N-Channel 40V(D-S) MOSFET

Product summary		
V_{DS}	100	V
$R_{DS(ON)}$(at V_{GS}=10V) Typ.	18	mΩ
I_D(Tc=25℃)	40	A

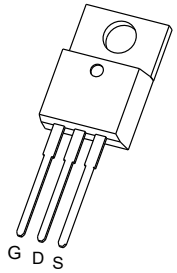
Features

- Advanced Trench Technology
- Low Gate Charge

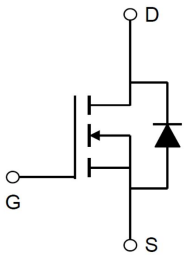
Applications

- PWM Application
- Load switching

Pin Configuration



TO-220



Packing Information

Device	Package	Packing Method	Quantity(Min. Package)
ECFB40N10	TO-220	Tube	1000pcs

Absolute Maximum Ratings (at T_A=25℃ 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℃	40	A
		T_C=100℃	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℃	119	W
T_J,T_{STG}	Junciton and Storage Temperature Range		-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case	1.05	℃/W

Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V	--	--	1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±20V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	2.0	2.9	4.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance [C]	V_{GS}=10V,I_D=20A	--	18	24	mΩ
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=1MHZ	--	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 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}=6Ω, 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℃, V_{DD}=30V, V_G=10V，R_G=25ohm，L=0.5mH，I_{AS}=24A.

C. Pulse Test: Pulse Width≤300us,Duty cycle ≤0.5%.

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

Typical Characteristics

Figure 1: Output Characteristics

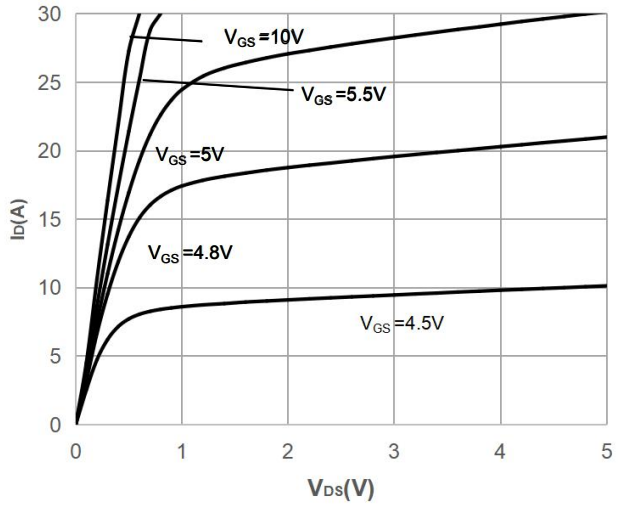


Figure 2: Typical Transfer Characteristics

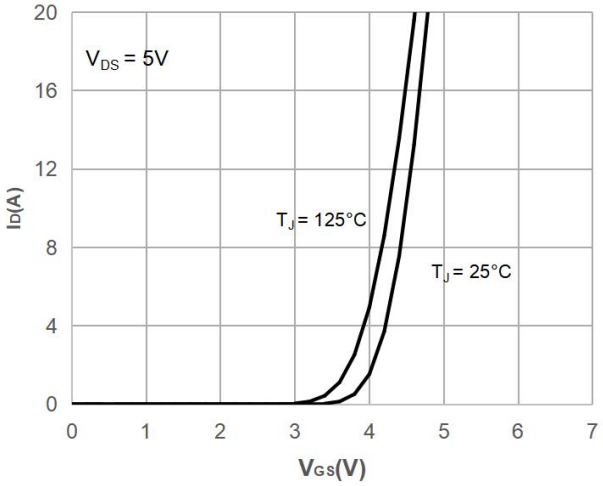


Figure 3: On-resistance vs. Drain Current

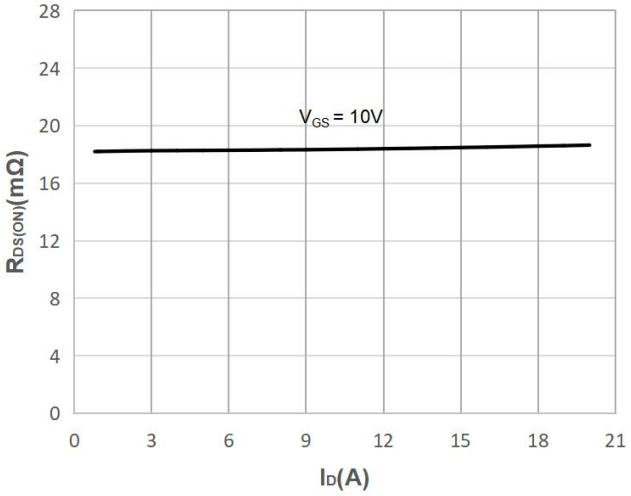


Figure 4: Body Diode Characteristics

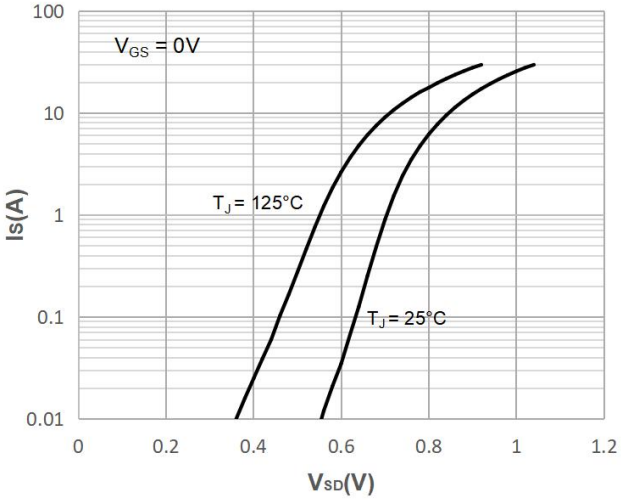


Figure 5: Gate Charge Characteristics

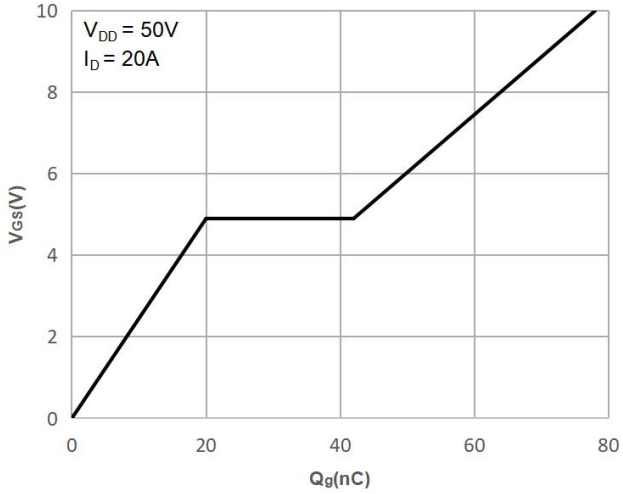
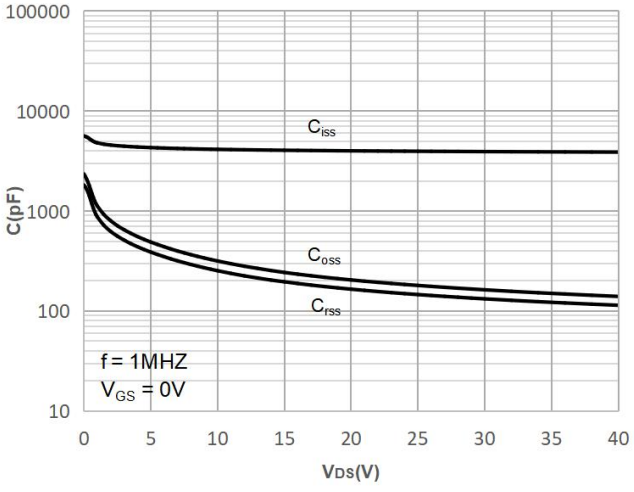


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

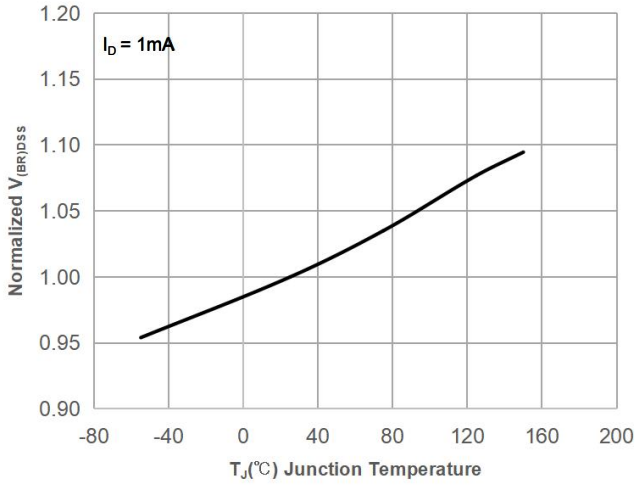


Figure 8: Normalized on Resistance vs. Junction Temperature

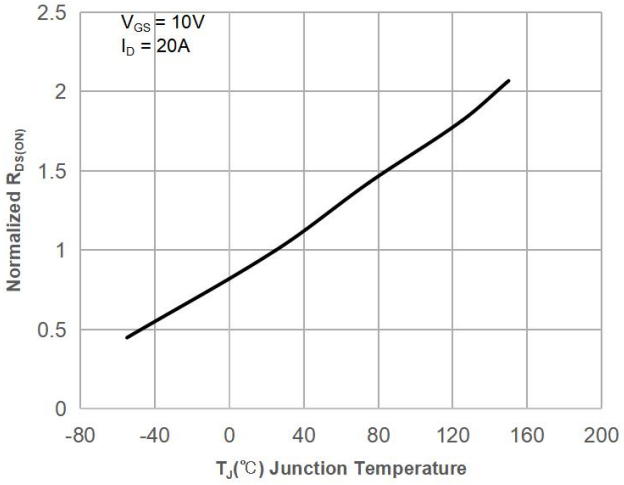


Figure 9: Maximum Safe Operating Area

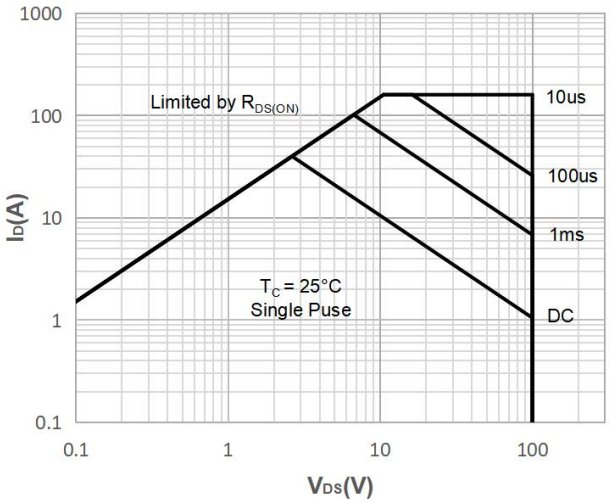


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

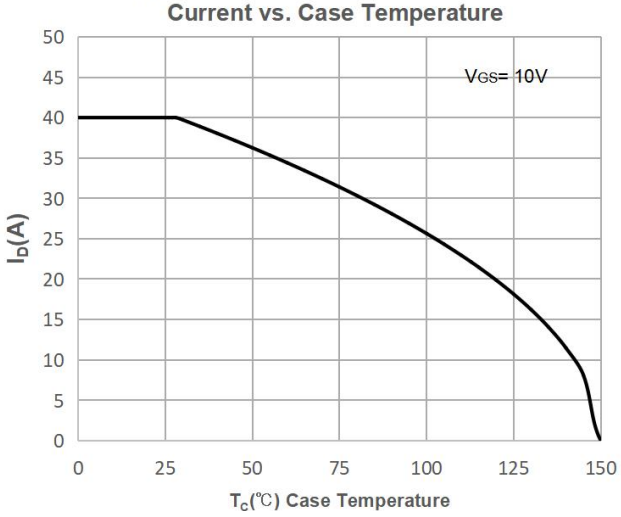


Figure 11: Normalized Maximum Transient Thermal Impedance

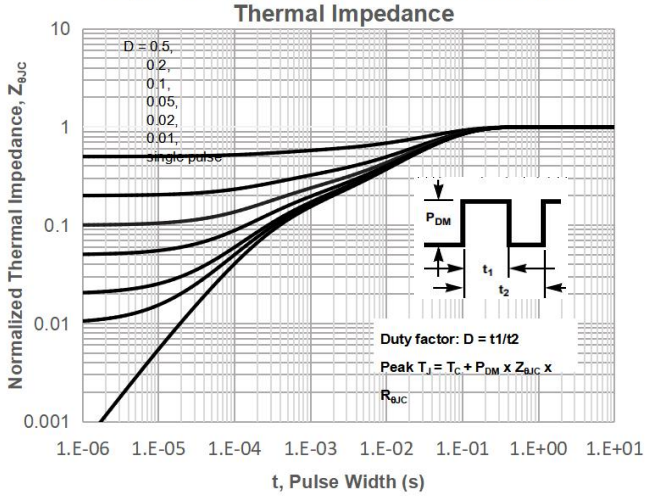
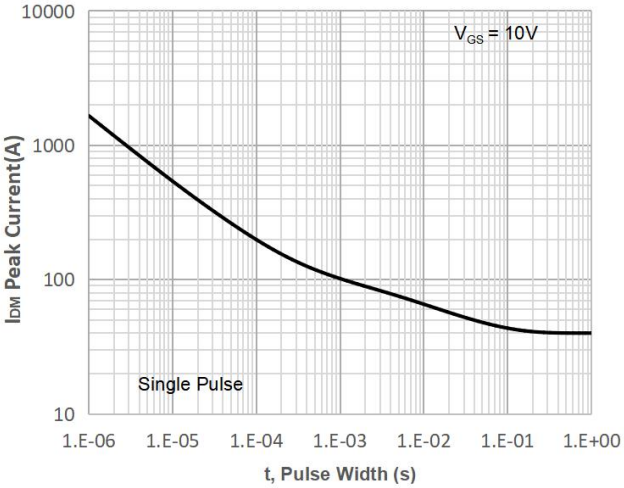


Figure 12: Peak Current Capacity



Test Circuit

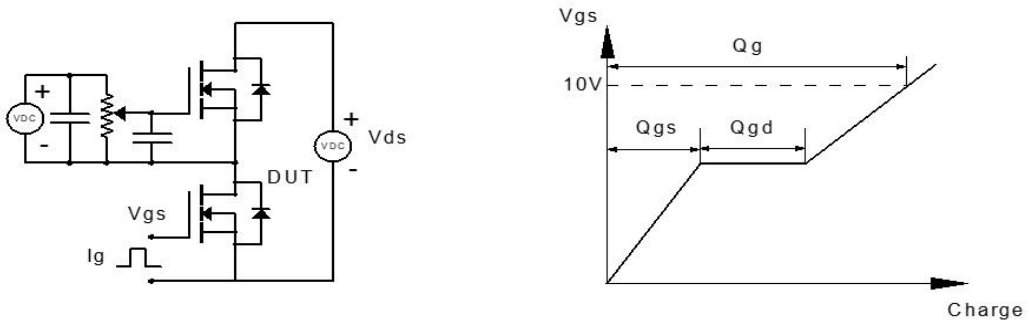


Figure 1: Gate Charge Test Circuit & Waveform

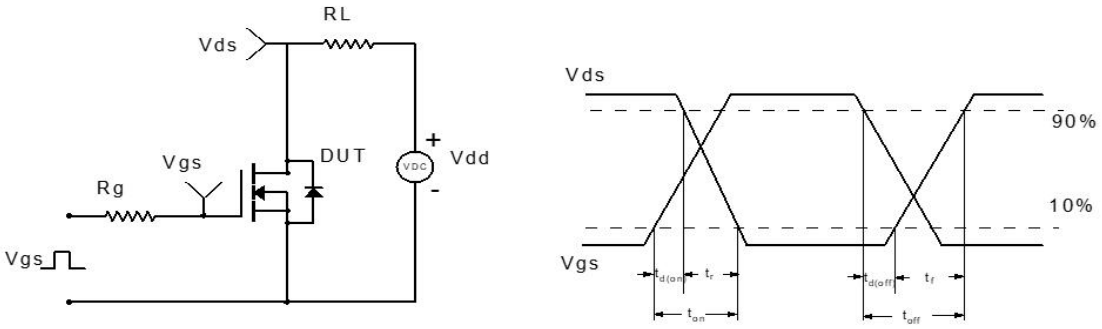


Figure 2: Resistive Switching Test Circuit & Waveform

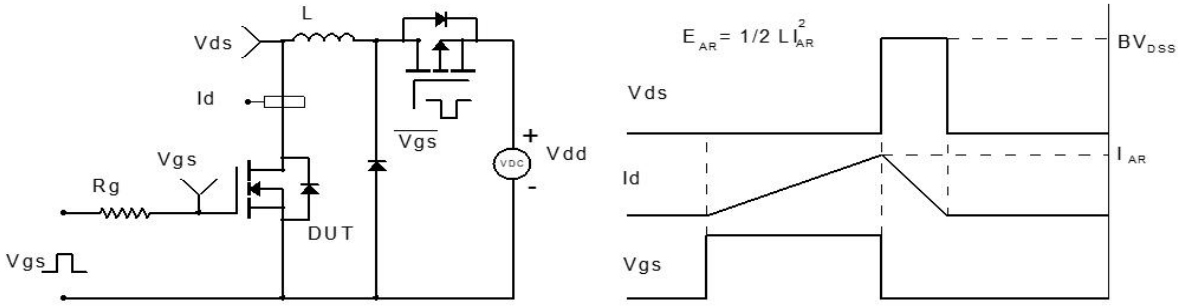


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

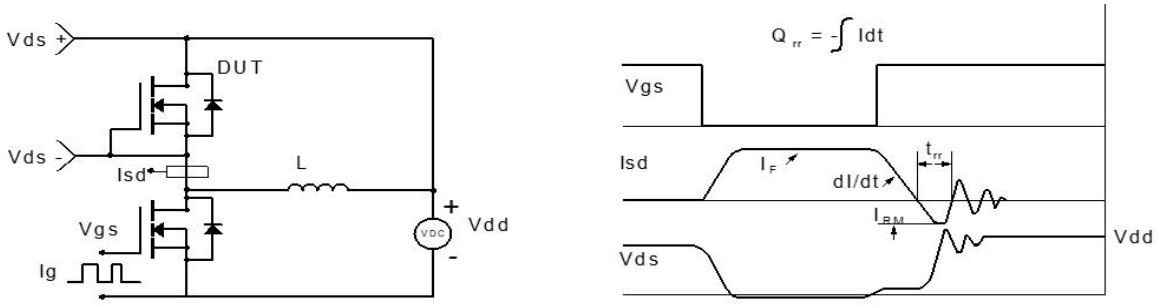
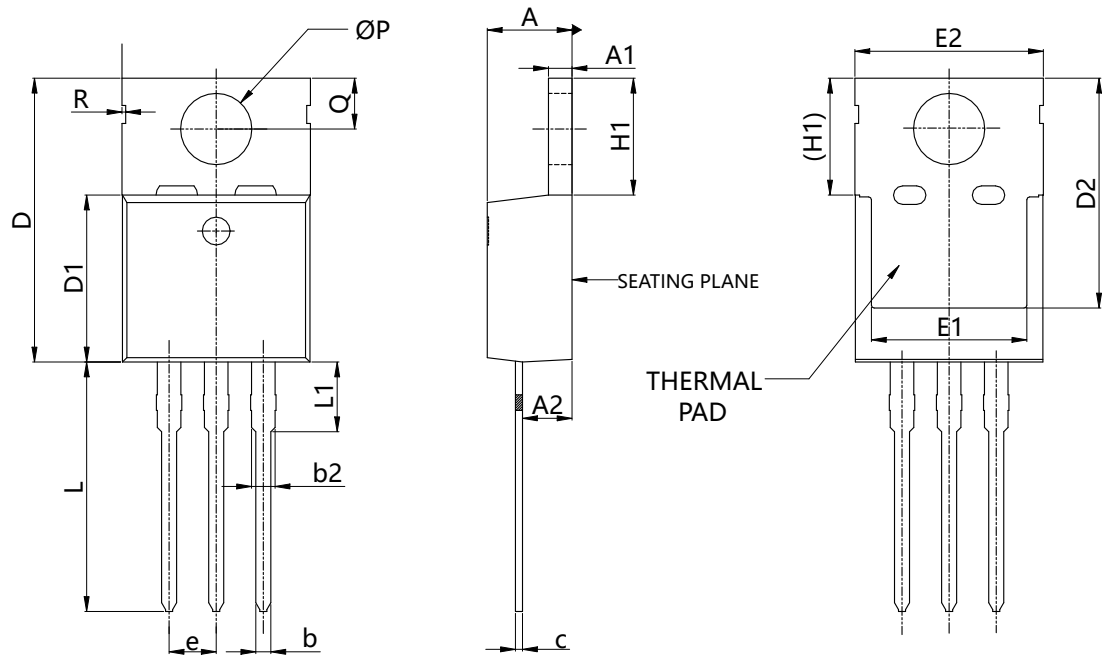


Figure 4: Diode Recovery Test Circuit & Waveform

TO-220 Package Information



SYMBOL	MILLIMETER		
	MIN.	NOMINAL	MAX.
A	4.47	4.57	4.67
A1	1.17	1.27	1.37
A2	2.52	2.67	2.82
b	0.71	0.81	0.91
b2	1.17	1.27	1.37
c	0.360	0.381	0.500
D	15.00	15.30	15.60
D1	8.70	9.00	9.30
D2	12.19	12.39	12.60
E	9.90	10.11	10.30
E1	8.08	8.38	8.68
E2	10.00	10.16	10.30
e	2.44	2.54	2.64
H1	6.00	6.30	6.60
L	13.15	13.45	13.75
L1	3.56	3.76	3.96
P	3.70	3.84	3.95
Q	2.60	2.74	2.90
R	0.00	0.20	0.35