

N-Channel 100V(D-S) MOSFET

Product summary		
V_{DS}	100	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	18	m Ω
$I_D(T_C=25^{\circ}C)$	40	A

Features

- Advanced Trench Technology
- Low Gate Charge

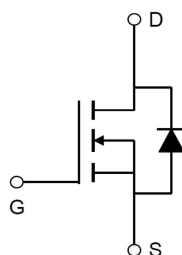
Applications

- PWM Application
- Load switching

Pin Configuration



TO-252



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECFA40N10	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		100	V
V_{GS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}C$	40	A
		$T_C=100^{\circ}C$	25	A
I_{DM}	Pulse Drain Current Tested ^A		160	A
E_{AS}	Single Pulse Avalanche Energy ^B		144	mJ
P_D	Power Dissipation	$T_C=25^{\circ}C$	105	W
T_J, T_{STG}	Junction and Storage Temperature Range		-55 to +150	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case	1.19	$^{\circ}C/W$

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	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	2.9	4.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ^C	$V_{GS}=10V, I_D=20A$	--	18	24	m Ω
V_{SD}	Forward Voltage	$I_S=20A, V_{GS}=0V$	--	--	1.2	V
I_S	Maximum Body-Diode Continuous Current		--	--	40	A
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V$ $f=1\text{MHz}$	--	3810	--	pF
C_{oss}	Output Capacitance		--	195	--	pF
C_{rss}	Reverse Transfer Capacitance		--	153	--	pF
Q_g	Total Gate Charge	$V_{DS}=50V, I_D=20A$ $V_{GS}=0 \text{ to } 10V$	--	78	--	nC
Q_{gs}	Gate-Source Charge		--	20	--	nC
Q_{gd}	Gate-Drain Charge		--	22	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=50V, I_D=20A,$ $R_{GEN}=6\Omega,$ $V_{GS}=10V$	--	17	--	ns
t_r	Turn-on Rise Time		--	27	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	45	--	ns
t_f	Turn-off Fall Time		--	10	--	ns

A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

B. EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=30V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=24A$.

C. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 0.5\%$.

D. Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure 1: Output Characteristics

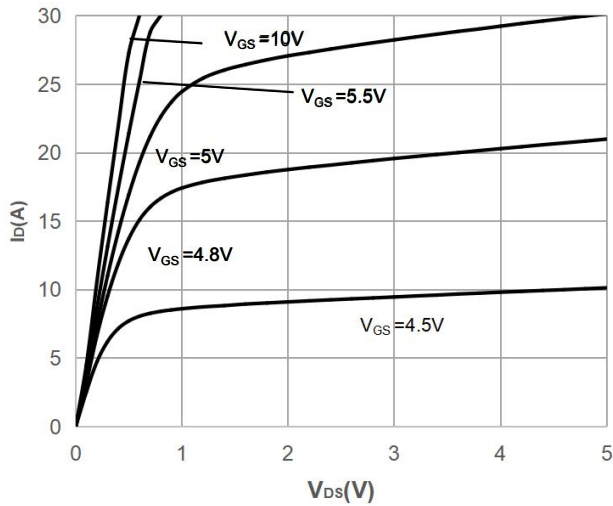


Figure 2: Typical Transfer Characteristics

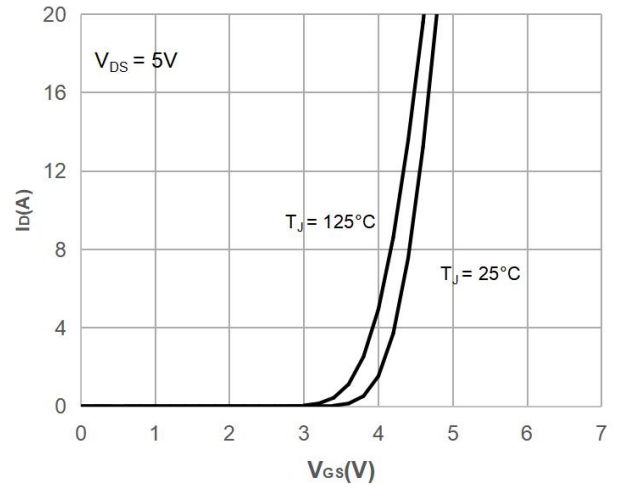


Figure 3: On-resistance vs. Drain Current

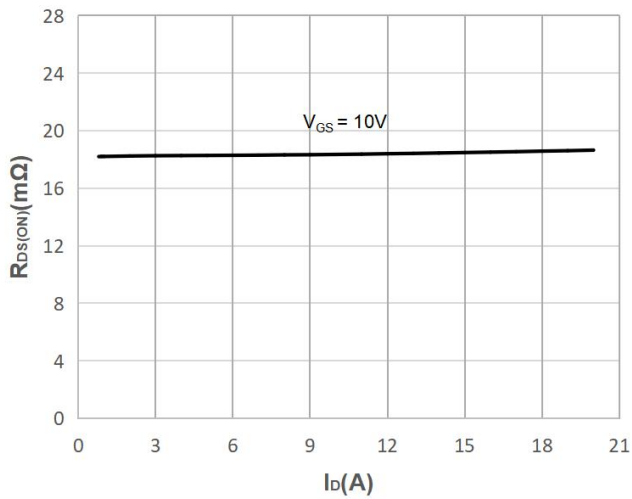


Figure 4: Body Diode Characteristics

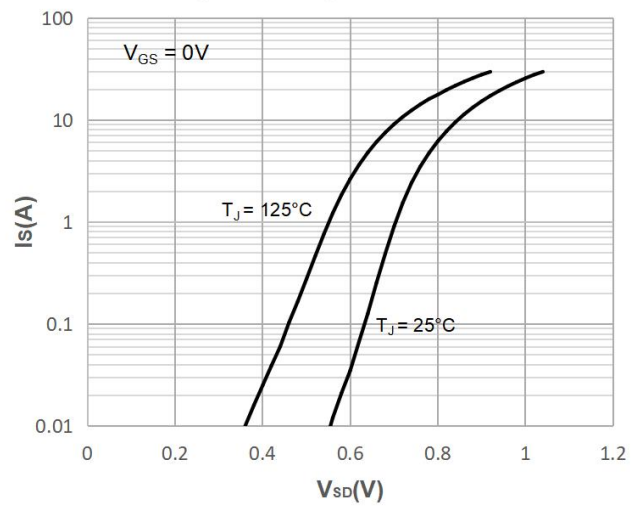


Figure 5: Gate Charge Characteristics

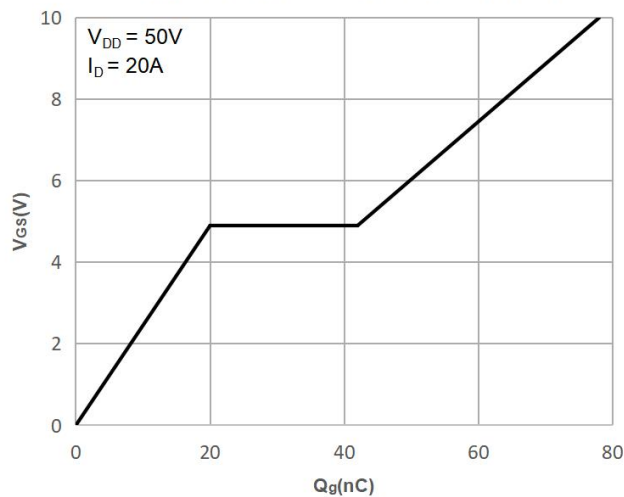
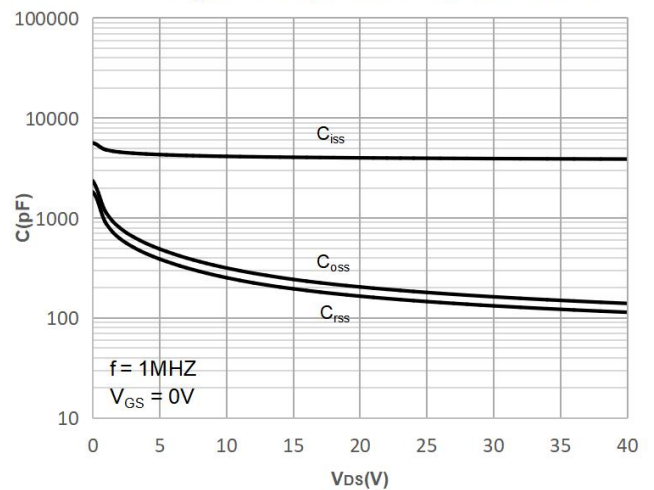


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

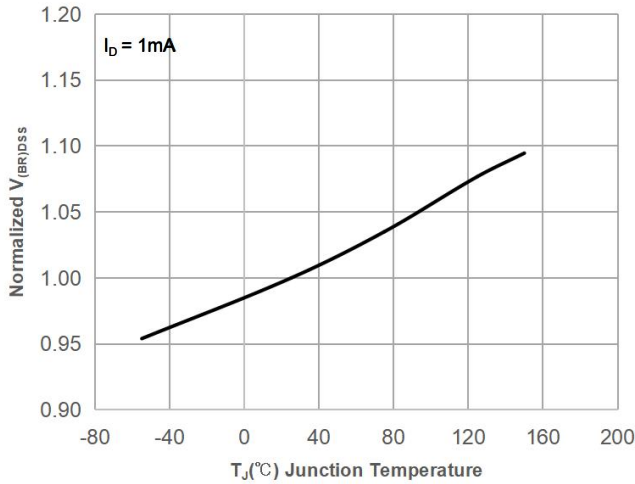


Figure 8: Normalized on Resistance vs. Junction Temperature

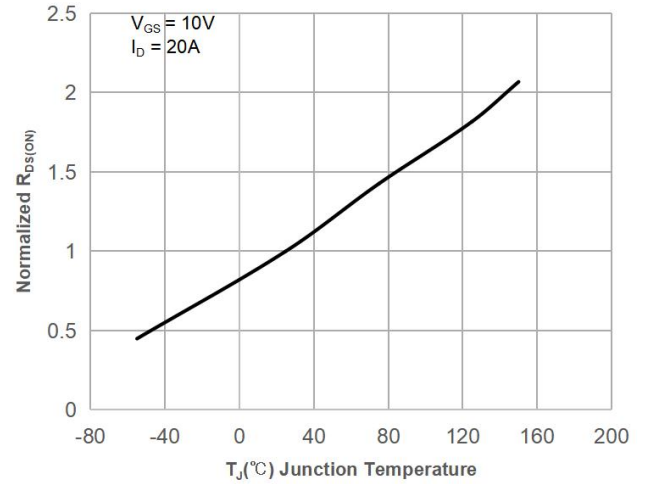


Figure 9: Maximum Safe Operating Area

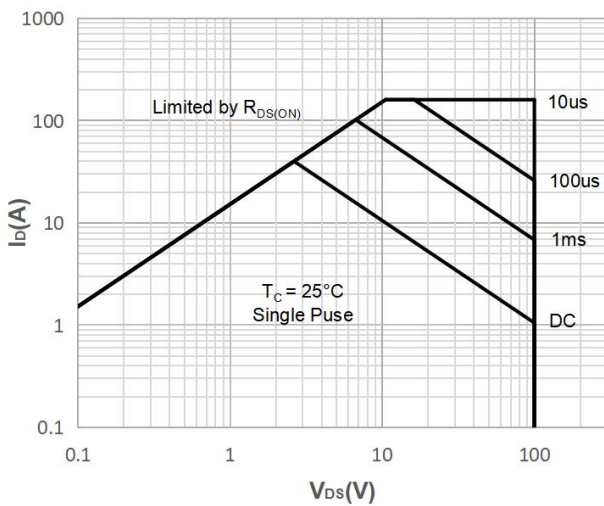


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

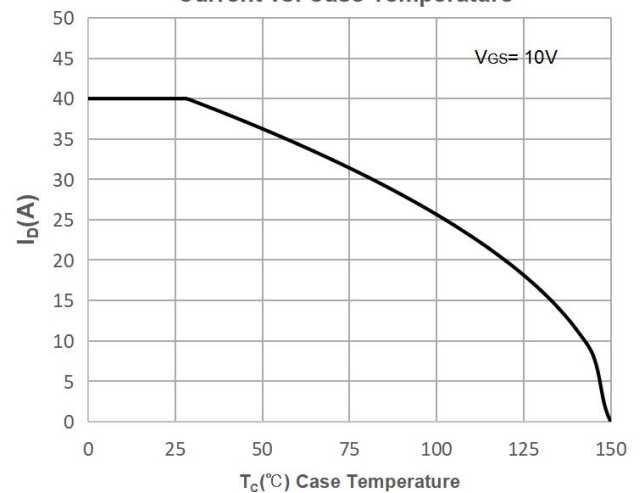


Figure 11: Normalized Maximum Transient Thermal Impedance

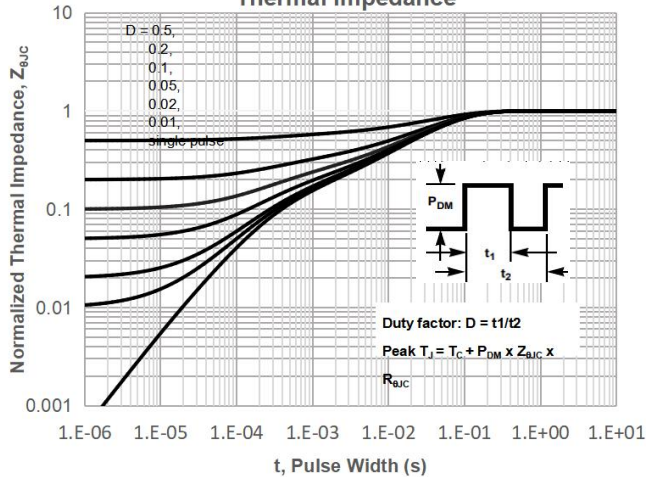
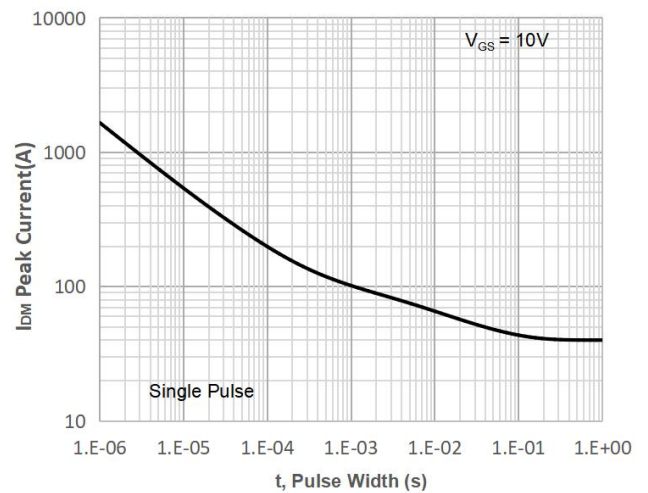


Figure 12: Peak Current Capacity



Test Circuit

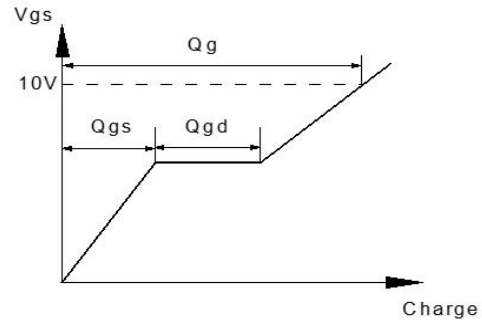
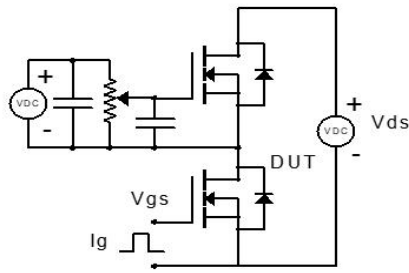


Figure 1: Gate Charge Test Circuit & Waveform

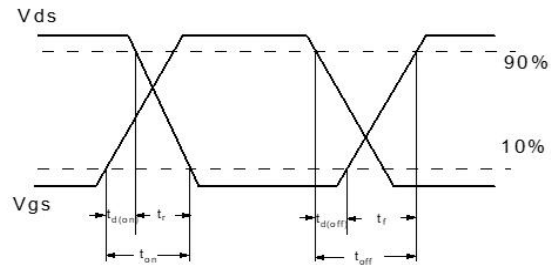
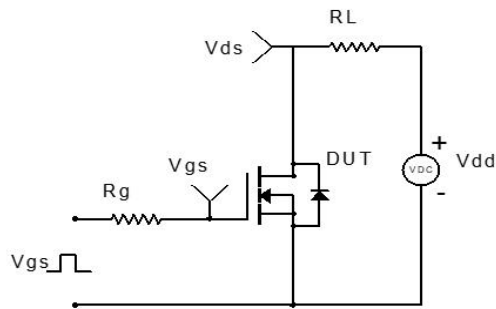


Figure 2: Resistive Switching Test Circuit & Waveform

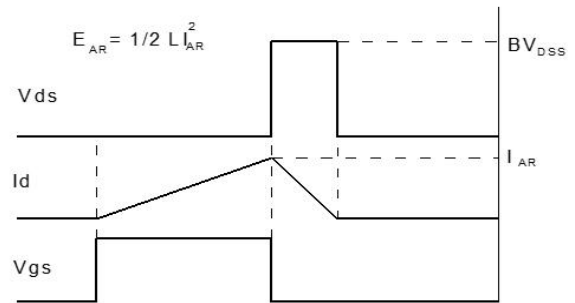
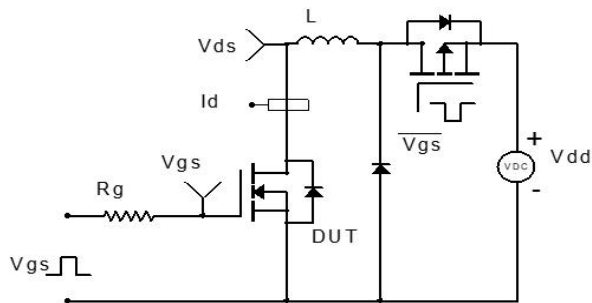


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

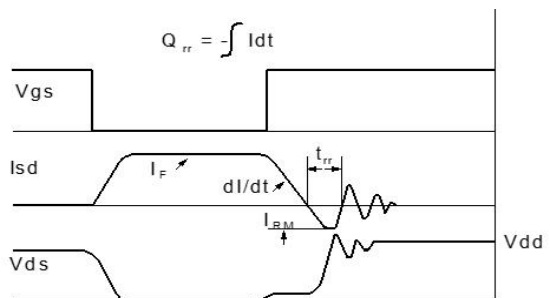
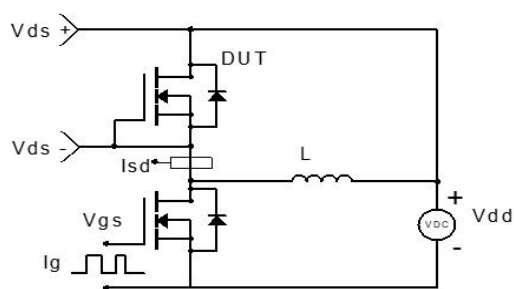
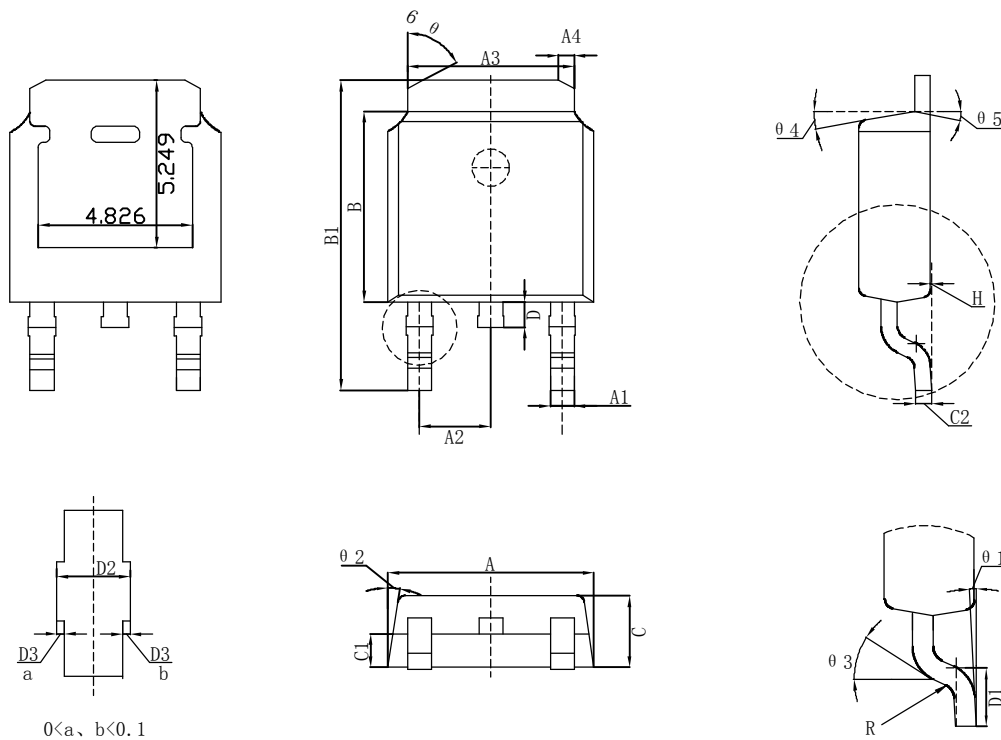


Figure 4: Diode Recovery Test Circuit & Waveform

TO-252 Package Information



标注	尺寸	最小 (mm)	最大 (mm)	标注	尺寸	最小 (mm)	最大 (mm)
A		6.50	6.70	D1		1.40	1.60
A1		0.71	0.81	D2		0.81	0.91
A2		2.236	2.336	D3		0.05TYP	
A3		5.284	5.384	H		0.00	0.10
A4		0.75	0.85	R		0.40TYP	
B		6.00	6.20	$\theta 1$		0° — 8°	
B1		9.80	10.10	$\theta 2$		8.5° TYP4	
C		2.20	2.40	$\theta 3$		25° TYP	
C1		0.967	1.087	$\theta 4$		10° TYP2	
C2		0.498	0.518	$\theta 5$		10° TYP	
D		0.70	0.90	$\theta 6$		70° TYP	