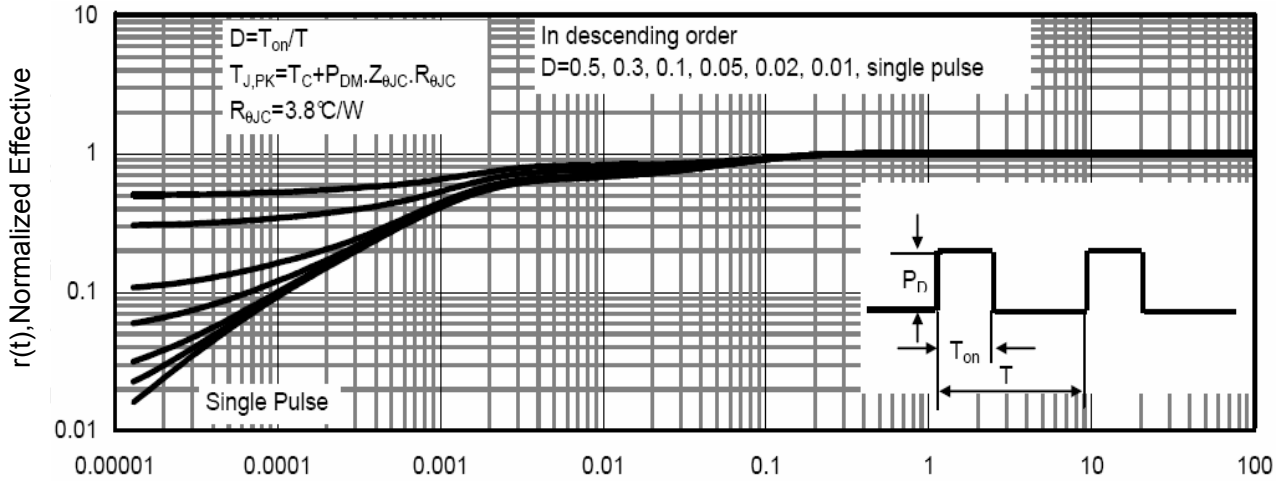
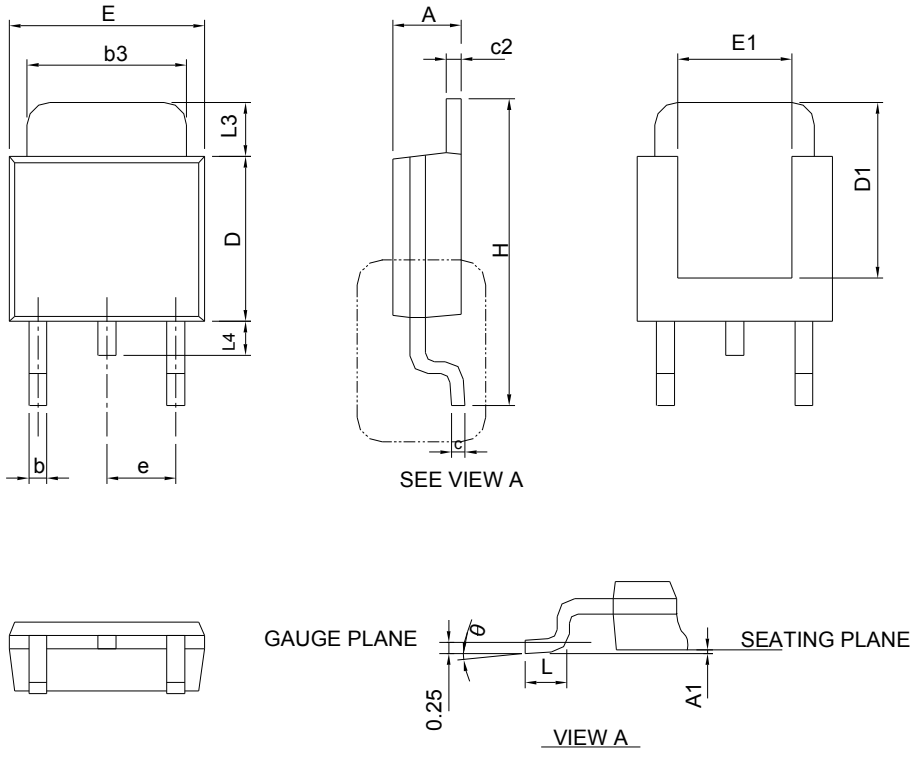


Figure 11 Normalized Maximum Transient Thermal Impedance

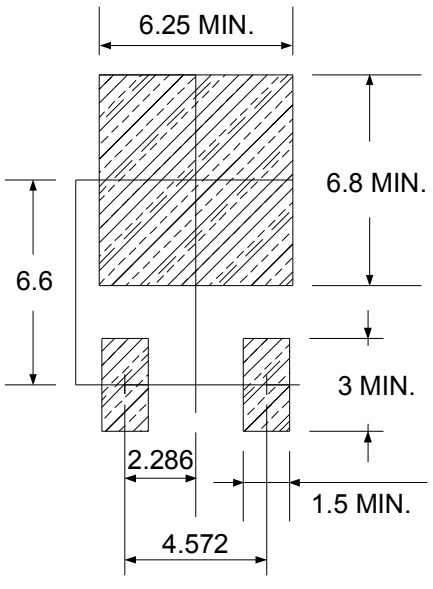
Package Information

TO-252-2L



SYMBOL	TO-252-3			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1		0.13		0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4		1.02		0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



UNIT: mm