

N-Channel 60V(D-S) MOSFET

Product summary		
V_{DS}	60	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	2.7	m Ω
I_D ($T_C=25^\circ C$)	180	A

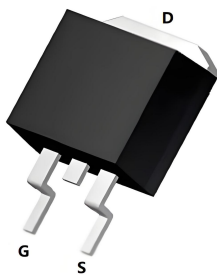
Features

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

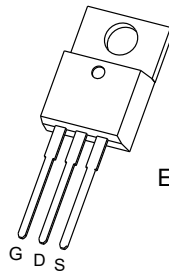
Applications

- Load Switch
- PWM Application
- Power management

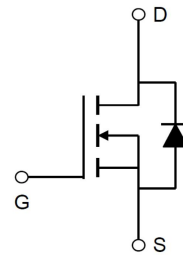
Pin Configuration



TO-263
ECFC180N06A



TO-220
ECFB180N06A



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECFC180N06A	TO-263	13"	800pcs

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^\circ C$	180
		$T_C=100^\circ C$	114
I_{DM}	Pulse Drain Current Tested ^A	720	A
E_{AS}	Single Pulse Avalanche Energy ^B	324	mJ
P_D	Power Dissipation	$T_C=25^\circ C$	258
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	0.58	$^\circ C/W$

Electrical Characteristics (at T_J =25°C Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, 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	3.0	4.0	V
R _{DS(ON)}	Drain-Source On-State Resistance ^C	V _{GS} =10V, I _D =30A	--	2.7	3.5	mΩ
V _{SD}	Diode Forward Voltage	I _S =30A, V _{GS} =0V	--	--	1.2	V
I _S	Maximum Body-Diode Continuous Current		--	--	180	A
Dynamic Parameters ^D						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V f=1MHZ	--	7660	--	pF
C _{oss}	Output Capacitance		--	642	--	pF
C _{rss}	Reverse Transfer Capacitance		--	620	--	pF
Q _g	Total Gate Charge	V _{DS} =30V, I _D =30A V _{GS} =10V	--	138	--	nC
Q _{gs}	Gate-Source Charge		--	21	--	nC
Q _{gd}	Gate-Drain Charge		--	33	--	nC
t _{D(on)}	Turn-on Delay Time	V _{DD} =30V, I _D =30A, R _L =1Ω, R _{GEN} =3Ω, V _{GS} =10V	--	14	--	ns
t _r	Turn-on Rise Time		--	10	--	ns
t _{D(off)}	Turn-off Delay Time		--	65	--	ns
t _f	Turn-off Fall Time		--	27	--	ns
t _{rr}	Reverse recovery time	I _F =20A, di/dt=100 A/uS	--	52	--	ns
Q _{rr}	Reverse recovery charge		--	75	--	nC

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

B. The EAS data shows Max. rating . The test condition is T_J=25°C, V_{DD}=40V, V_G=10V, R_g=25Ω, L=0.5mH, I_{AS}=36A.

C. The data tested by pulsed , pulse width≤300us , duty cycle≤0.5%.

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

Typical Characteristics

Figure 1: Output Characteristics

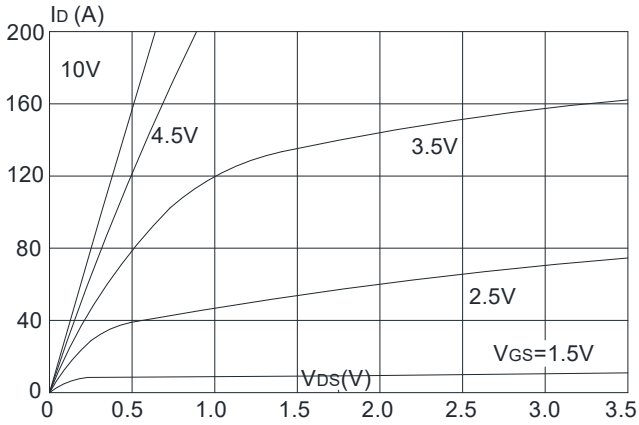


Figure 2: Typical Transfer Characteristics

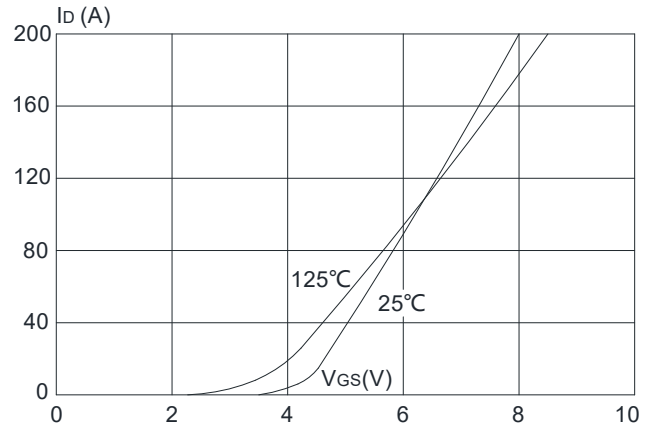


Figure 3: On-resistance vs. Drain Current

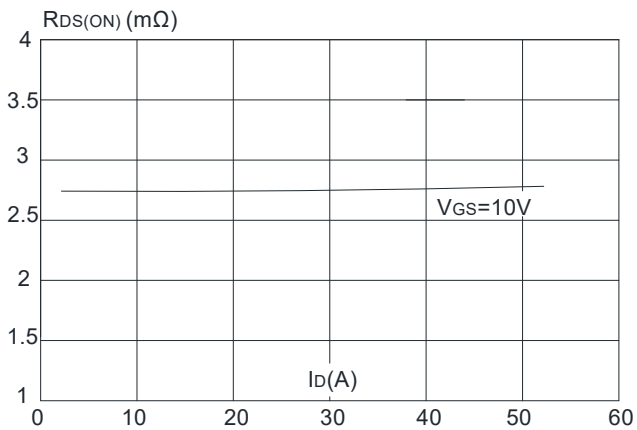


Figure 4: Body Diode Characteristics

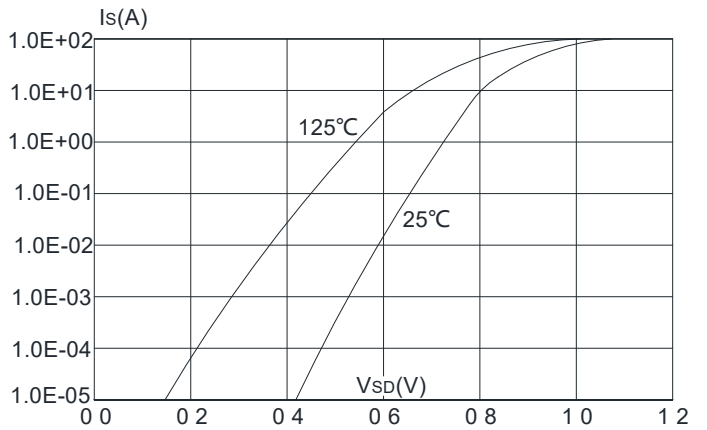


Figure 5: Gate Charge Characteristics

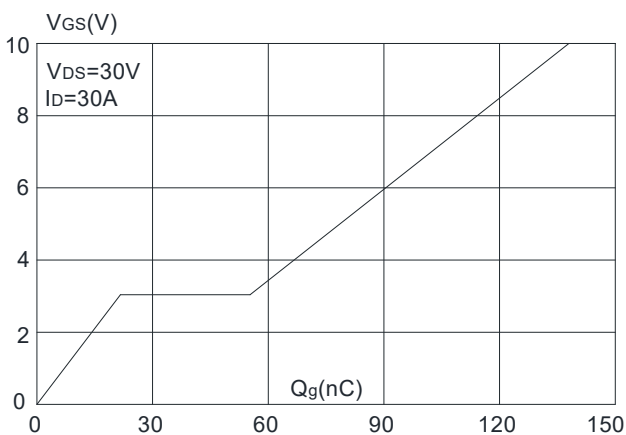
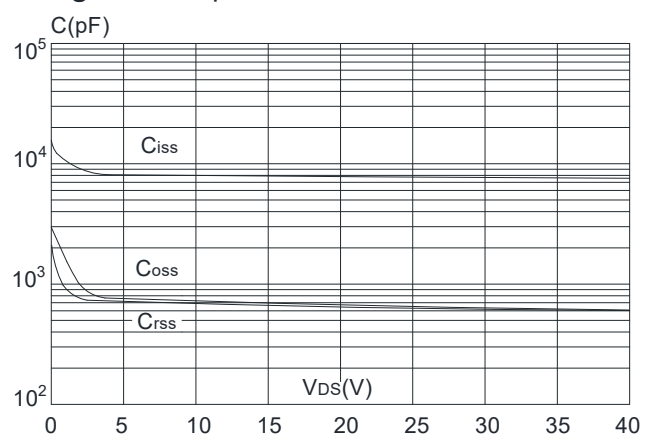


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

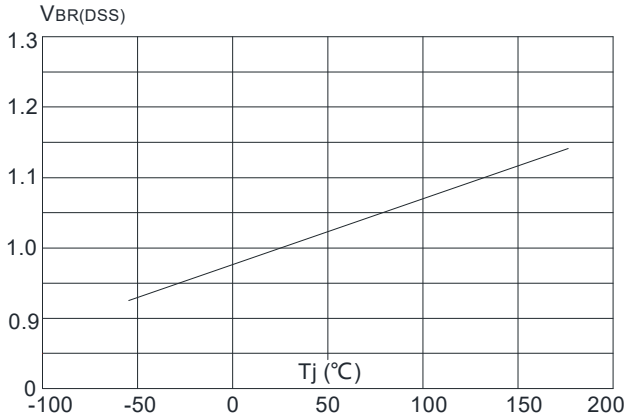


Figure 8: Normalized on Resistance vs. Junction Temperature

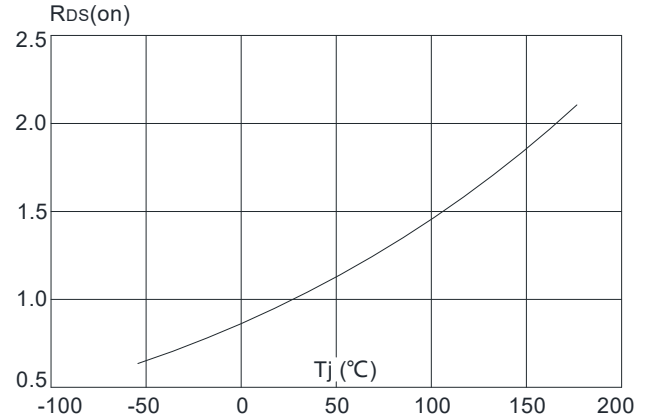


Figure 9: Maximum Safe Operating Area

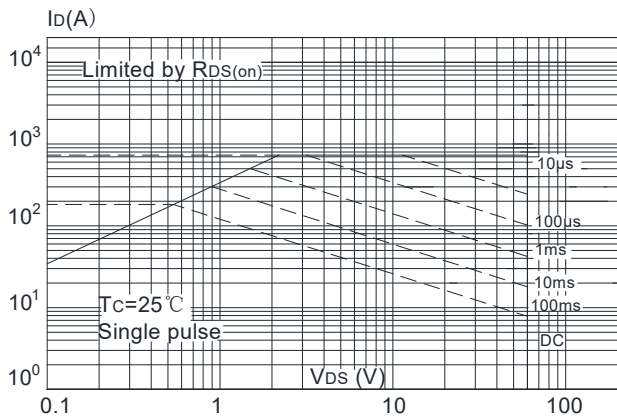


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

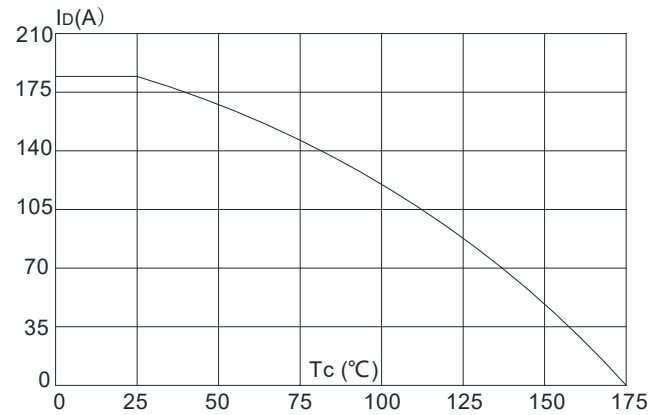
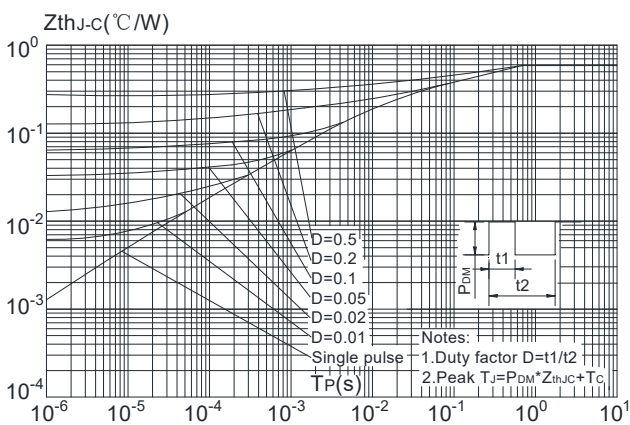


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit



Figure1:Gate Charge Test Circuit & Waveform

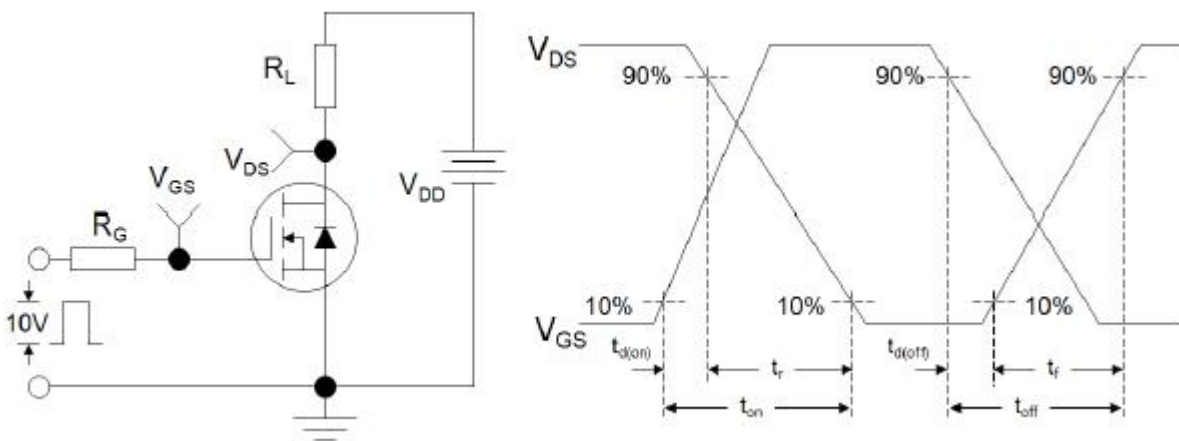


Figure 2: Resistive Switching Test Circuit & Waveforms

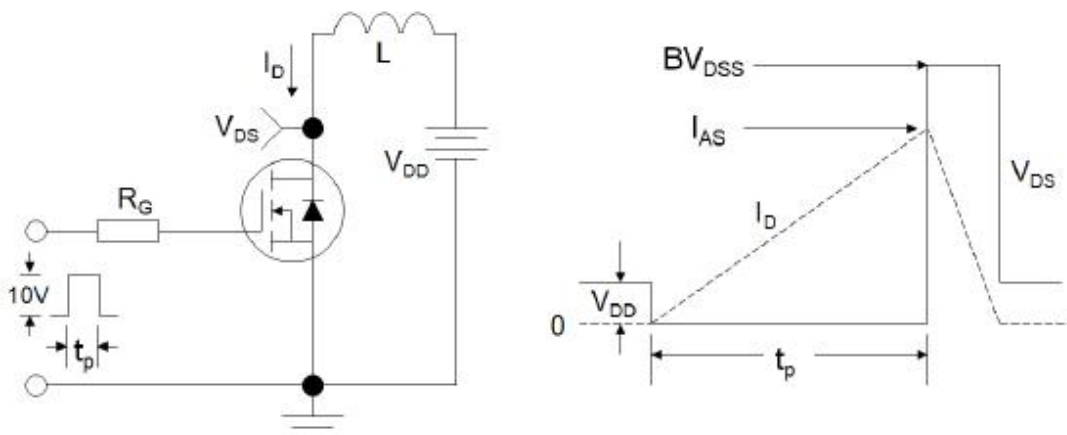
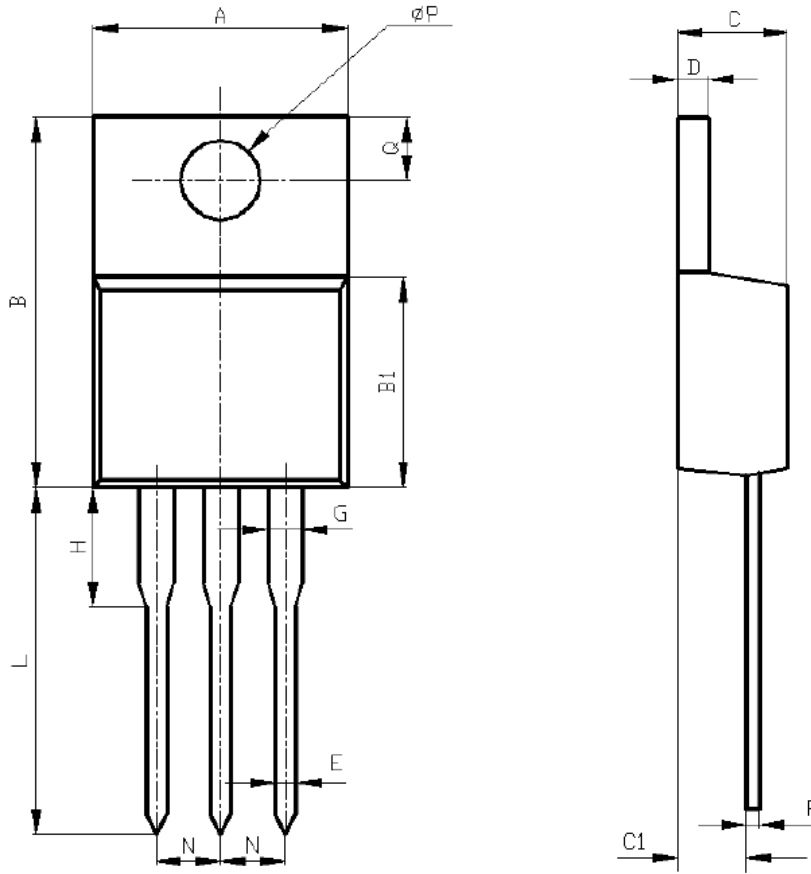


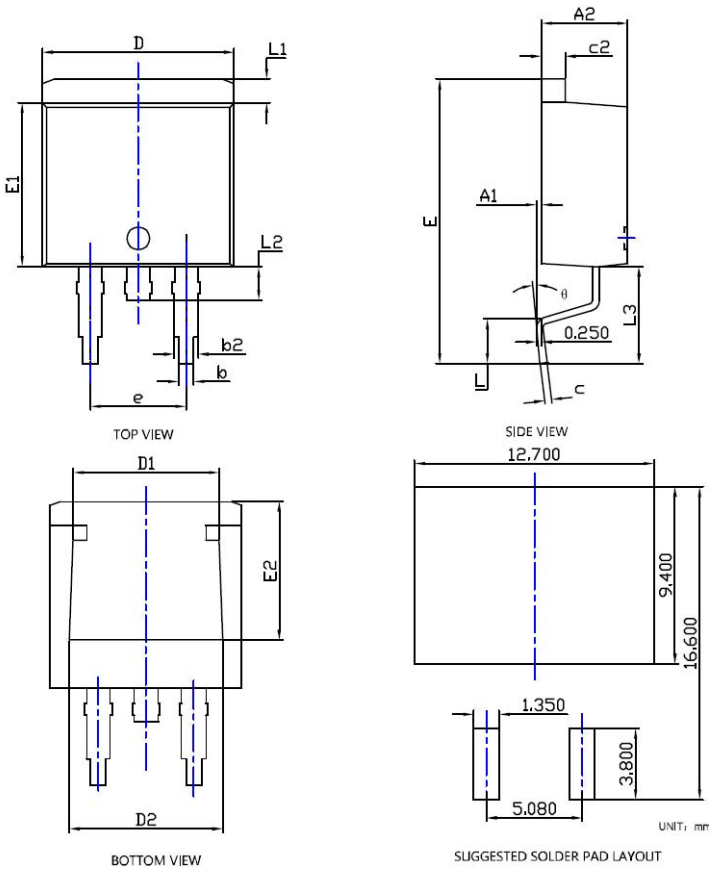
Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

ECFB180N06A(TO-220) Package Information(mm)



SYMBOLS	MILLIMETERS	
	MIN	MAX
A	10.10	10.50
B	15.20	15.60
B1	9.00	9.40
C	4.40	4.60
C1	2.40	3.00
D	1.20	1.40
E	0.70	0.90
F	0.40	0.60
G	1.17	1.37
H	3.30	3.80
L	13.10	13.70
N	2.34	2.74
Q	2.40	3.00
ΦP	3.70	3.90

ECFC180N06A(TO-263) Package Information



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.010	0.000	---	0.250
A2	0.174	0.180	0.186	4.430	4.580	4.730
b	0.028	0.032	0.036	0.720	0.820	0.920
b2	0.046	0.050	0.054	1.180	1.280	1.380
c	0.013	0.015	0.018	0.330	0.390	0.450
c2	0.048	0.050	0.053	1.220	1.280	1.34
D	0.394	0.400	0.406	10.000	10.150	10.300
D1	0.295	0.307	0.319	7.500	7.800	8.100
D2	0.303	0.315	0.327	7.700	8.000	8.300
E	0.571	0.591	0.610	14.500	15.000	15.500
E1	0.337	0.341	0.348	8.550	8.700	8.850
E2	0.276	0.287	0.299	7.000	7.300	7.600
e	0.200BSC			5.080BSC		
L	0.070	---	0.110	1.790	---	2.790
L1	0.044	---	0.056	1.120	---	1.420
L2	0.030	---	0.070	0.770	---	1.770
L3	0.197REF			5.000REF		
θ	0°	---	8°	0°	---	8°

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.