



<p>Features</p> <ul style="list-style-type: none"> • Fast Switching • Low ON Resistance($R_{dson} \leq 7.0m\Omega$) • Low Gate Charge • Low Reverse transfer capacitances • 100% Single Pulse avalanche energy Test 	<p>General Description</p> <p>The 4080K 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.</p>
<p>Package</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="207 694 430 963"> <p>Marking and pin assignment</p> </div> <div data-bbox="606 716 893 918"> <p>TO-252top view</p> </div> <div data-bbox="1037 672 1276 940"> <p>Schematic diagram</p> </div> </div>	

Absolute ($T_c=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Voltage	40	V
I_D	Continuous Drain Current $T_C = 25^\circ\text{C}$	80	A
	Continuous Drain Current $T_C = 100^\circ\text{C}$	48	A
I_{DM}^{al}	Pulsed Drain Current $T_C = 25^\circ\text{C}$	320	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}^{a2}	Avalanche Energy	272	mJ
I_{AS}^{a2}	Avalanche Current	28	A
P_D	Power Dissipation $T_C = 25^\circ\text{C}$	86	W
	Derating Factor above 25°C	0.71	W/ $^\circ\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$



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

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 40V, V _{GS} = 0V, T _J = 25°C	--	--	1	μA
		V _{DS} =32V, V _{GS} = 0V, T _J = 125°C	--	--	100	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =20V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-20V	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =20A	--	5	7.0	mΩ
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =4.5V, I _D =15A	--	6.2	8.5	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.70	2.50	V

Pulse width tp≤300μs, δ≤2%

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	--	2.5	--	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} =20V f = 1.0MHz	--	2560	--	pF
C _{oss}	Output Capacitance		--	278	--	
C _{rss}	Reverse Transfer Capacitance		--	257	--	



Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _d (ON)	Turn-on Delay Time	V _{GS} =10V, R _G =2Ω V _{DD} =20V, I _D =20A	--	15.4	--	ns
t _r	Rise Time		--	22.8	--	
t _d (OFF)	Turn-Off Delay Time		--	59.6	--	
t _f	Fall Time		--	14.6	--	
Q _g	Total Gate Charge	V _{DD} =20V, I _D =20A, V _{GS} =10V	--	53.6	--	nC
Q _{gs}	Gate to Source Charge		--	6.8	--	
Q _{gd}	Gate to Drain ("Miller")Charge		--	14.2	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I _S	Continuous Source Current (Body Diode)	T _C = 25 °C	--	--	80	A
I _{SM}	Maximum Pulsed Current (Body Diode)		--	--	320	A
V _{SD}	Diode Forward Voltage	I _S =19.0A, V _{GS} =0V	--	--	1.5	V
t _{rr}	Reverse Recovery Time	I _S =19.0A, T _j = 25°C	--	23.6	--	ns
Q _{rr}	Reverse Recovery Charge	dI _F /dt=100A/us, V _{GS} =0V	--	13.5	--	nC
Pulse width t _p ≤300μs, δ≤2%						

Symbol	Parameter	Max.	Units
R _{θJC}	Junction-to-Csae	1.43	°C/W
R _{θJA}	Junction-to-Ambient	68.5	°C/W

Notes:a1. Repetitive rating; pulse width limited by maximum junction temperature

a2. L=0.5mH, I_D=33A, Start T_J=25°C

a3. Recommend soldering temperature defined by IPC/JEDEC J-STD 020



Typical Characteristics

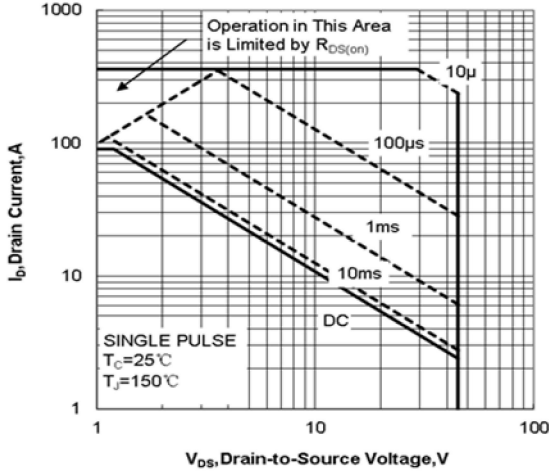


Figure 1 Maximum Forward Bias Safe Operating Area

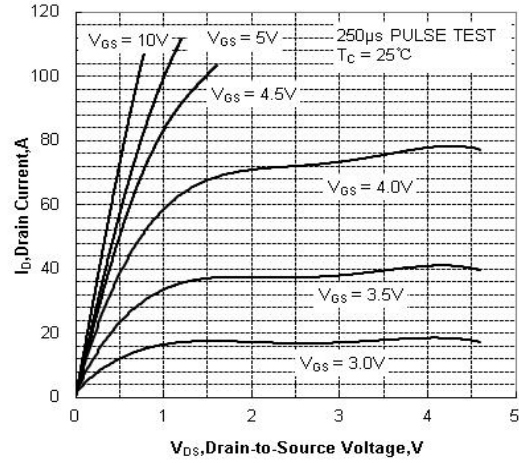


Figure 2 Typical Output Characteristics

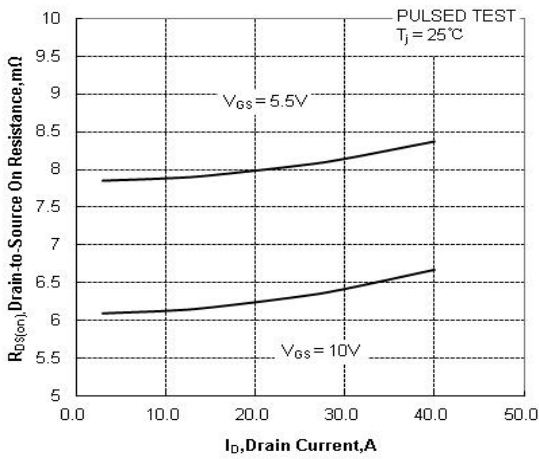


Figure 3 Typical Drain to Source ON Resistance vs Drain

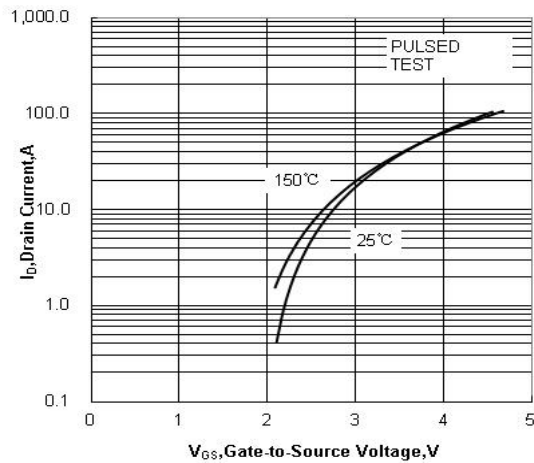


Figure 4 Typical Transfer

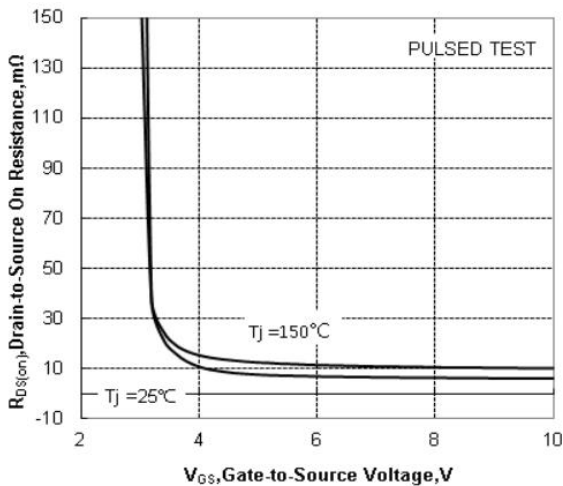


Figure 5 Drain-to-Source On Resistance vs Gate Voltage

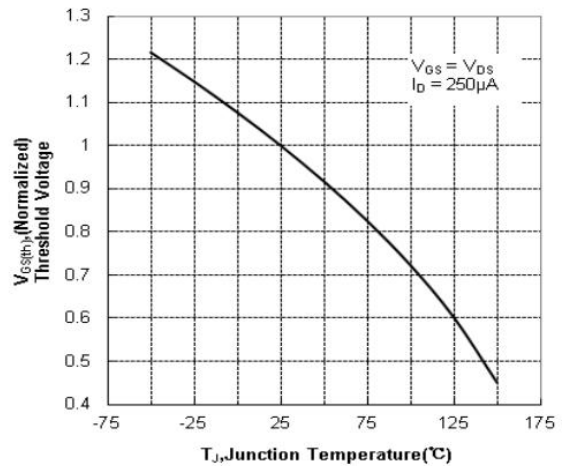


Figure 6 Typical Threshold Voltage vs Junction Temperature and Drain Current

Test Circuit and Waveform

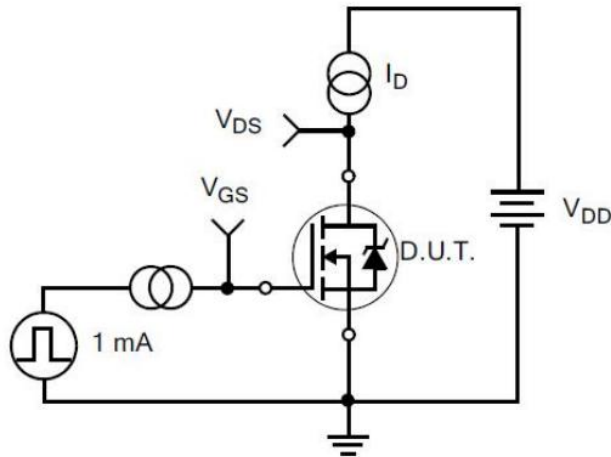


Figure 13. Gate Charge Test Circuit

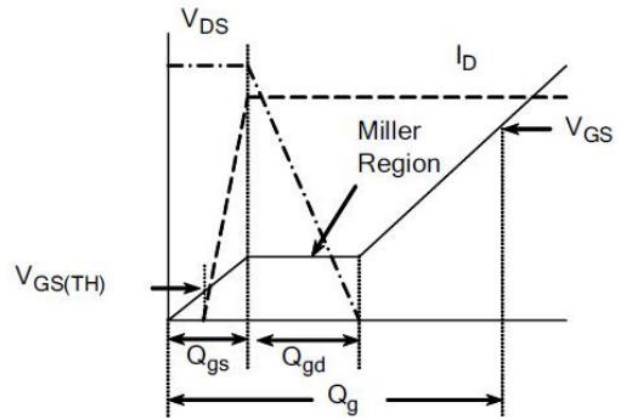


Figure 14. Gate Charge Waveforms

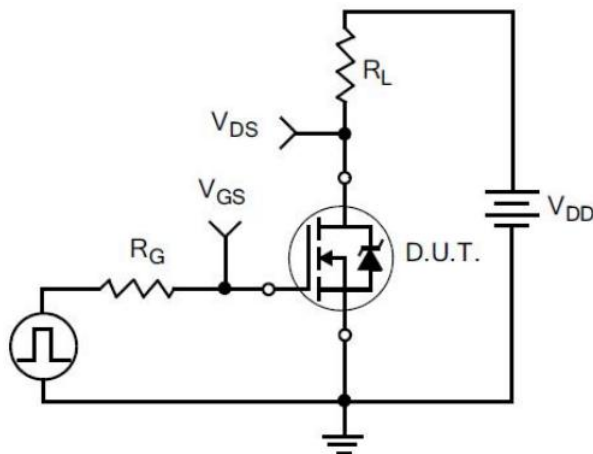


Figure 15. Resistive Switching Test Circuit

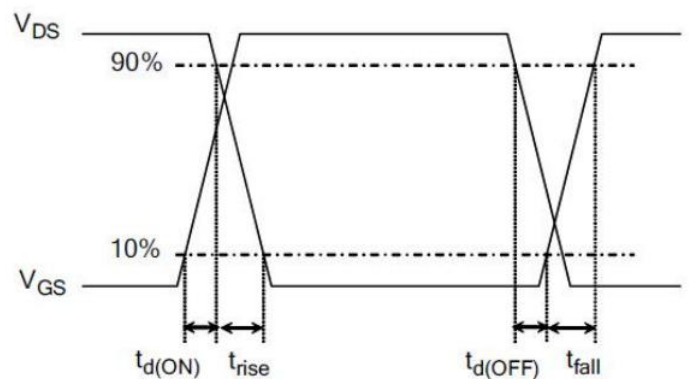


Figure 16. Resistive Switching Waveforms

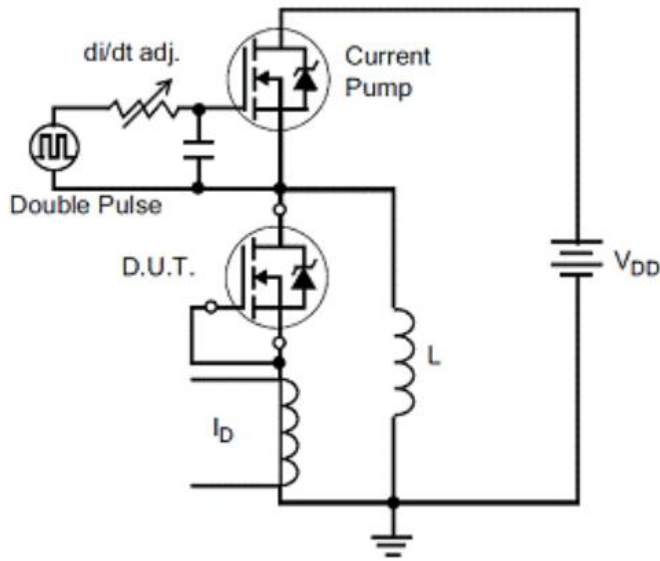


Figure 17. Diode Reverse Recovery Test Circuit

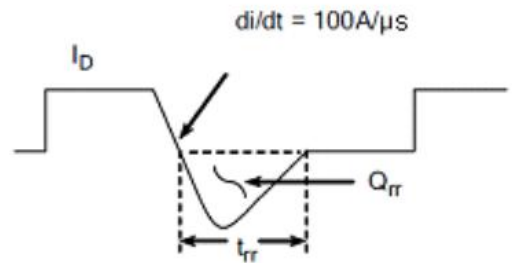


Figure 18. Diode Reverse Recovery Waveform

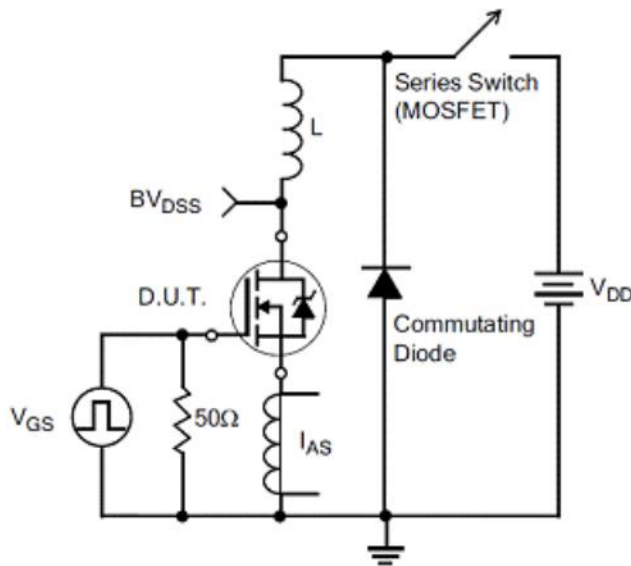


Figure19.Unclamped Inductive Switching Test Circuit

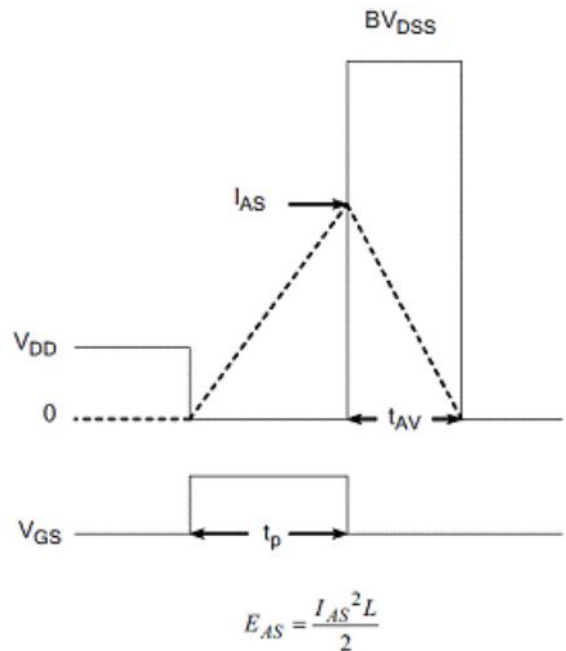
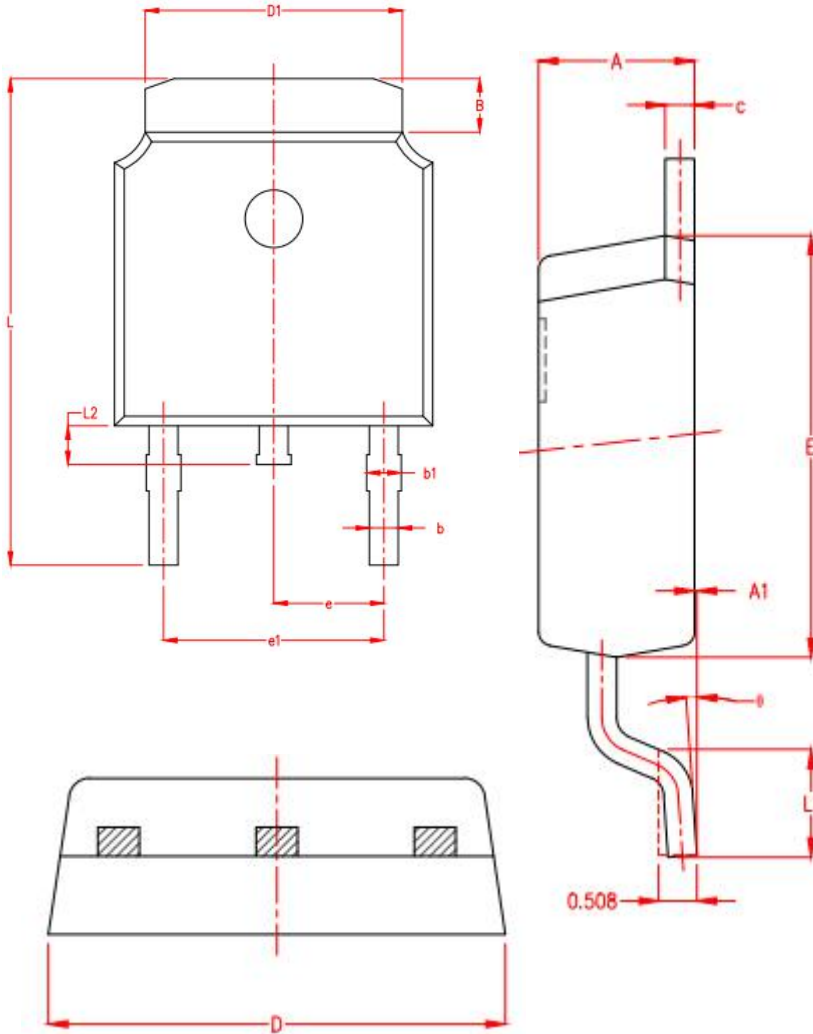


Figure20.Unclamped Inductive Switching Waveform



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°