Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
20V	8mΩ@4.5V	40A
	12mΩ@2.5V	

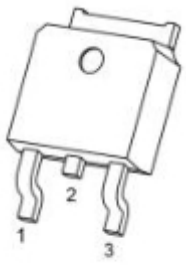
Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Applications

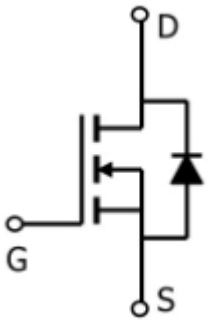
- Power switching application
- Load switching
- Uninterruptible power supply

Package

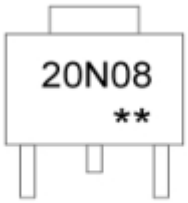


TO-252(G:1 D:2 S:3)

Circuit diagram



Marking



20N08 : Product code

** : Week code.

Absolute maximum ratings

(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous (TC=25℃)	I_D	40	A
Drain Current-Continuous (TC=100℃)		28	A
Pulsed Drain Current	I_{DM}	160	A
Maximum Power Dissipation (TC=25℃)	P_D	40	W
Single pulse avalanche energy (1)	E_{AS}	150	mJ
Thermal Resistance,Junction-to-Case(2)	$R_{\theta JC}$	3.8	℃/W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Electrical characteristics

(T_A=25℃, unless otherwise noted)

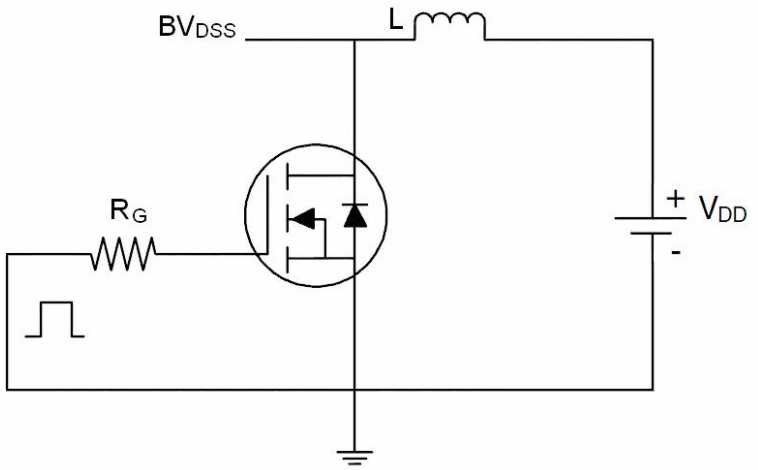
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D =250μA	20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =20V,V_{GS} = 0V			10	uA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V , V_{DS}=0V			±100	uA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.5	0.7	1.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} =4.5V, I_D =20A		8	11	mΩ
		V_{GS} =2.5V, I_D =15A		12	16	
Forward Transconductance	g_{FS}	V_{DS} =5V, I_D =20A	10			S
Dynamic characteristics (4)						
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V, f=1MHz		900		pF
Output Capacitance	C_{oss}			162		
Reverse Transfer Capacitance	C_{rss}			105		
Switching Characteristics (4)						
Turn-On Delay Time	$T_{d(on)}$	V_{GS}=10V, V_{DS}=10V, R_L=0.5Ω, R_{GEN}=3Ω		4.5		nS
Rise Time	T_r			9.2		
Turn-Off Delay Time	$T_{d(off)}$			18.7		
Fall Time	T_f			3.3		
Total Gate Charge(4.5V)	Q_g	V_{GS}=10V, V_{DS}=10V, I_D=20A		15		nC
Gate-Source Charge	Q_{gS}			1.8		
Gate-Drain Charge	Q_{gd}			2.8		
Drain-Source Diode Characteristics						
Diode Forward Voltage (3)	V_{SD}	I_S=20A, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 20A di/dt = 100A/μs(3)		43		nS
Reverse Recovery Charge	Q_{rr}			9.5		nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

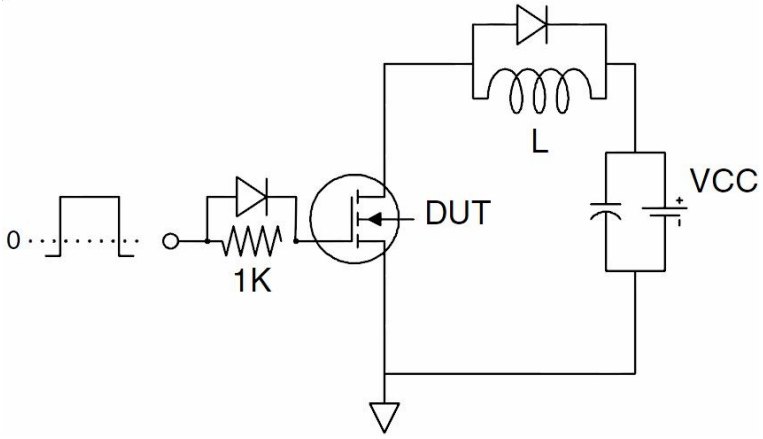
1. E_{AS} condition: T_j=25℃,V_{DD} =10V,V_G =10V,L=0.5mH,Rg=25Ω.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.

Test Circuit

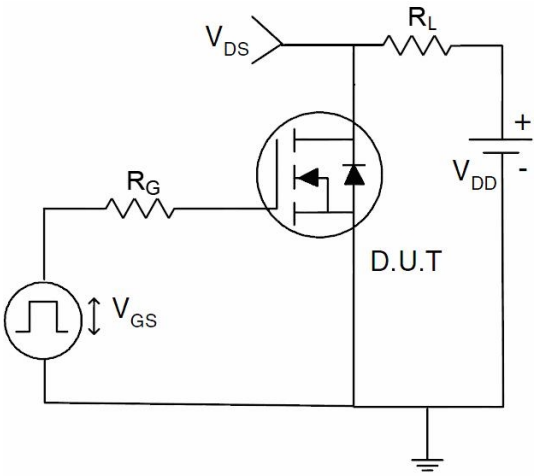
- EAS Test Circuits



- Gate Charge Test Circuit



- Switch Time Test Circuit



Typical Characteristics

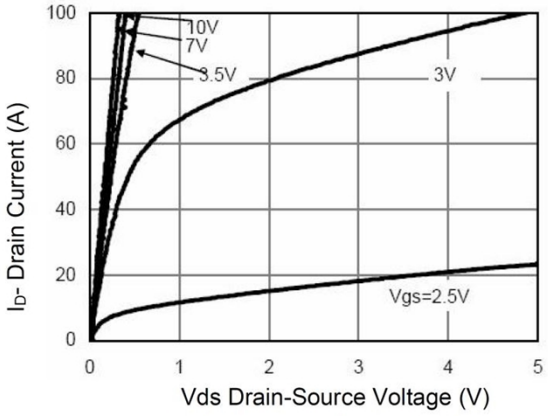


Figure 1 Output Characteristics

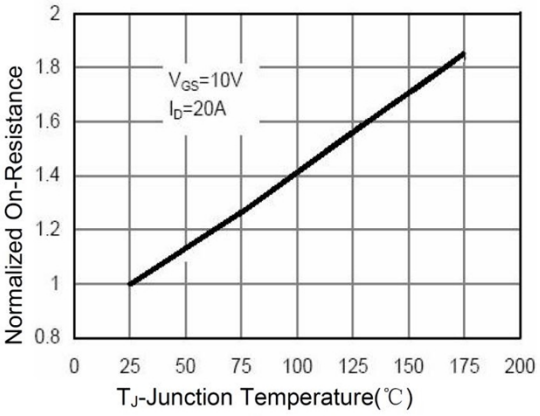


Figure 4 Rdson-Junction Temperature

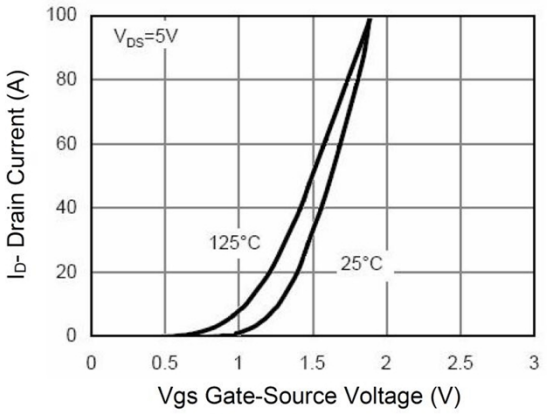


Figure 2 Transfer Characteristics

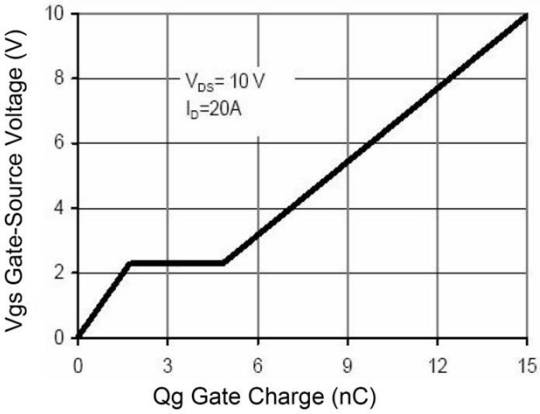


Figure 5 Gate Charge

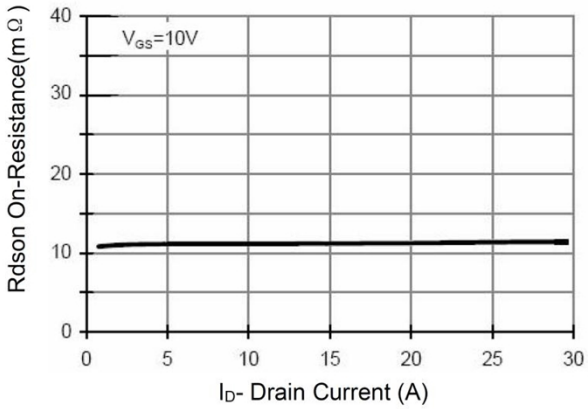


Figure 3 Rdson- Drain Current

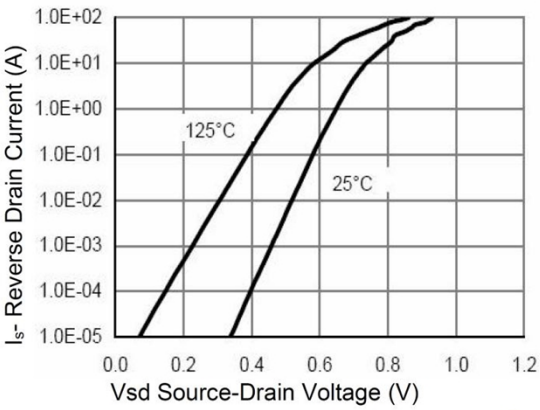


Figure 6 Source- Drain Diode Forward

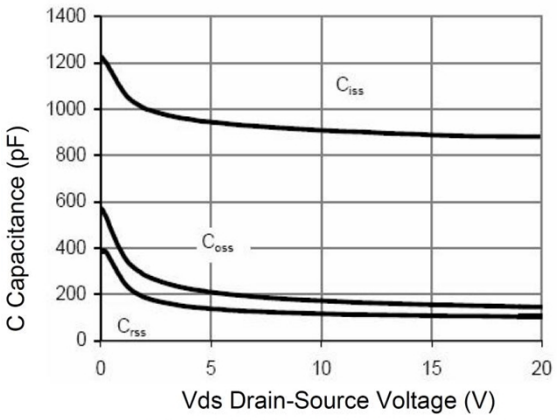


Figure 7 Capacitance vs Vds

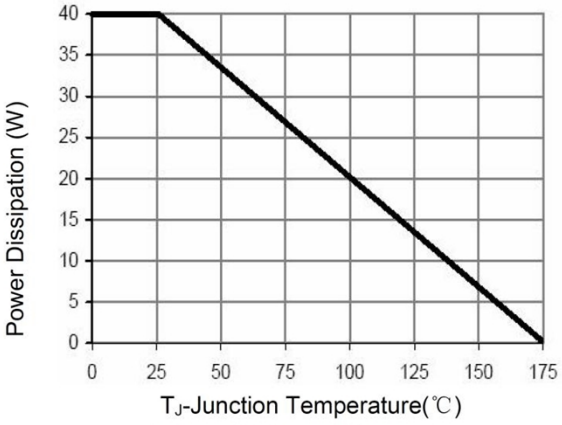


Figure 9 Power De-rating

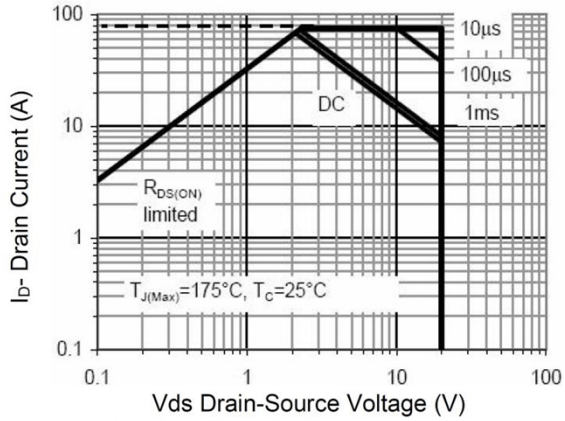


Figure 8 Safe Operation Area

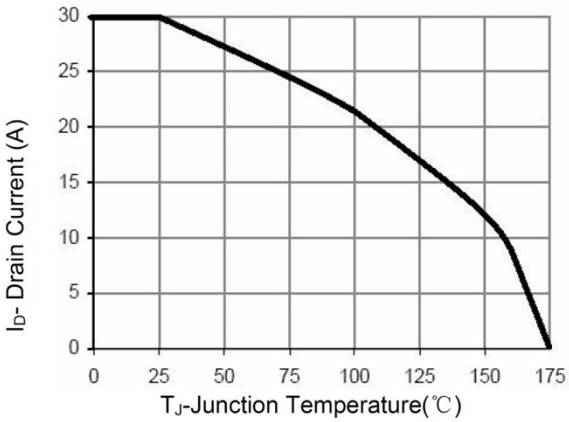


Figure 10 Current De-rating

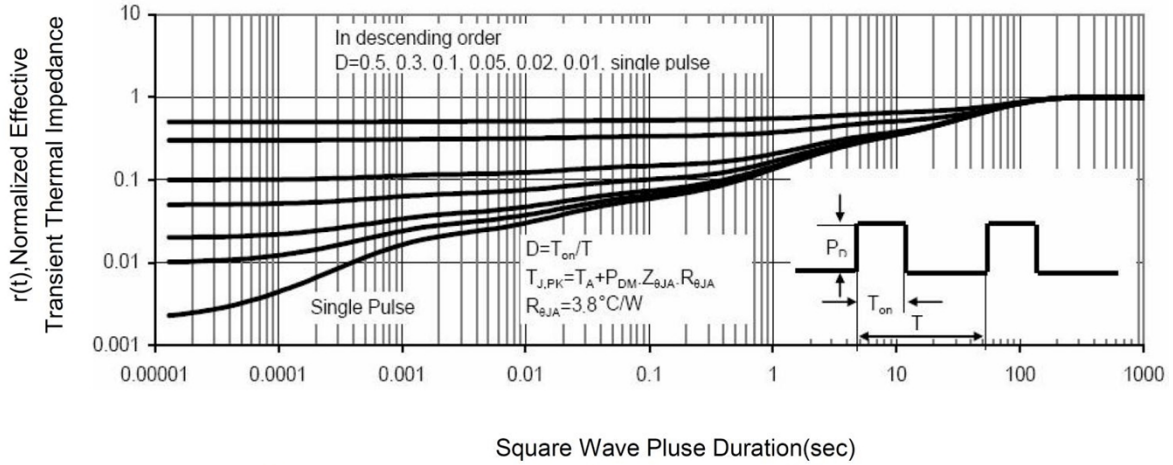
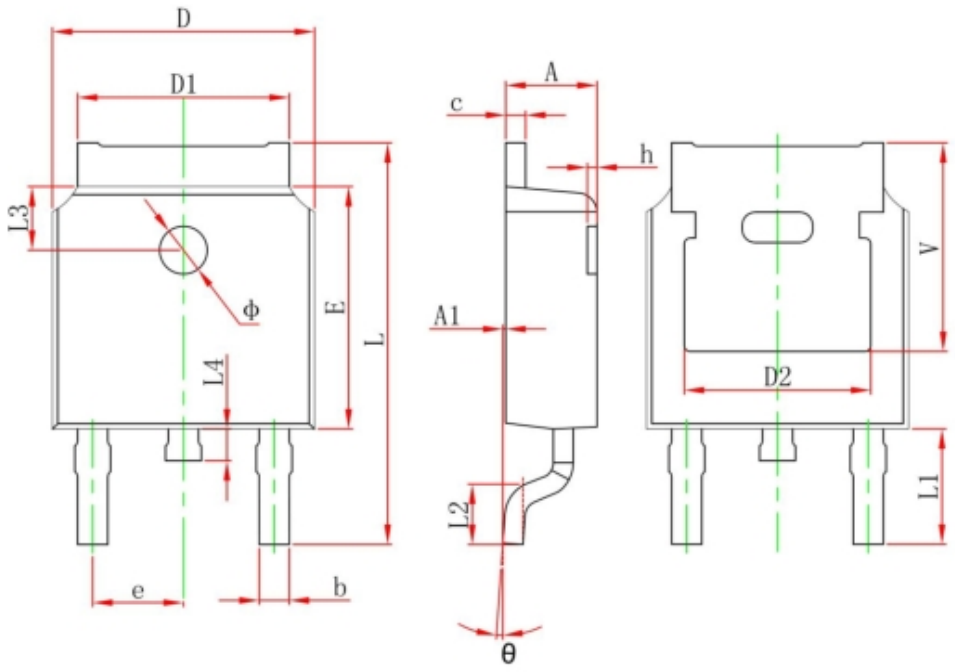


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	