

N-Channel Power MOSFET

GENERAL DESCRIPTION

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently.

This new high energy device also offers a drain

Designed for high voltage, high speed power supplies ,

converters, power motor controls and bridge circuits

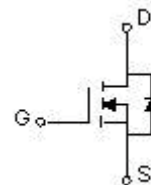
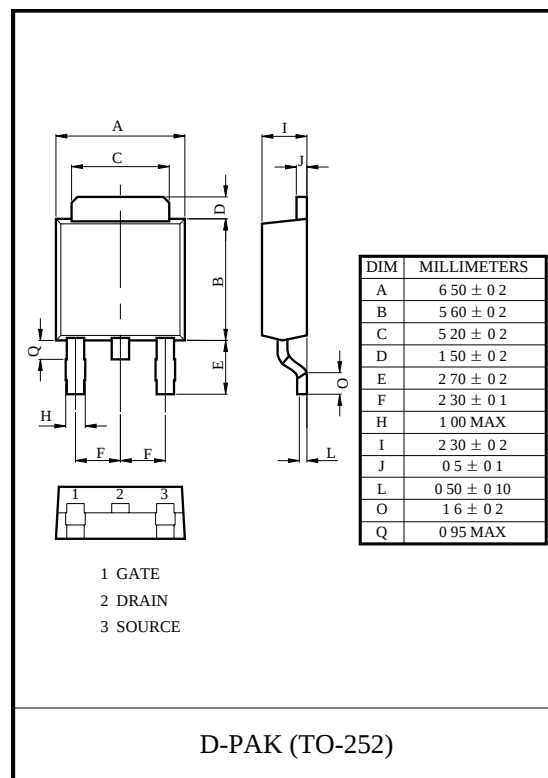
power supplies

FEATURE

- High density cell design for ultra low $R_{ds(on)}$
- 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}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	40	A
Pulsed Drain Current	I_{DM}	160	A
Single Pulsed Avalanche Energy	$E_{AS}^{(1)}$	320	mJ
Power Dissipation	P_D	1.25	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	100	$^\circ\text{C/W}$
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: $V_{DD}=50\text{V}$, $L=0.5\text{mH}$, $R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$



FTK40N10D

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 =250μA	100			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
On characteristics (note1)						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2		4	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =28A		14	17	mΩ
Forward transconductance	g _{FS}	V _{DS} =25V, I _D =28A	32			S
Dynamic characteristics (note 2)						
Input capacitance	C _{iSS}	V _{DS} =30V,V _{GS} =0V, f =1MHz		3400		pF
Output capacitance	C _{oSS}			290		
Reverse transfer capacitance	C _{rSS}			221		
Switching characteristics (note 2)						
Total gate charge	Q _g	V _{DS} =30V, V _{GS} =10V, I _D =30A		94		nC
Gate-source charge	Q _{gs}			16		
Gate-drain charge	Q _{gd}			24		
Turn-on delay time	t _{d(on)}	V _{DD} =30V,V _{GS} =10V,R _G = 2.5Ω, I _D =2A, R _L =15Ω		15		ns
Turn-on rise time	t _r			11		
Turn-off delay time	t _{d(off)}			52		
Turn-off fall time	t _f			13		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage(note1)	V _{SD}	V _{GS} =0V, I _S =28A			1.2	V
Continuous drain-source diode forward current	I _S				40	A
Pulsed drain-source diode forward current	I _{SM}				160	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)

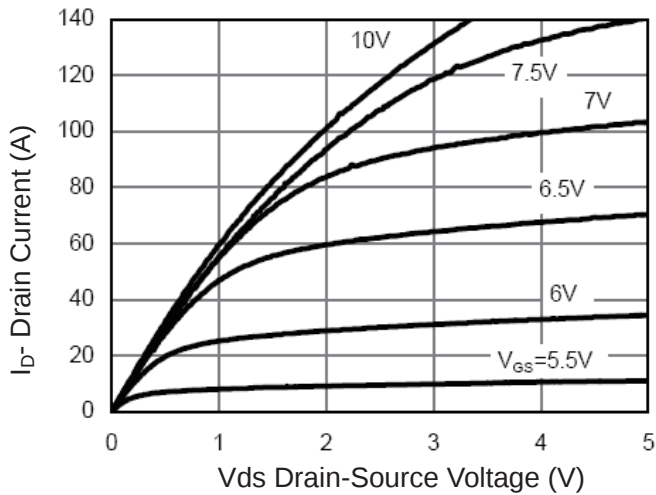


Figure 1 Output Characteristics

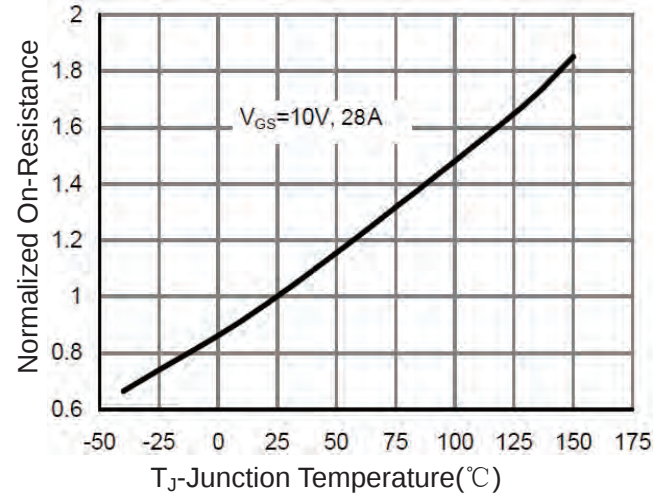


Figure 4 Rdson-Junction Temperature

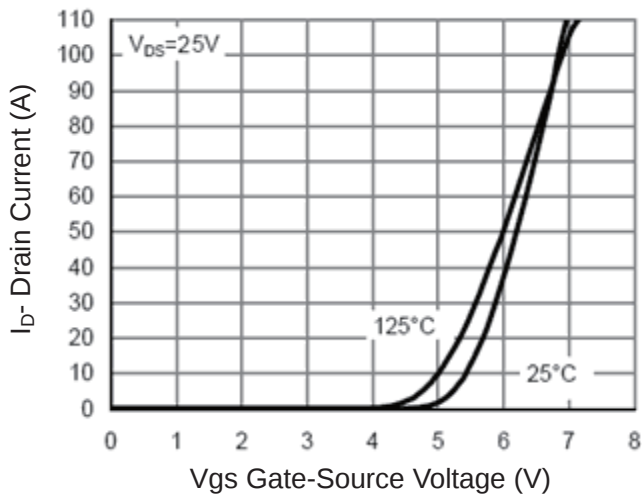


Figure 2 Transfer Characteristics

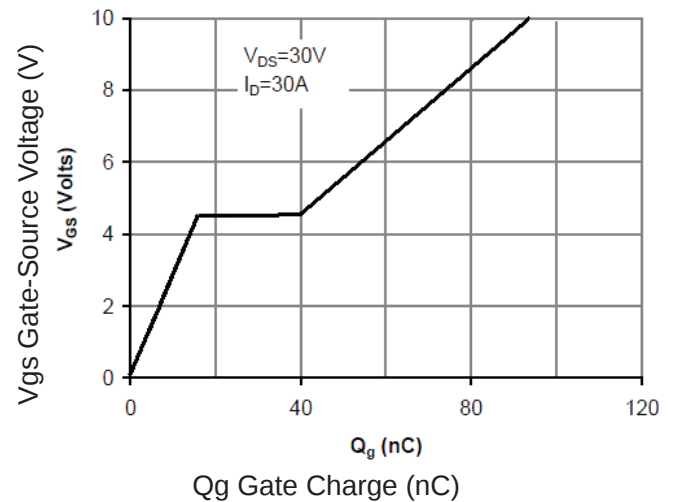


Figure 5 Gate Charge

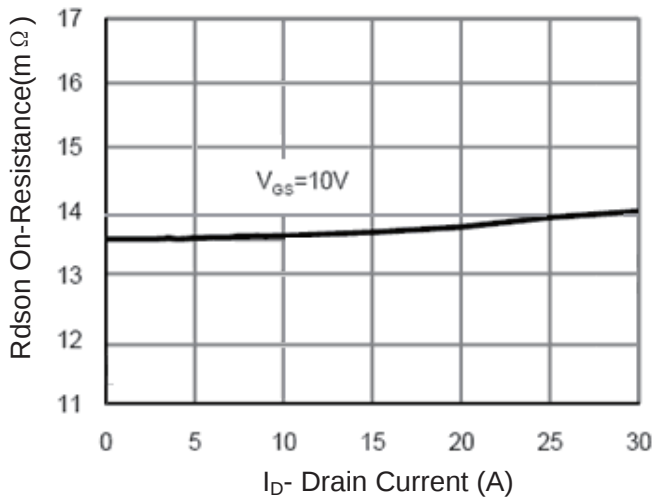


Figure 3 Rdson- Drain Current

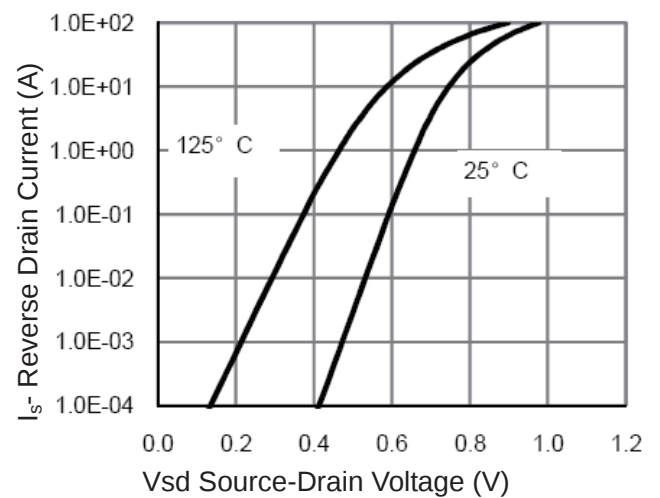


Figure 6 Source- Drain Diode Forward

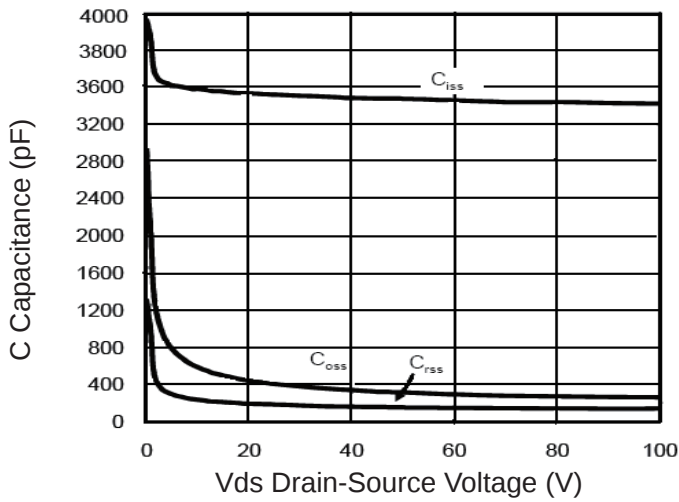


Figure 7 Capacitance vs V_{DS}

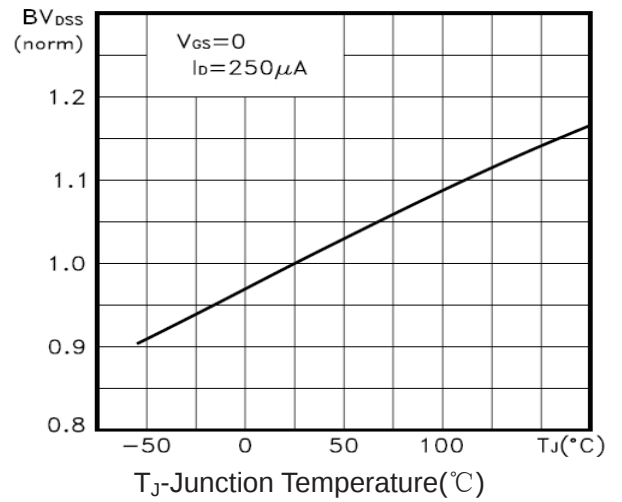


Figure 9 BV_{DSS} vs Junction Temperature

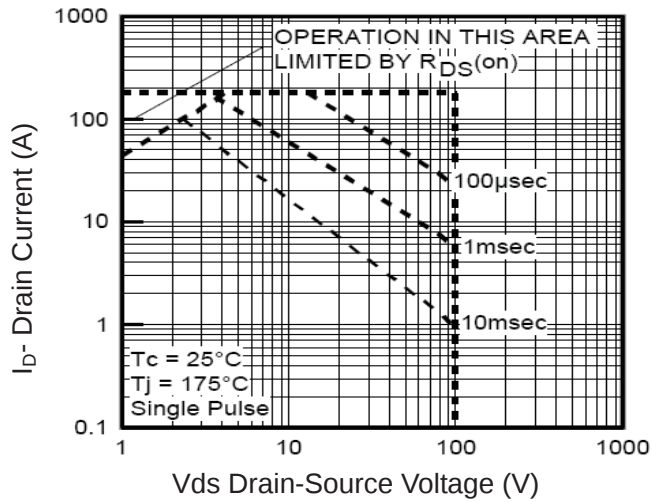


Figure 8 Safe Operation Area

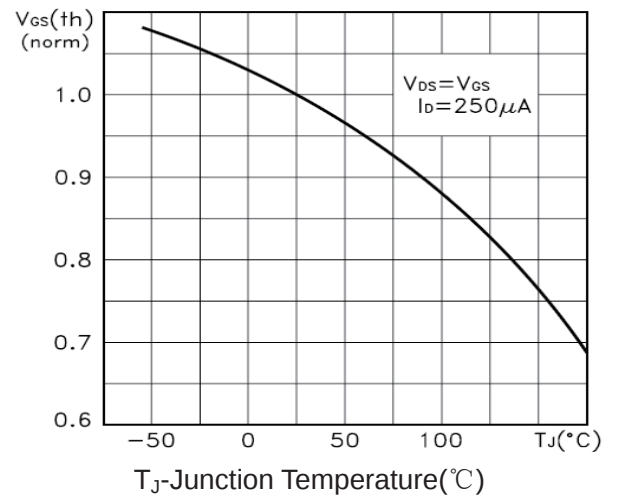


Figure 10 $V_{GS(th)}$ vs Junction Temperature

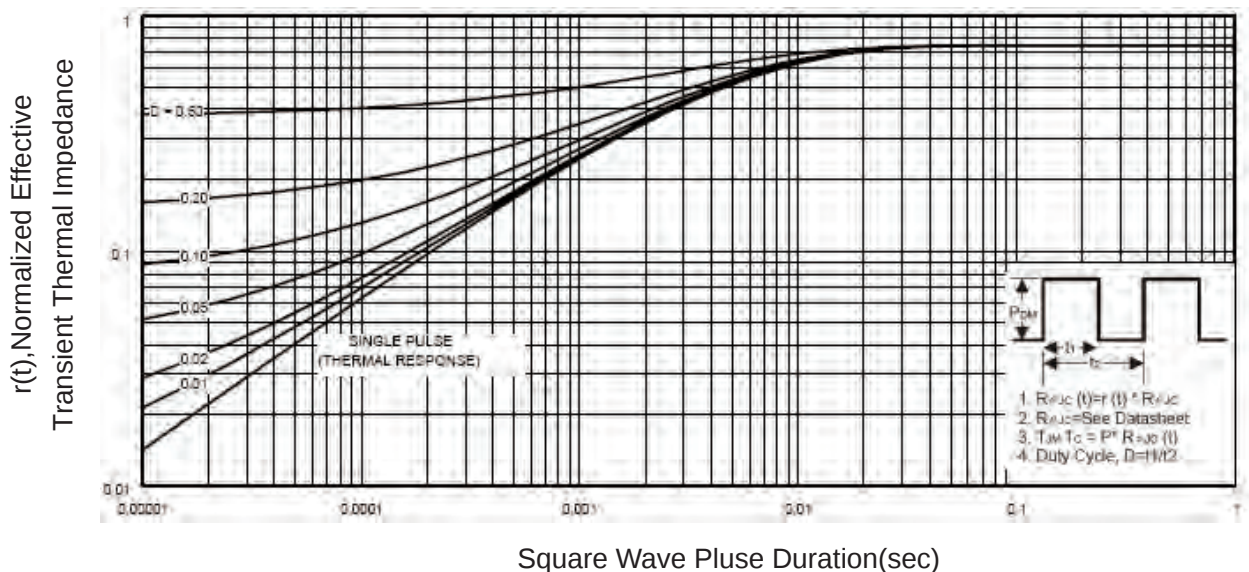


Figure 11 Normalized Maximum Transient Thermal Impedance