

N-Channel 40V(D-S) MOSFET

Product summary		
V_{DS}	40	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	5.4	m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$) Typ.	6.8	m Ω
I_D ($T_C=25^\circ C$)	60	A

Features

- High density cell design for low $R_{DS(ON)}$
- Excellent package for heat dissipation
- Trench Power MV MOSFET technology

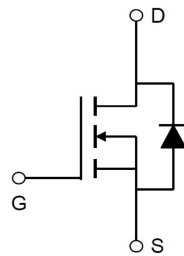
Applications

- High current load applications
- Load switching

Pin Configuration



TO-252



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECFA60N04A	TO-252	13"	2500pcs

Absolute Maximum Ratings (at $T_A=25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units	
V_{DS}	Drain-Source Voltage	40	V	
V_{GS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current at $V_{GS}=10V$	$T_C=25^\circ C$	60	A
		$T_C=100^\circ C$	42	A
I_{DM}	Pulse Drain Current Tested ^A	200	A	
E_{AS}	Single Pulse Avalanche Energy ^B	120	mJ	
P_D	Power Dissipation	54	W	
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +175	$^\circ C$	

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case ^C	2.8	$^\circ C/W$

Electrical Characteristics (at $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V$	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=20A$	--	5.4	7	m Ω
		$V_{GS}=4.5V, I_D=10A$	--	6.8	9.5	m Ω
V_{SD}	Forward Voltage	$I_S=20A, V_{GS}=0V$	--	--	1.2	V
I_S	Maximum Body-Diode Continuous Current		--	--	60	A
Dynamic Parameters						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=20V$ $f=1\text{MHz}$	--	1420	--	pF
C_{oss}	Output Capacitance		--	232	--	pF
C_{rss}	Reverse Transfer Capacitance		--	150	--	pF
Switching Parameters						
Q_g	Total Gate Charge	$V_{DS}=20V, I_D=20A$ $V_{GS}=10V$	--	29	--	nC
Q_{gs}	Gate-Source Charge		--	7	--	nC
Q_{gd}	Gate-Drain Charge		--	7	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=20V, I_D=2A,$ $R_L=1\Omega, R_{GEN}=3\Omega,$ $V_{GS}=10V$	--	6	--	nS
t_r	Turn-on Rise Time		--	35	--	nS
$t_{D(off)}$	Turn-off Delay Time		--	29	--	nS
t_f	Turn-off Fall Time		--	8	--	nS

A. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

B. $T_J=25^\circ\text{C}$, $V_{DD}=20V$, $V_G=10V$, $L=0.5\text{mH}$, $R_g=25\Omega$.

C. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in² pad of 2oz copper.

Typical Characteristics

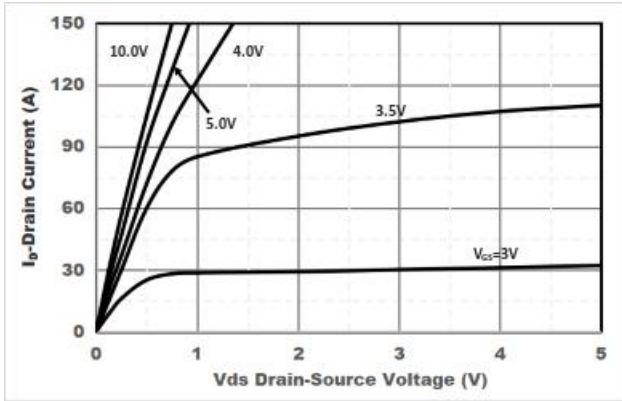


Figure1. Output Characteristics

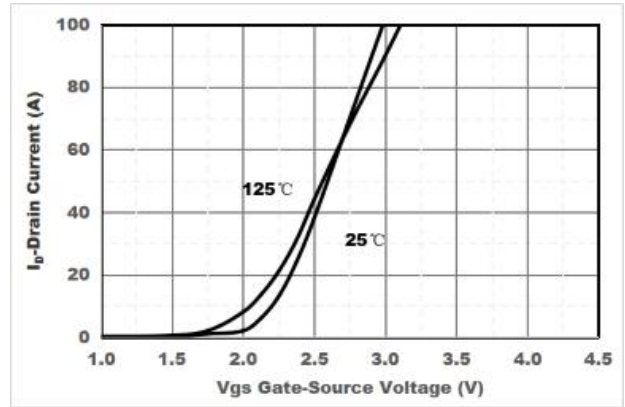


Figure2. Transfer Characteristics

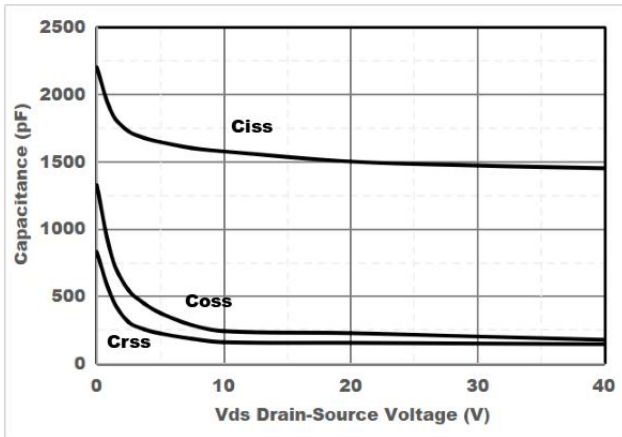


Figure3. Capacitance Characteristics

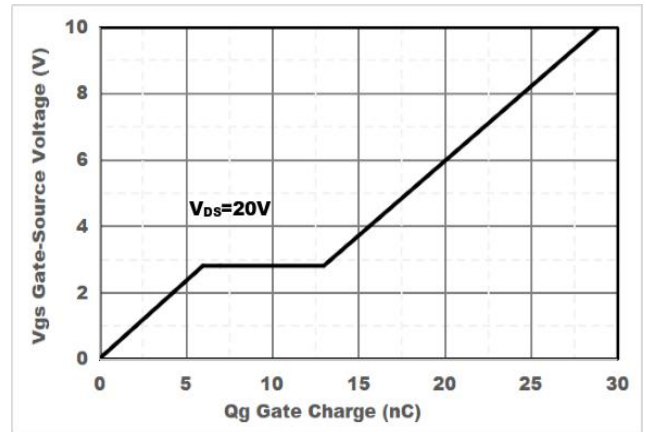


Figure4. Gate Charge

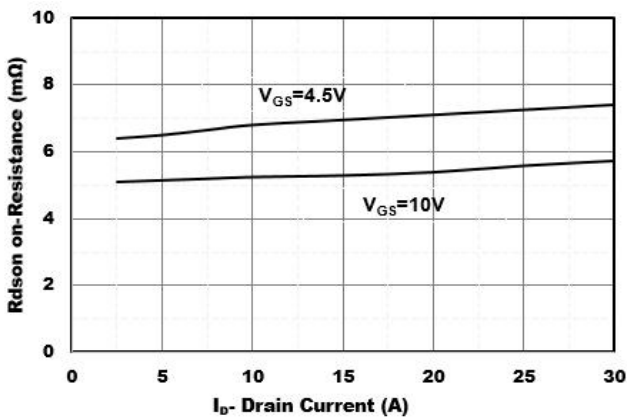


Figure5. Drain-Source on Resistance

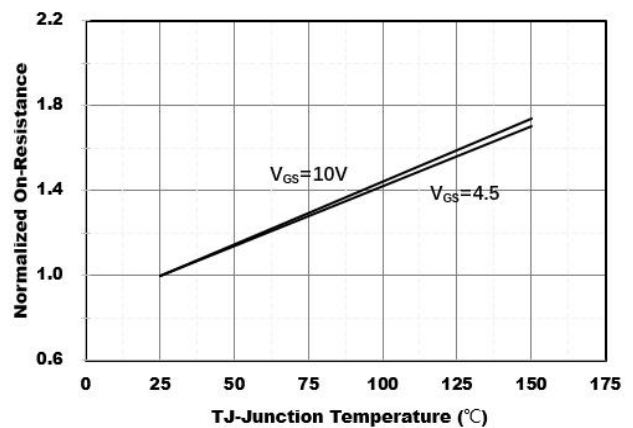


Figure6. Drain-Source on Resistance

Typical Characteristics

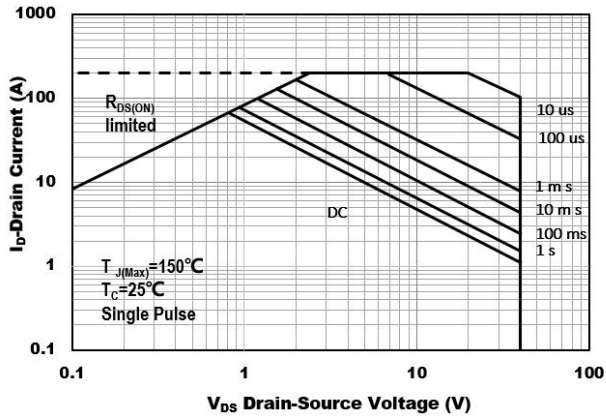


Figure7. Safe Operation Area

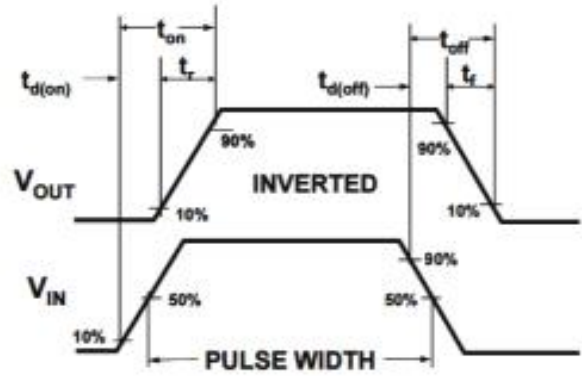
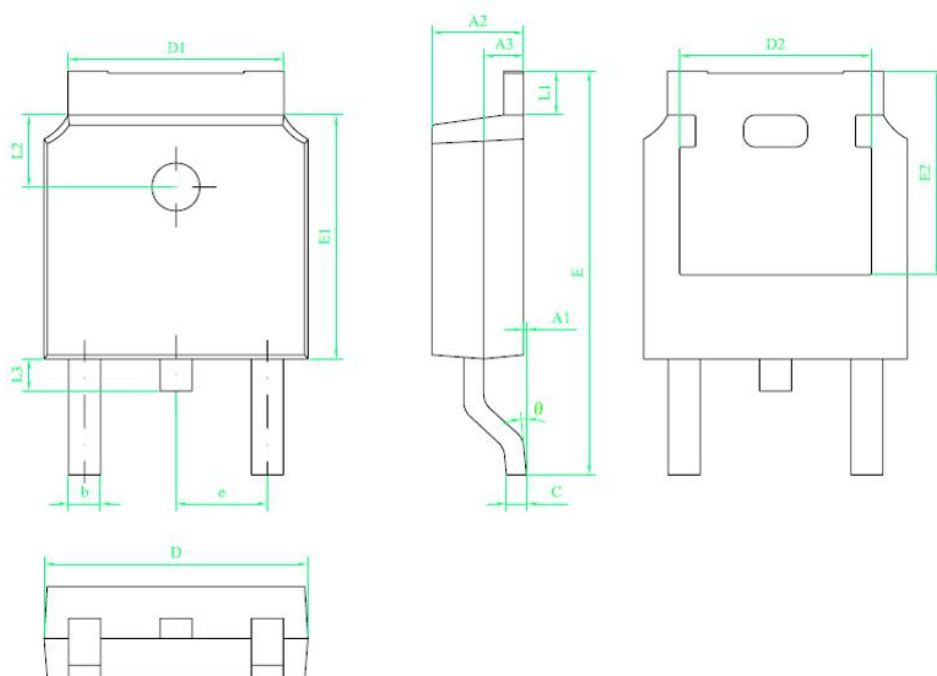


Figure8. Switching wave

TO-252 Package Information



符号	尺寸		
	min	nom	max
A1	0	---	0.10
A2	2.20	2.30	2.40
A3	0.90	1.00	1.10
b	0.75	---	0.85
c	0.50	---	0.60
D	6.50	6.60	6.70
D1	5.30	5.40	5.50
D2	4.70	4.80	4.90
E	9.90	10.10	10.30
E1	6.00	6.10	6.20
E2	5.20	5.30	5.40
e	2.20	2.286	2.40
L1	0.90	---	1.25
L2	1.70	1.80	1.90
L3	0.60	0.80	1.00
θ	0°	---	8°

技术要求:

1. 树脂体不应有崩裂、缺损等缺陷;
2. 树脂上下部X、Y方向偏差不得超过0.20;
3. 胶体两端留胶总宽和宽度不超过0.50;
4. 所有单位为mm;