



N-Channel Enhancement Mode Power MOSFET

Description

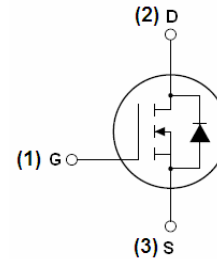
The EZ40N70 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

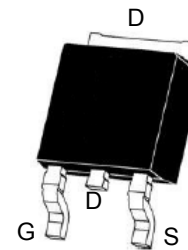
- $V_{DS} = 45V, I_D = 70A$
 $R_{DS(ON)} < 12m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 15m\Omega @ V_{GS} = 4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



TO-252 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
EZ40N70	EZ40N70	TO-252	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	45	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	70	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	50	A
Pulsed Drain Current	I_{DM}	280	A
Maximum Power Dissipation	P_D	65	W
Derating factor		0.43	W/ $^\circ C$
Single pulse avalanche energy ^(Note 5)	E_{AS}	182	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

**Thermal Characteristic**

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.3	$^{\circ}\text{C}/\text{W}$
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Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	45	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=45V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	6.5	12	m Ω
		$V_{GS}=4.5V, I_D=20A$		8.5	15	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=20A$	20	-	-	S
Dynamic Characteristics^(Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	1800	-	PF
Output Capacitance	C_{oss}		-	180	-	PF
Reverse Transfer Capacitance	C_{rss}		-	162	-	PF
Switching Characteristics^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, R_L=1\Omega$ $V_{GS}=10V, R_G=3\Omega$	-	6.4	-	nS
Turn-on Rise Time	t_r		-	17.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.6	-	nS
Turn-Off Fall Time	t_f		-	16.8	-	nS
Total Gate Charge	Q_g	$V_{DS}=20V, I_D=20A,$ $V_{GS}=10V$	-	36.8		nC
Gate-Source Charge	Q_{gs}		-	4.8		nC
Gate-Drain Charge	Q_{gd}		-	11.2		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=10A$	-		1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	70	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 20A$ $di/dt = 100A/\mu s$ ^(Note 3)	-	29	-	nS
Reverse Recovery Charge	Q_{rr}		-	26	-	nC

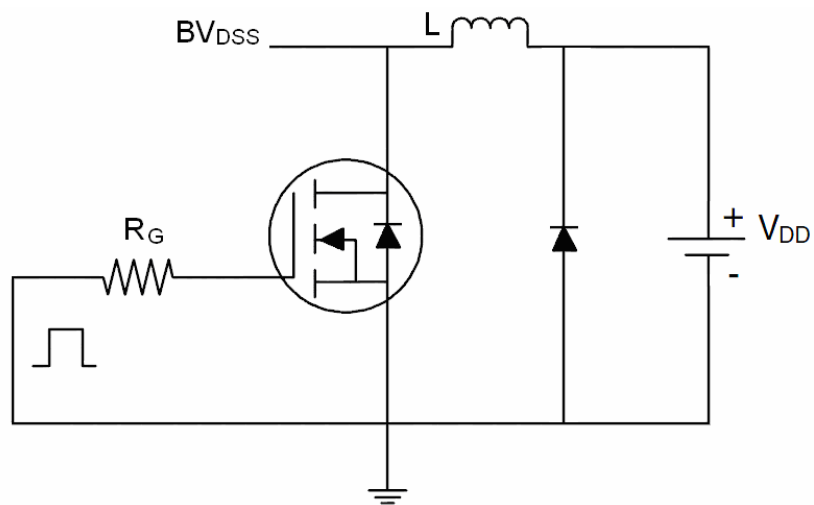
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. E_{AS} condition : $T_J=25^{\circ}\text{C}, V_{DD}=20V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$,

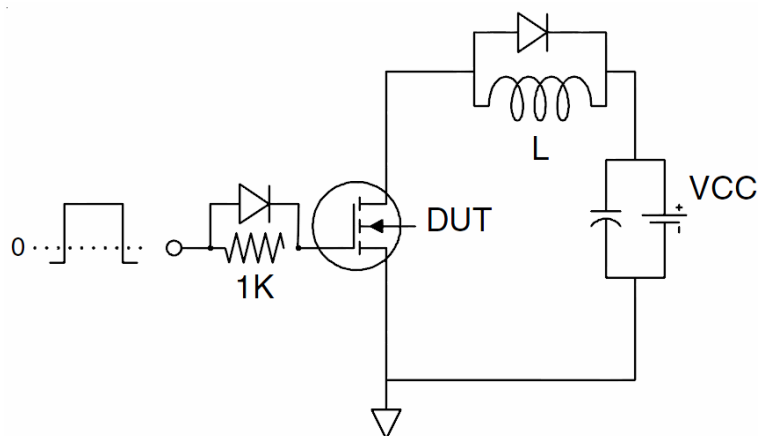


Test circuit

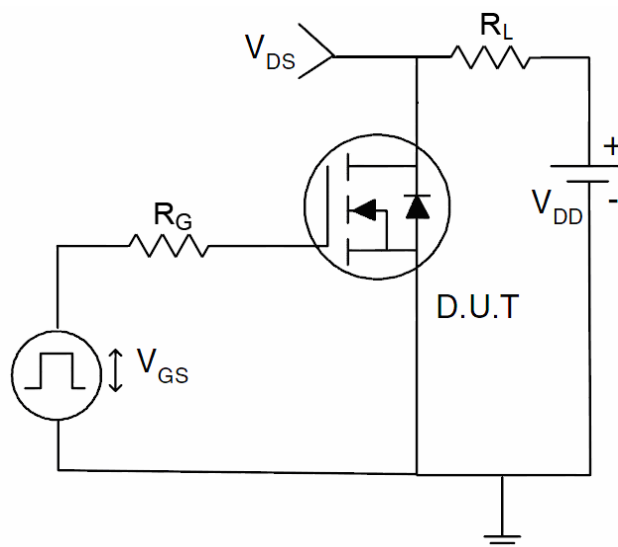
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit





Typical Electrical and Thermal Characteristics (Curves)

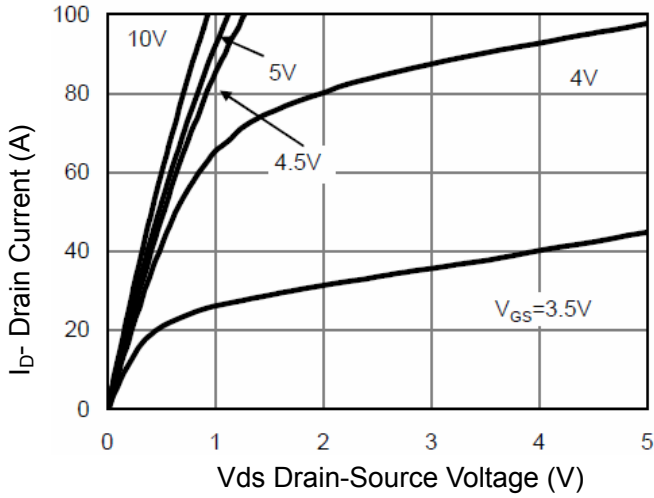


Figure 1 Output Characteristics

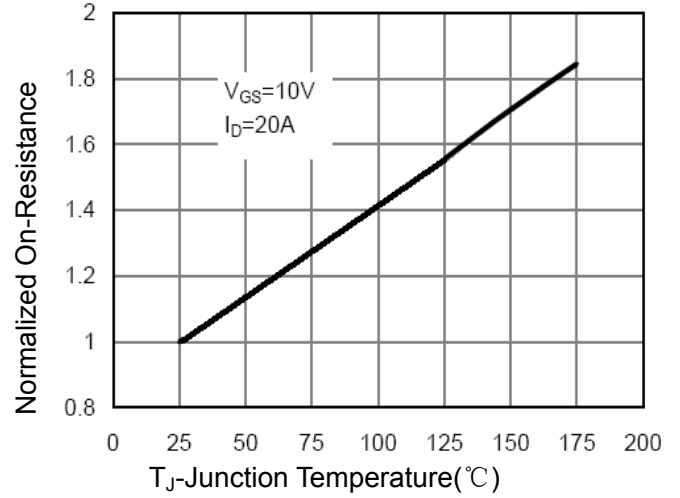


Figure 4 Rds(on)-Junction Temperature

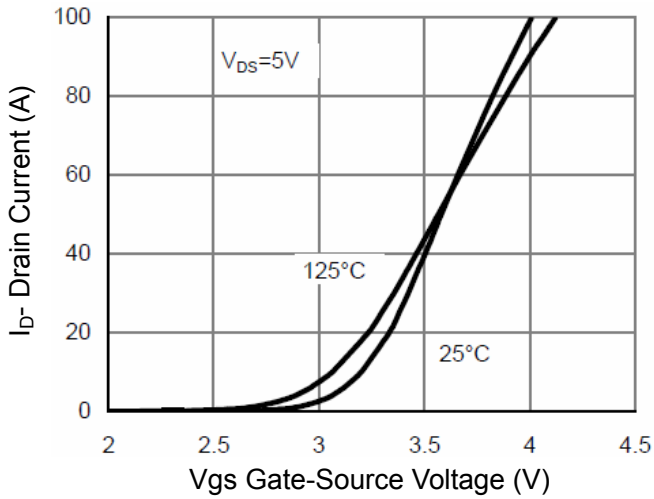


Figure 2 Transfer Characteristics

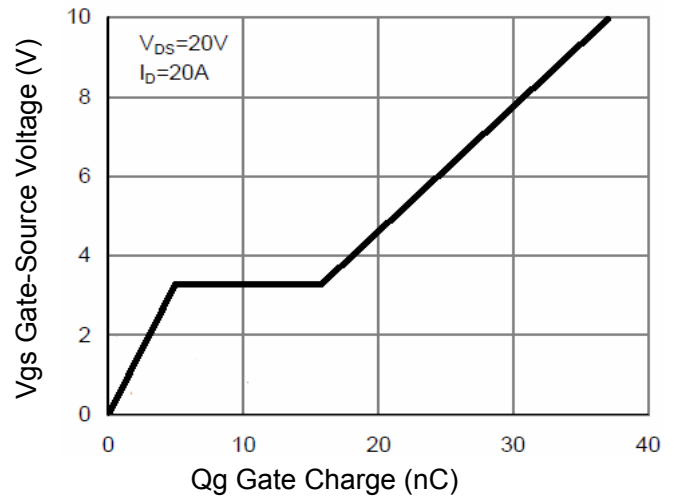


Figure 5 Gate Charge

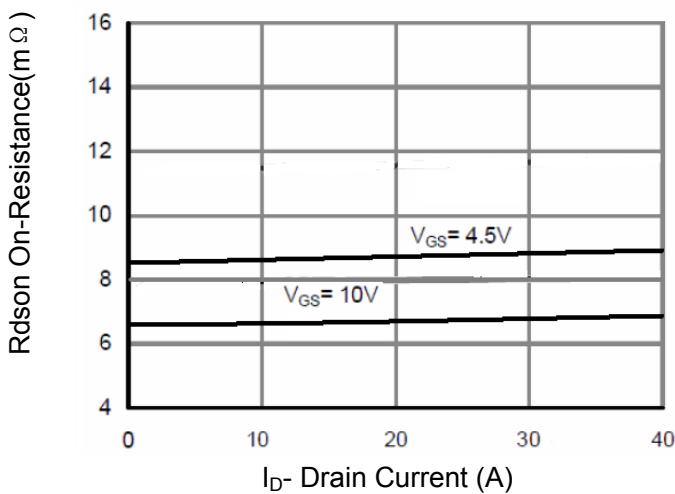


Figure 3 Rds(on)- Drain Current

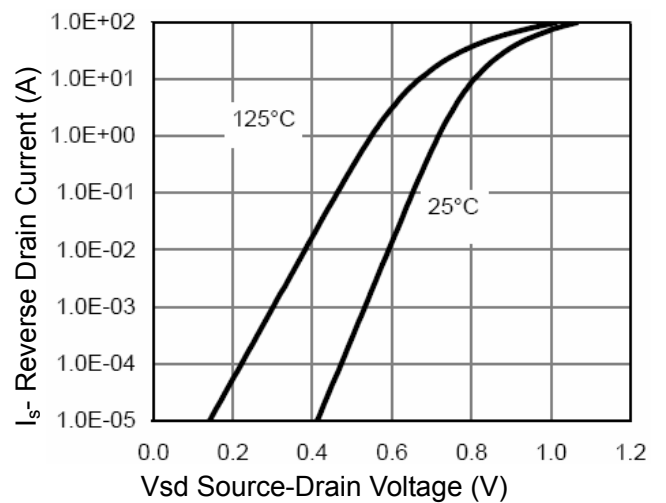


Figure 6 Source- Drain Diode Forward

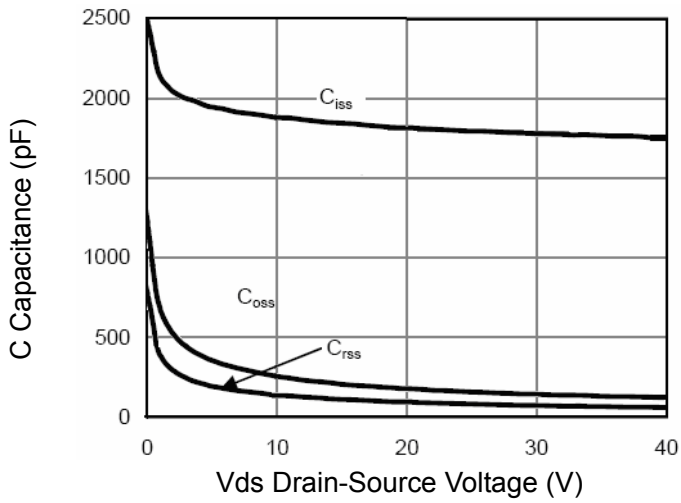


Figure 7 Capacitance vs Vds

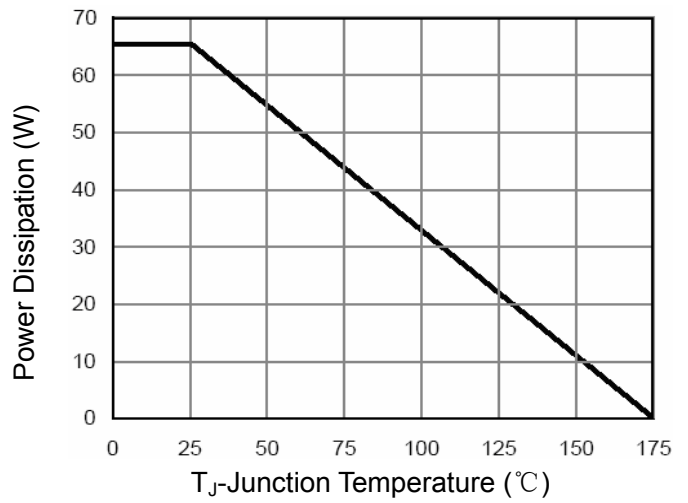


Figure 9 Power De-rating

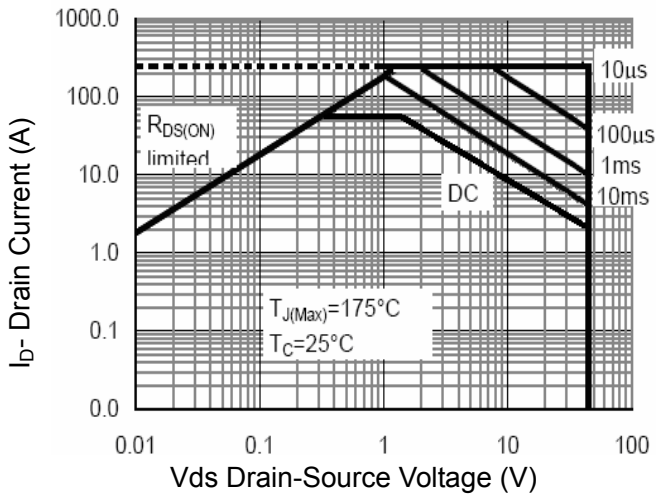


Figure 8 Safe Operation Area

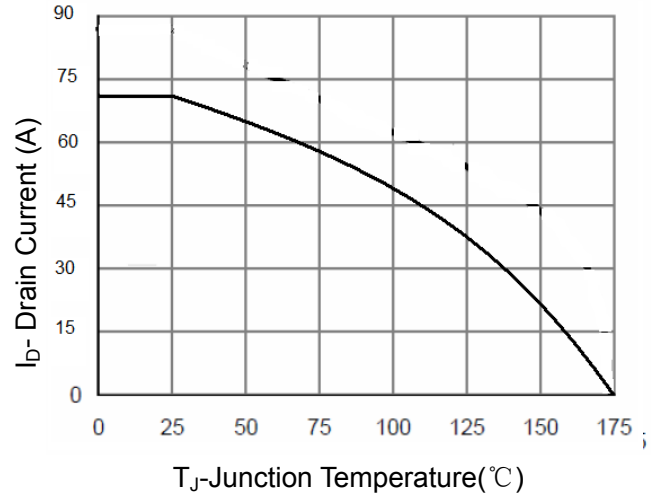


Figure 10 Current De-rating

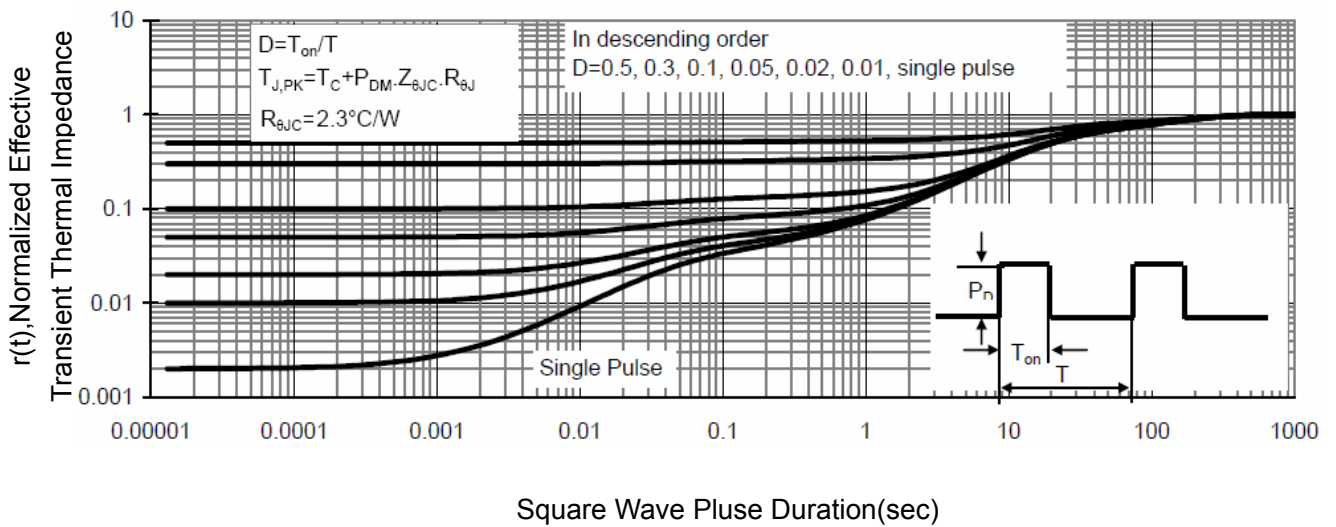


Figure 11 Normalized Maximum Transient Thermal Impedance