



Description

Features

- Extremely Low RDS(on):
- Typ.RDS(on) =5.2mΩ @VGS=10 V, Id=40 A
- Good stability and uniformity
- 100% avalanche tested
- Excellent package for good heat dissipation

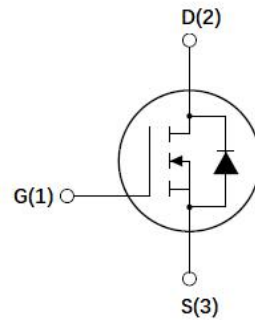
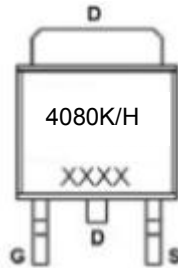
General Description

The 4080 uses advanced trench technology to provide excellent RDS(ON), low gate charge This device is suitable for use in UPS, power switching and general purpose applications.

Package



TO-252



Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units
V _{DSS}	Drain-Source Voltage	40	V
V _{GSS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current	T _C = 25°C	80
		T _C = 100°C	55
I _{DM}	Pulsed Drain Current ^{note1}	300	A
E _{AS}	Single Pulsed Avalanche Energy ^{note2}	270	mJ
P _D	Power Dissipation	T _C = 25°C	80
			0.55
R _{θJC}	Thermal Resistance, Junction to Case	1.86	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +175	°C

* Drain current limited by maximum junction temperature.



Electrical Characteristics (T_C=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	40	45		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
I _{GSSF}	Gate Leakage Current, Forward	V _{GS} = 20 V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate Leakage Current, Reverse	V _{GS} = -20 V, V _{DS} = 0 V	100			nA
On Characteristics						
V _{GS(TH)}	Gate Threshold voltage	V _{DS} = V _{GS} , I _D = 250 uA	1.2	1.7	2.2	V
R _{DS(on)}	Drain-Source on-state resistance	V _{GS} = 10 V, I _D = 20 A		5.2	7	mΩ
		V _{GS} = 4.5 V, I _D = 20 A		9.0	13	mΩ
g _{FS}	Forward Transconductance	V _{DS} = 5 V, I _D = 24 A (Note 3)	15			S
Dynamic Characteristics						
C _{iss}	Input capacitance	V _{DS} =20V, V _{GS} =0V, F=1.0Mhz		1800		pF
C _{oss}	Output capacitance			140		pF
C _{rss}	Reverse transfer capacitance			125		pF
Switching Characteristics						
t _{d(on)}	Turn On Delay Time	V _{DD} =20V, I _D =20A, V _{GS} =10V, R _G =30hm (Note 3, 4)		5		ns
t _r	Rising Time			27		ns
t _{d(off)}	Turn Off Delay Time			12		ns
t _f	Fall Time			23		ns
Q _g	Total Gate Charge	V _{DD} =20V, I _D =20A, V _{GS} =10V (Note 3, 4)		34		nC
Q _{gs}	Gate-Source Charge			4.8		nC
Q _{gd}	Gate-Drain Charge			7.2		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current				80	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 10A			1.2	V
T _{rr}	Reverse recovery time	I _F =20A, di/dt=100A/μS		16		ns
Q _{rr}	Reverse recovery charge			11		nC

Notes:

Repetitive Rating : Pulse width limited by maximum junction temperature

L = 0.5 mH, I_{AS} = 35 A, V_{DD} = 20V, R_G = 25 Ω, Starting T_J = 25°C

I_{SD} ≤ 40A, di/dt = 100A/us, V_{DD} ≤ B_VDSS, Starting T_J =25°C

Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%

Essentially independent of operating temperature



Typical Performance Characteristics

Figure 1: Output Characteristics

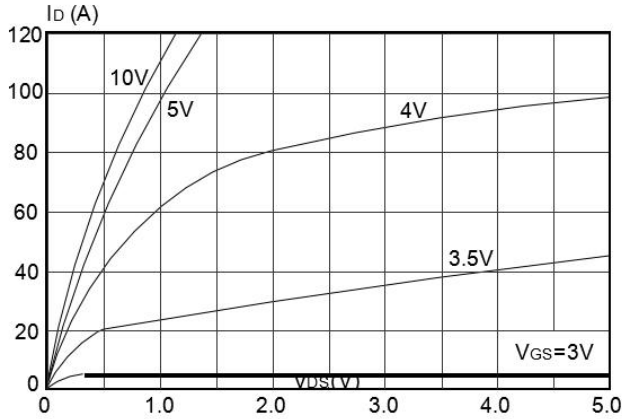


Figure 2: Typical Transfer Characteristics

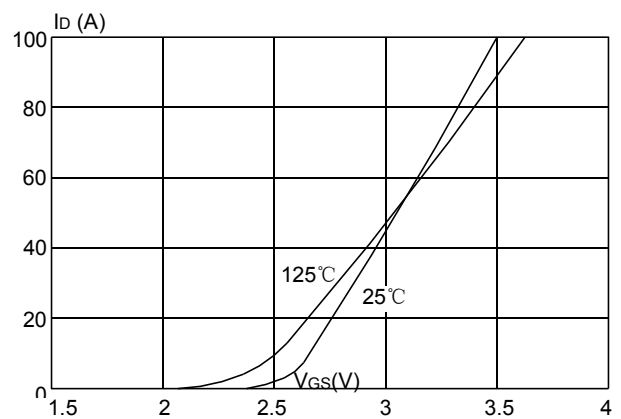


Figure 3: On-resistance vs. Drain Current

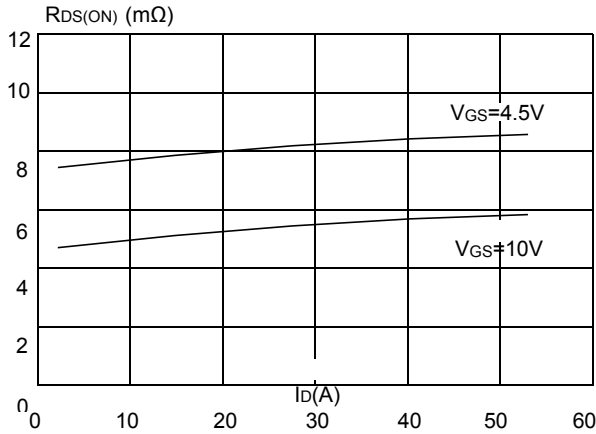


Figure 4: Body Diode Characteristics

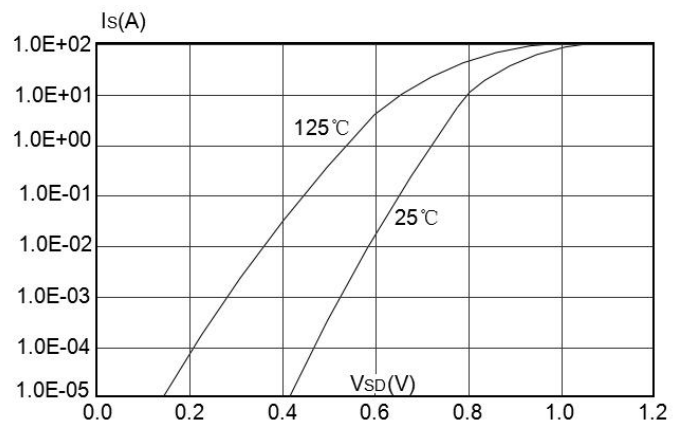


Figure 5: Normalized Breakdown Voltage vs. Junction Temperature

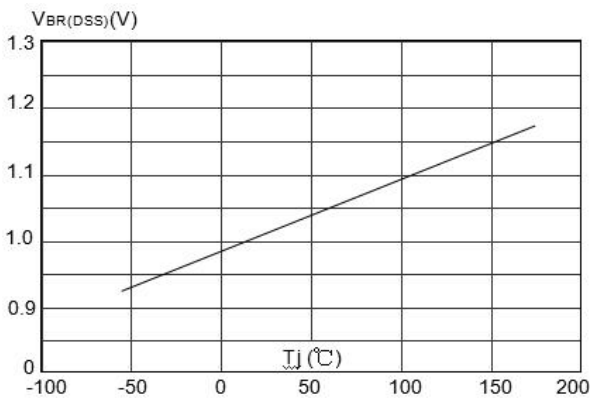


Figure 6: Normalized on Resistance vs. Junction Temperature

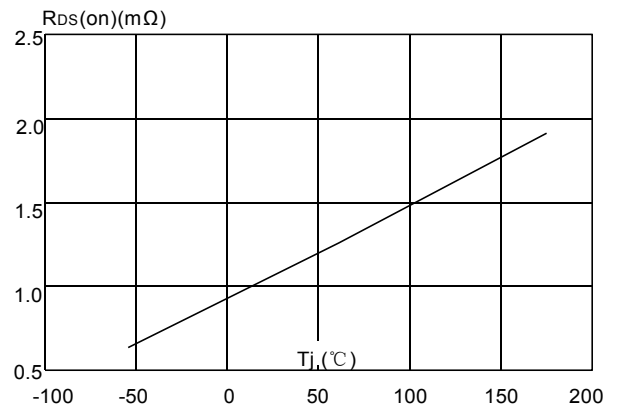




Figure 7: Maximum Safe Operating Area

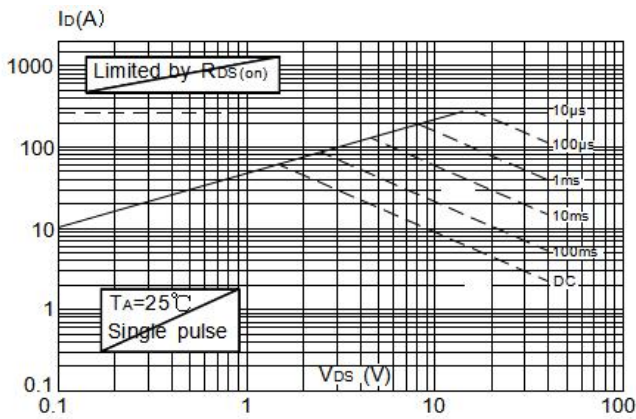


Figure 8: Maximum Continuous Drain Current vs. Case Temperature

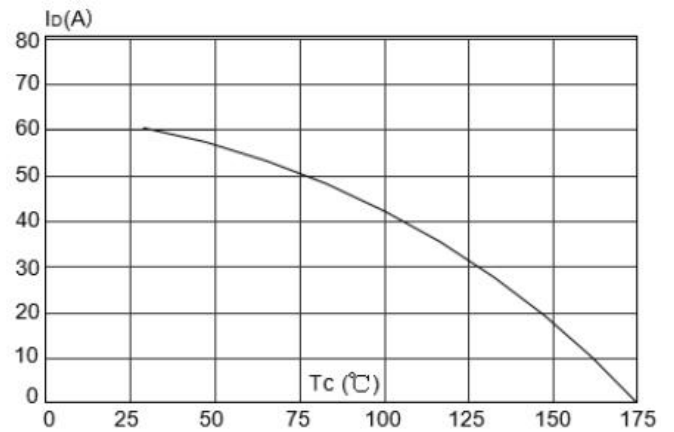
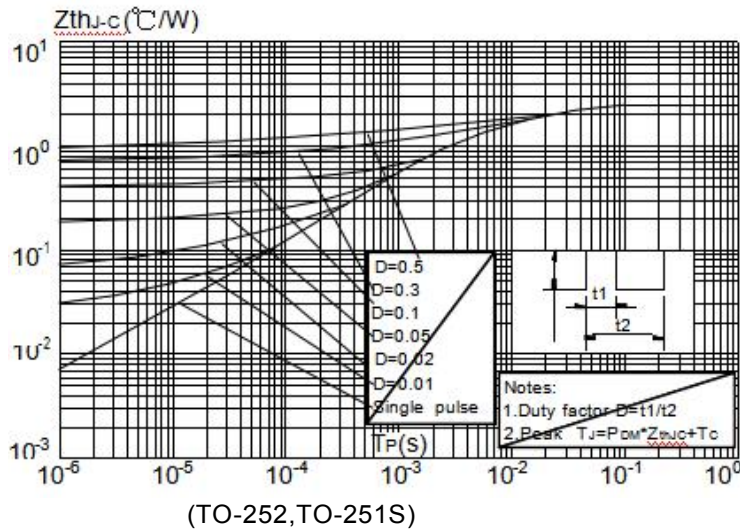
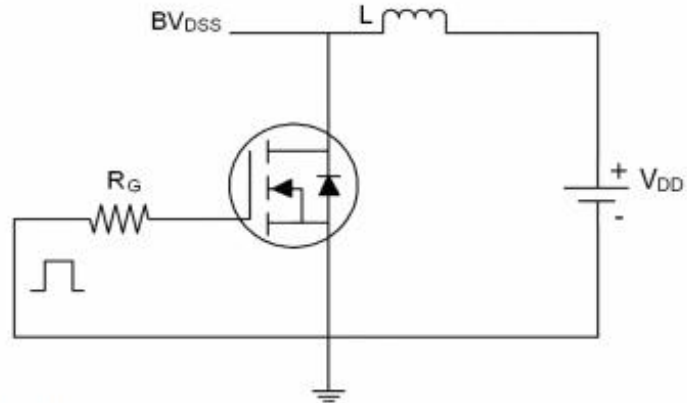


Figure.9: Maximum Effective Transient Thermal Impedance, Junction-to-Case

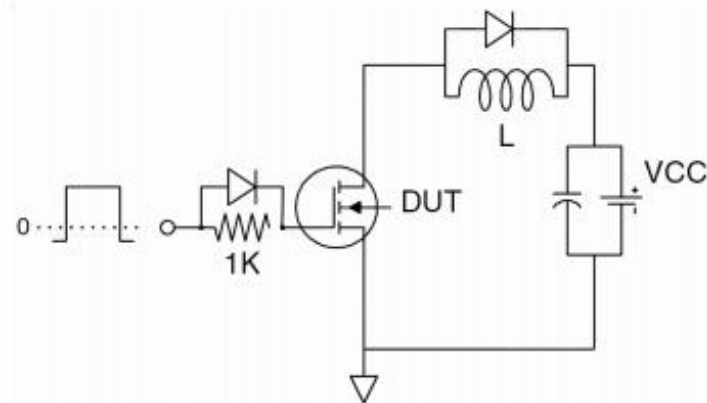


Test Circuit

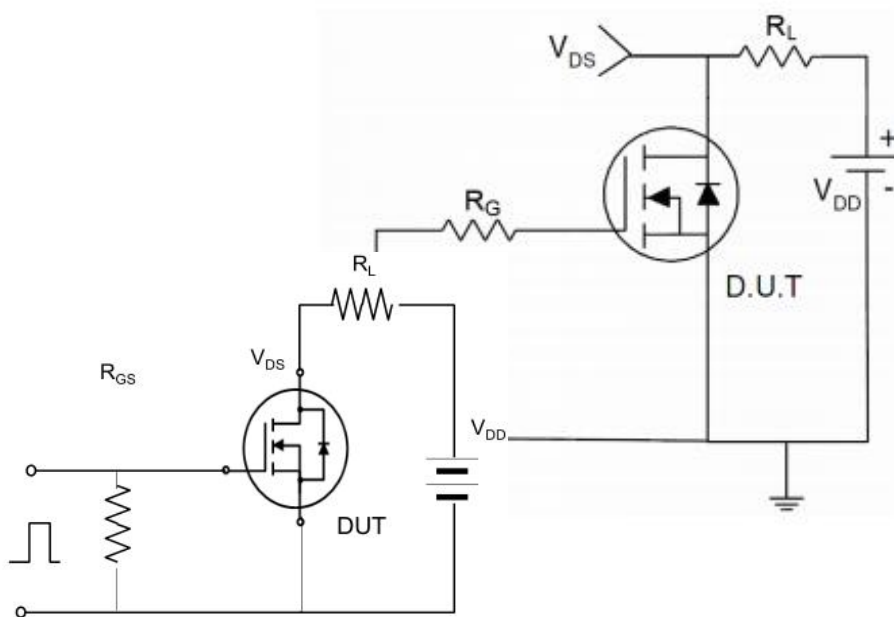
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:

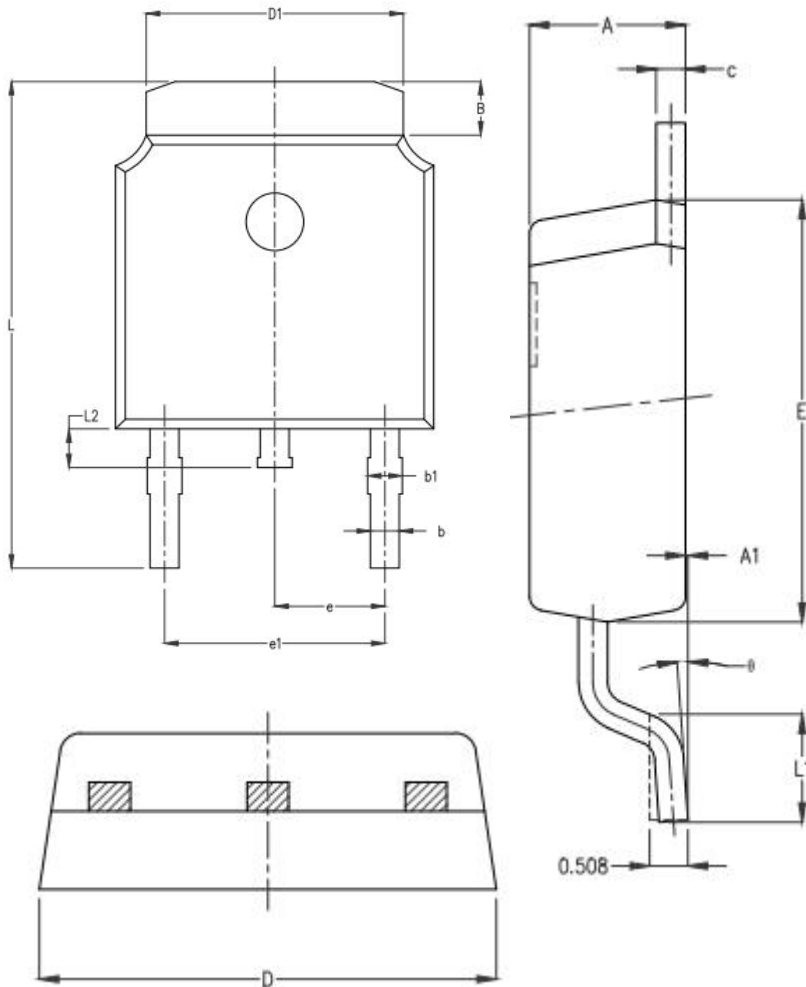


3) Switch Time Test Circuit:





TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.15	2.25	2.35
A1	0.00	0.06	0.12
B	0.96	1.11	1.26
b	0.59	0.69	0.79
b1	0.69	0.81	0.93
c	0.34	0.42	0.50
D	6.45	6.60	6.75
D1	5.23	5.33	5.43
E	5.95	6.10	6.25
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.90	10.10	10.30
L1	1.40	1.55	1.70
L2	0.60	0.80	1.00
θ	0°	4°	8°