

N-Channel Power MOSFET

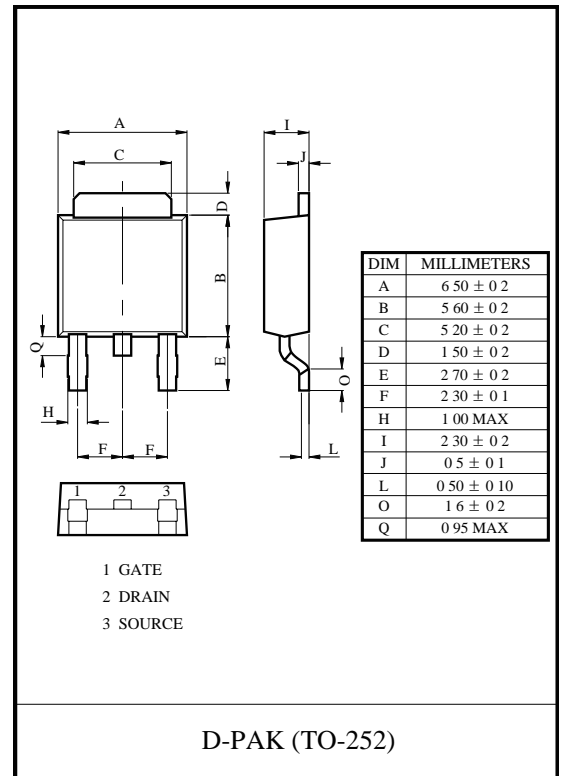
GENERAL DESCRIPTION

The FTK4060K 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.

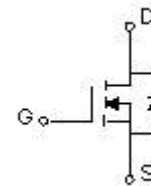
FEATURE

- High density cell design for ultra low R_{dson}
- 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



APPLICATION

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



MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain - Source Voltage	V_{DS}	40	V
Gate - Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	60	A
Pulsed Drain Current	I_{DM}	200	A
Single Pulsed Avalanche Energy	$E_{AS}^{(1)}$	400	mJ
Maximum Power Dissipation	P_D	54	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.3	$^{\circ}\text{C}/\text{W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	- 55 ~ +150	$^{\circ}\text{C}$
Lead Temperature for Soldering Purposes(1/8" from case for 10s)	T_L	260	$^{\circ}\text{C}$

(1). E_{AS} condition: $V_{DD}=20\text{V}$, $L=0.5\text{mH}$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}\text{C}$



FTK4060K

ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain - source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	45		V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$			1	μA
Gate - body leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
On characteristics (note1)						
Gate - threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.6	2.5	V
Static drain - source on - state resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		7.3	13	$m\Omega$
		$V_{GS} = 4.5V, I_D = 20A$			20	$m\Omega$
Forward transconductance	g_{fs}	$V_{DS} = 10V, I_D = 20A$	15			S
Dynamic characteristics (note 2)						
Input capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V,$ $f = 1MHz$		1800		pF
Output capacitance	C_{oss}			280		
Reverse transfer capacitance	C_{rss}			190		
Switching characteristics (note 2)						
Total gate charge	Q_g	$V_{DS} = 20V, V_{GS} = 10V,$ $I_D = 20A$		29		nC
Gate - source charge	Q_{gs}			4.5		
Gate - drain charge	Q_{gd}			6.4		
Turn - on delay time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 2A,$ $V_{GS} = 10V, R_G = 3\Omega,$ $R_L = 1\Omega$		6.4		ns
Turn - on rise time	t_r			17.2		
Turn - off delay time	$t_{d(off)}$			29.6		
Turn - off fall time	t_f			16.8		
Drain-Source Diode Characteristics						
Drain - source diode forward voltage(note1)	V_{SD}	$V_{GS} = 0V, I_S = 10A$			1.2	V
Continuous drain - source diode forward current	I_S				60	A
Pulsed drain - source diode forward current	I_{SM}				240	A

Notes:

1. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Guaranteed by design, not subject to production.

Typical Electrical and Thermal Characteristics (Curves)

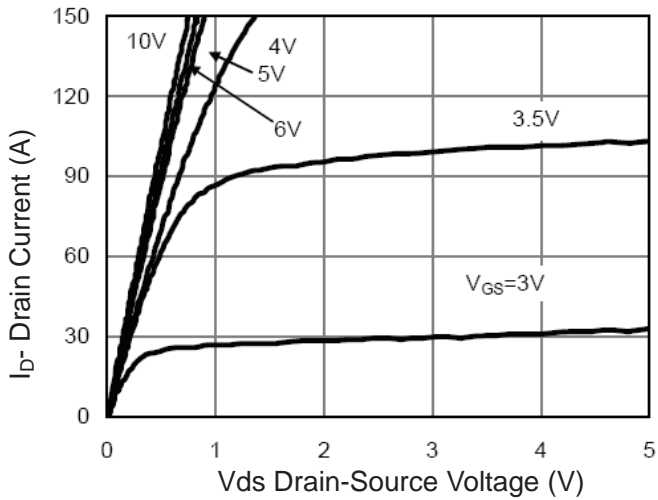


Figure 1 Output Characteristics

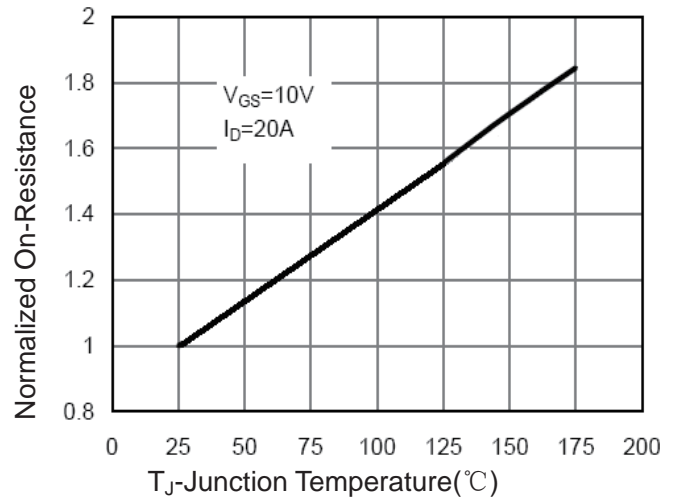


Figure 4 Rdson-Junction Temperature

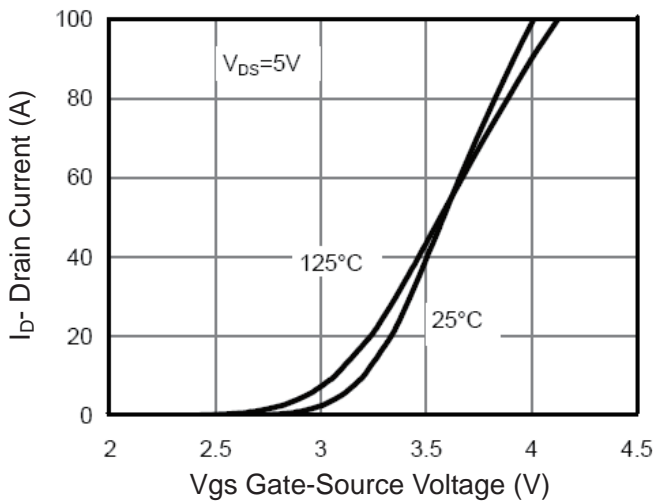


Figure 2 Transfer Characteristics

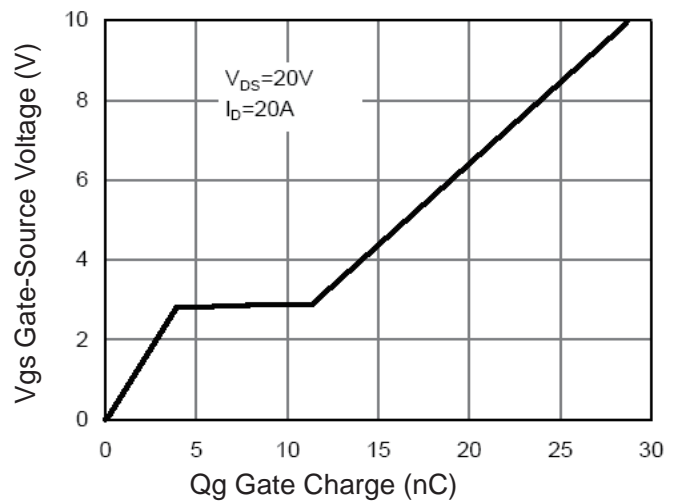


Figure 5 Gate Charge

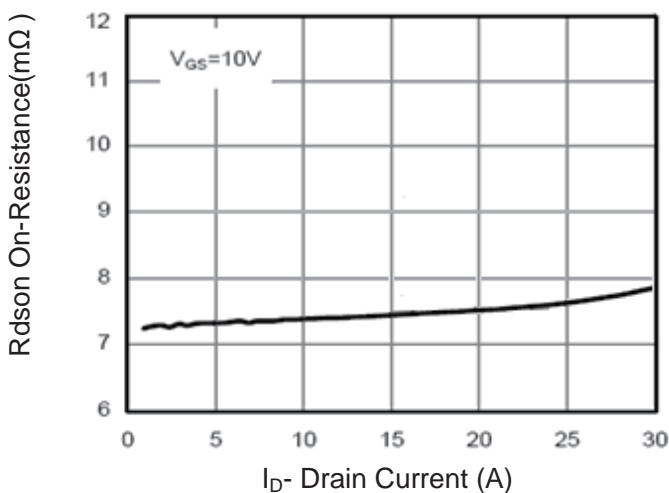


Figure 3 Rdson- Drain Current

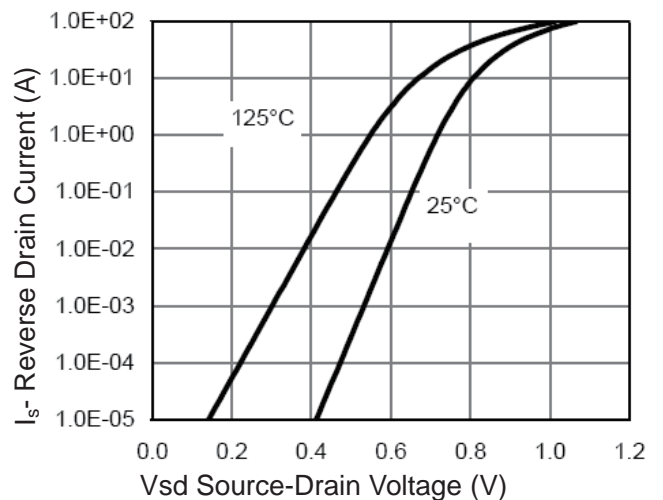


Figure 6 Source- Drain Diode Forward

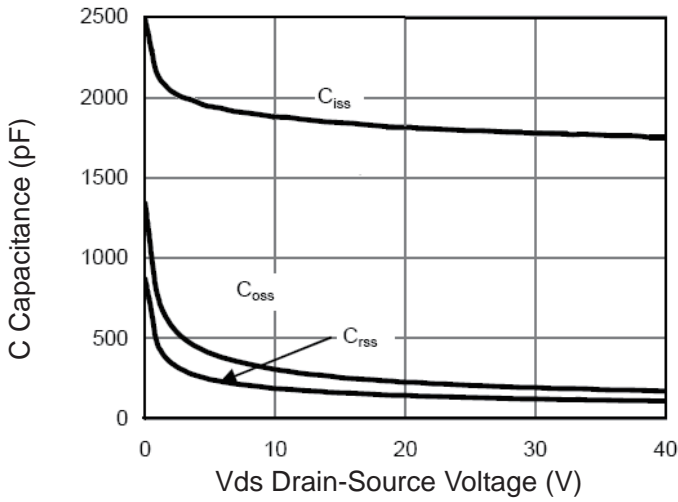


Figure 7 Capacitance vs Vds

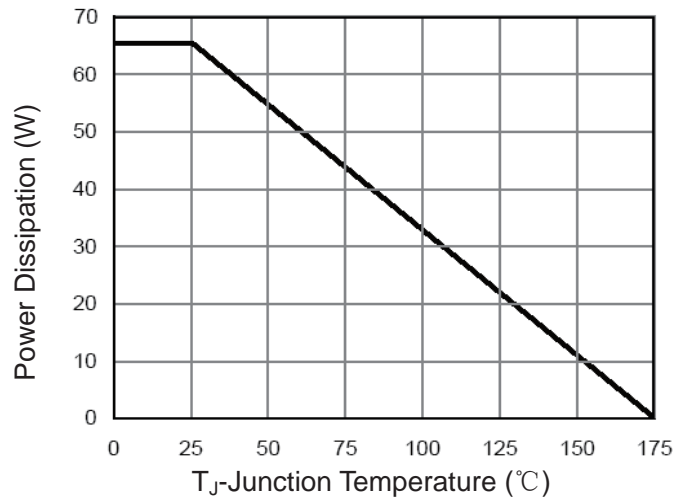


Figure 9 Power De-rating

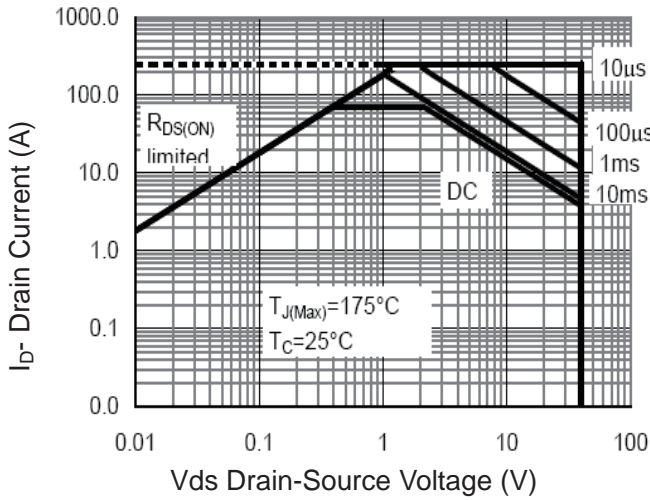


Figure 8 Safe Operation Area

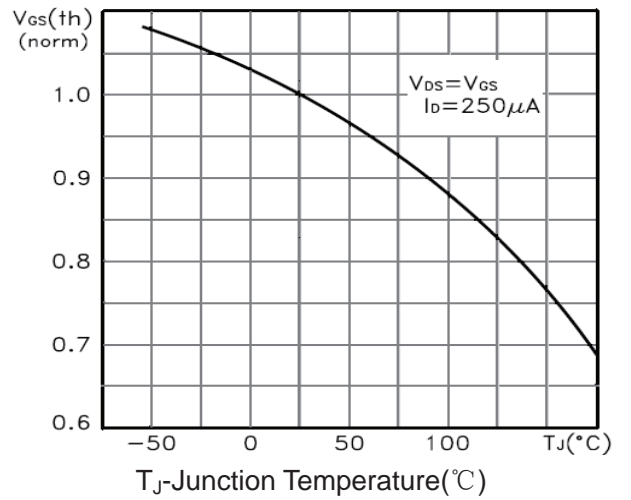


Figure 10 V_{GS(th)} vs Junction Temperature

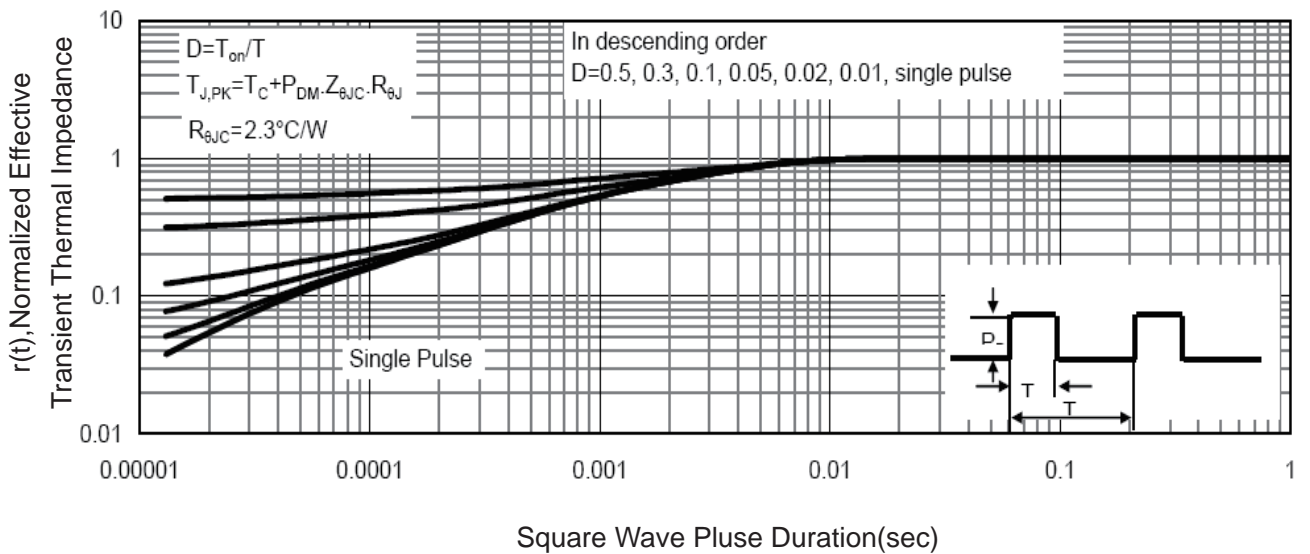


Figure 11 Normalized Maximum Transient Thermal Impedance