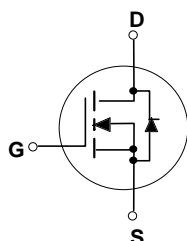


**FH3080K-A**
**N-Channel Trench Power MOSFET**
**Features**

- 30V,90A
- $R_{DS(ON)}=3.6m\Omega$  (Typ.) @  $V_{GS}=10V$
- $R_{DS(ON)}=5.0m\Omega$  (Typ.) @  $V_{GS}=4.5V$
- Advanced Trench Technology
- Provide Excellent  $R_{DS(ON)}$  and Low Gate Charge

**Application**

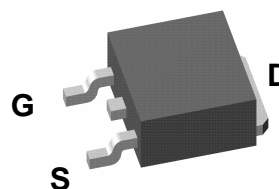
- Load Switch
- PWM Application
- Power management



Schematic diagram

**TO-252**


Marking and pin assignment



TO-252 top view

**Absolute Maximum Ratings** ( $T_C=25^\circ C$  unless otherwise specified)

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	90
		$T_C = 100^\circ C$	58
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	360	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	250	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	90
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.67	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ C$

**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V,$	-	-	1.0	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=30A$	-	3.6	4.8	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$	-	5	7.3	
$g_{FS}$	Forward Transconductance	$V_{DS}=5V, I_D=15A$	-	28	-	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1.0MHz$	-	1950	-	pF
$C_{oss}$	Output Capacitance		-	320	-	pF
$C_{rSS}$	Reverse Transfer Capacitance		-	240	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=25V, I_D=20A,$ $V_{GS}=10V$	-	42	-	nC
$Q_{gs}$	Gate-Source Charge		-	4	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	14	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V,$ $R_I=0.75\Omega, R_{GEN}=3\Omega,$ $V_{GS}=10V$	-	13	-	ns
$t_r$	Turn-on Rise Time		-	36	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	43	-	ns
$t_f$	Turn-off Fall Time		-	16	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	90	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	360	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	-	-	1.2	V
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=20A, di/dt=100A/\mu s$	-	16	-	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge		-	5	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition:  $T_J=25^\circ\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_G=25\Omega$

Typical Performance Characteristics

Figure 1: Output Characteristics

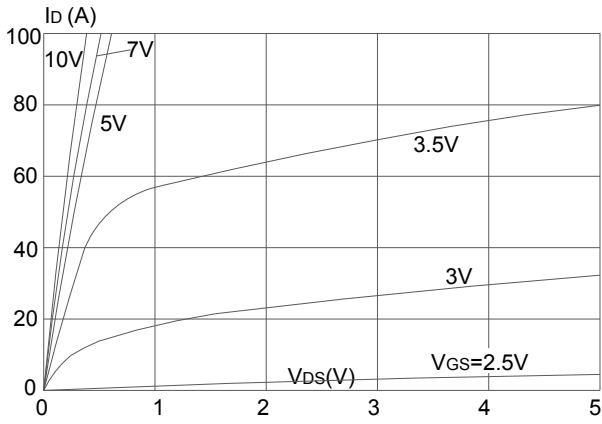


Figure 2: Typical Transfer Characteristics

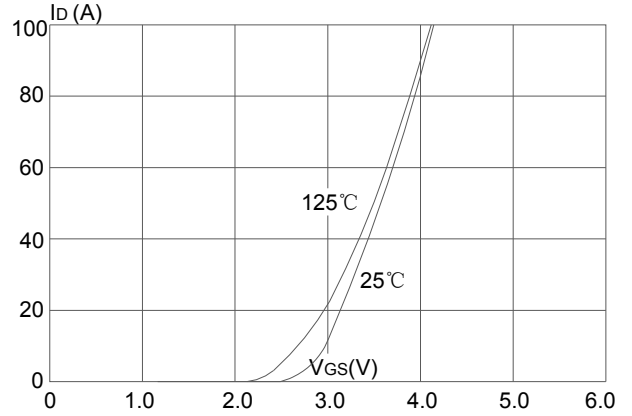


Figure 3: On-resistance vs. Drain Current

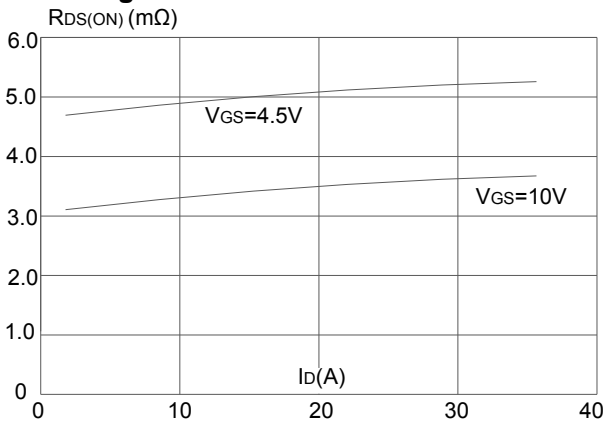


Figure 4: Body Diode Characteristics

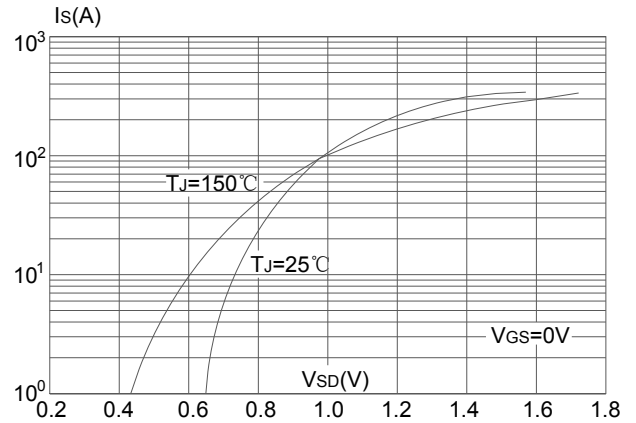


Figure 5: Gate Charge Characteristics

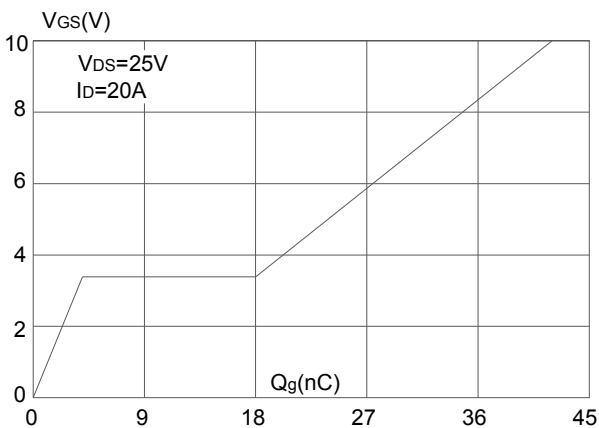
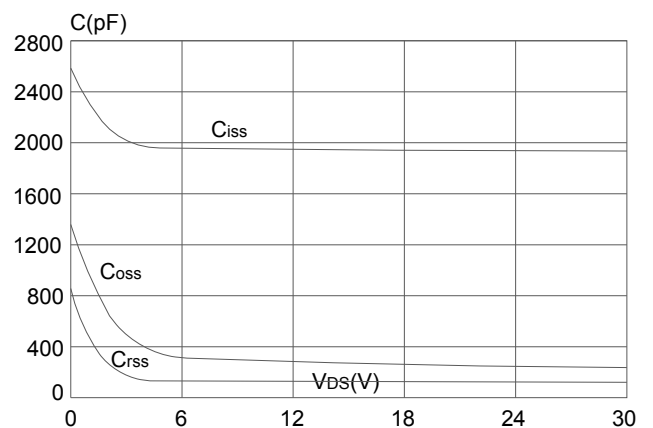
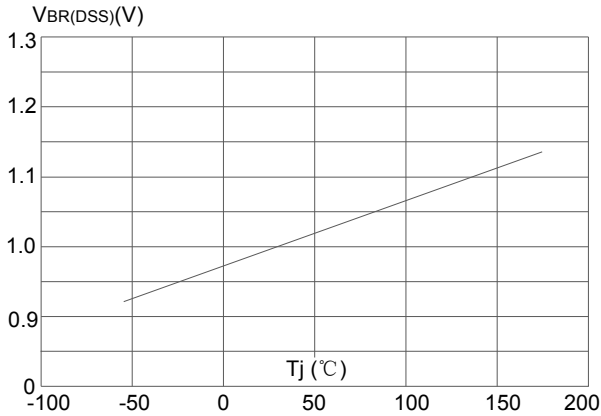


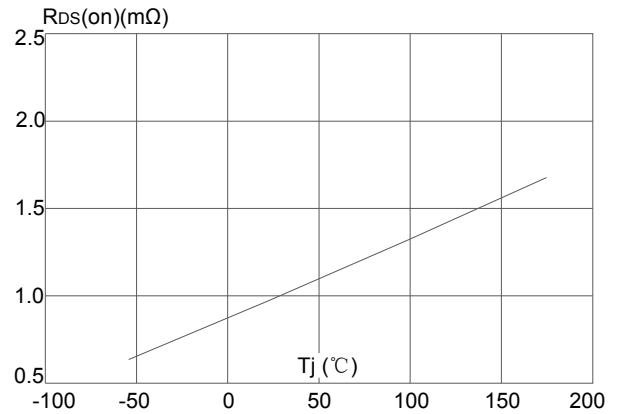
Figure 6: Capacitance Characteristics



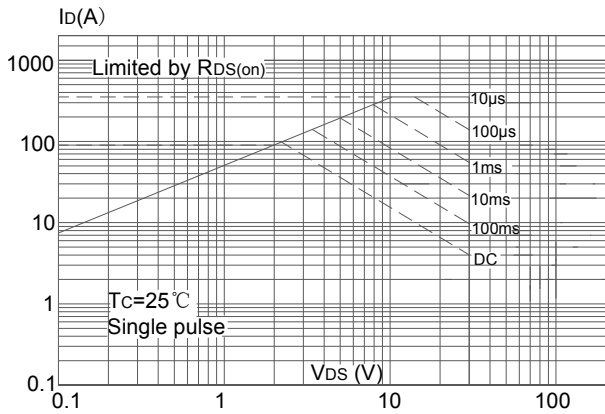
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



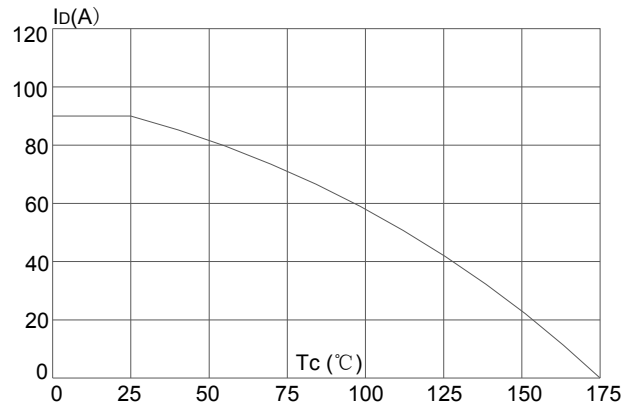
**Figure 8:** Normalized on Resistance vs. Junction Temperature



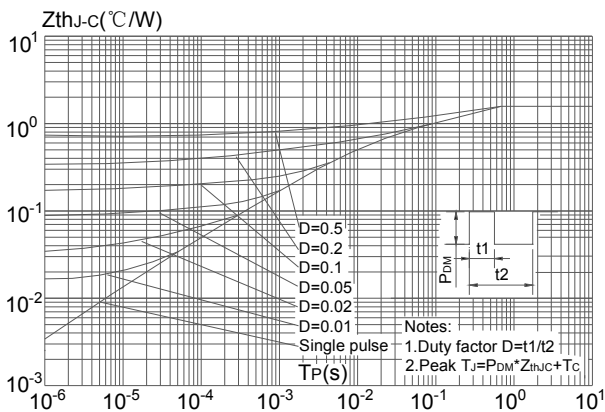
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-252)



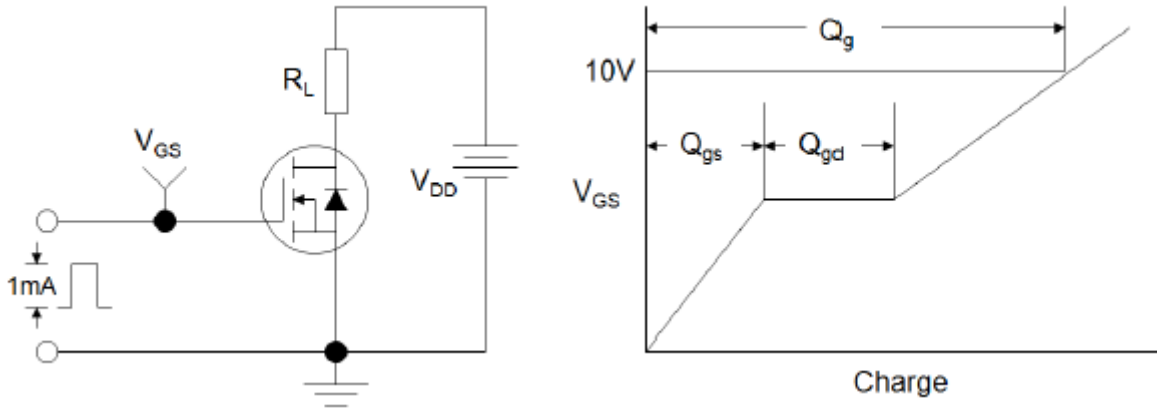


Figure 1: Gate Charge Test Circuit & Waveform

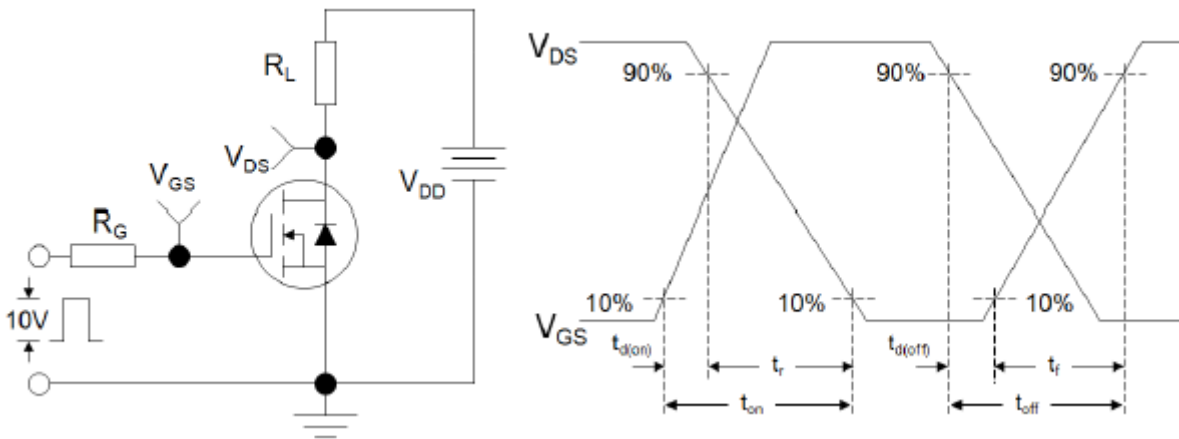


Figure 2: Resistive Switching Test Circuit & Waveforms

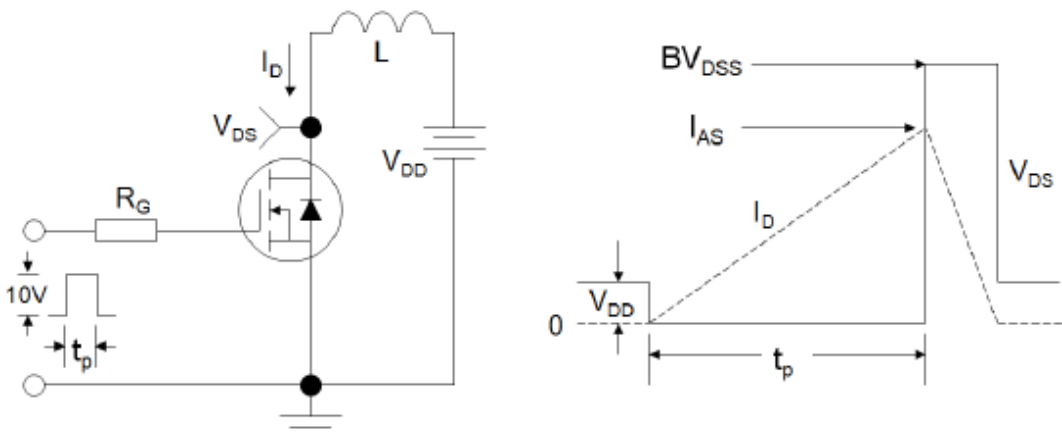
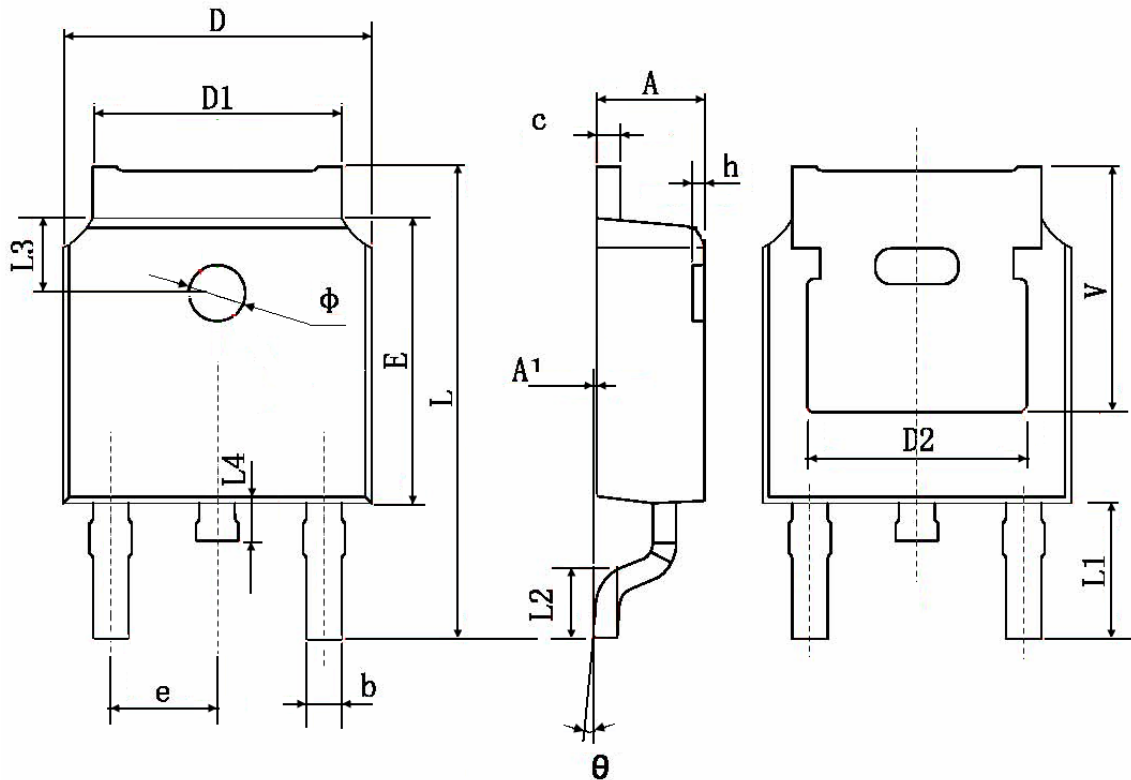


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms



## Package Information : TO-252



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 TYP.		0.190 TYP.	
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 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
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 TYP.		0.211 TYP.	