

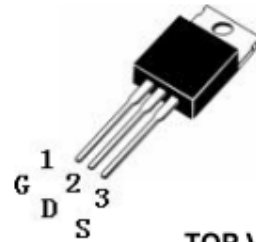
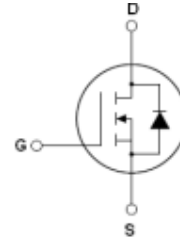
Description

The EC736014 is a new generation of middle voltage and high current N-Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability. EC736014 is assembled in high reliability and qualified assembly house.

Features and Benefits

- ◆ Advanced trench process technology
- ◆ avalanche energy, 100% test
- ◆ Fully characterized avalanche voltage and current

ID =60A
BV=60V
Rdson=14mΩ(max.)



TOP View (TO220)

Application

- ◆ Power switching application

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C=25^\circ\text{C}$	Continuous drain current, $V_{GS}@10\text{V}$	60	A
$I_D @ T_C=100^\circ\text{C}$	Continuous drain current, $V_{GS}@10\text{V}$	42	
I_{DM}	Pulsed drain current ①	240	
$P_D @ T_C=25^\circ\text{C}$	Power dissipation	115	W
$P_D @ T_C=25^\circ\text{C}$	Linear derating factor	0.74	W/°C
V_{GS}	Gate-to-Source voltage	±20	V
E_{AS}	Single pulse avalanche energy ②	235	mJ
E_{AR}	Repetitive avalanche energy	TBD	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C

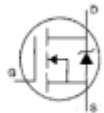
Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	1.31	—	°C/W
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

Electrical Characteristics @T_J=25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS}	Drain-to-Source breakdown voltage	60	—	—	V	V _{GS} =0V, I _D =250μA
R _{DS(on)}	Static Drain-to-Source on-resistance	—	12	14	mΩ	V _{GS} =10V, I _D =30A
V _{GS(th)}	Gate threshold voltage	2.0	—	4.0	V	V _{DS} =V _{GS} , I _D =250μA
g _{fs}	Forward transconductance	—	60	—	S	V _{DS} =5V, I _D =30A
I _{DSS}	Drain-to-Source leakage current	—	—	2	μA	V _{DS} =60V, V _{GS} =0V
		—	—	10	μA	V _{DS} =60V, V _{GS} =0V, T _J =150°C
I _{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V _{GS} =20V
	Gate-to-Source reverse leakage	—	—	-100	nA	V _{GS} =-20V
Q _g	Total gate charge	—	45	—	nC	I _D =30A
Q _{gs}	Gate-to-Source charge	—	4	—		V _{DD} =30V
Q _{gd}	Gate-to-Drain("Miller") charge	—	15	—		V _{GS} =10V
t _{d(on)}	Turn-on delay time	—	14.6	—	nS	V _{DD} =30V
t _r	Rise time	—	14.2	—		I _D =2A, R _L =15Ω
t _{d(off)}	Turn-Off delay time	—	40	—		R _G =2.5Ω
t _f	Fall time	—	7.3	—		V _{GS} =10V
C _{iss}	Input capacitance	—	1480	—	pF	V _{GS} =0V
C _{oss}	Output capacitance	—	190	—		V _{DS} =25V
C _{rss}	Reverse transfer capacitance	—	135	—		f=1.0MHZ

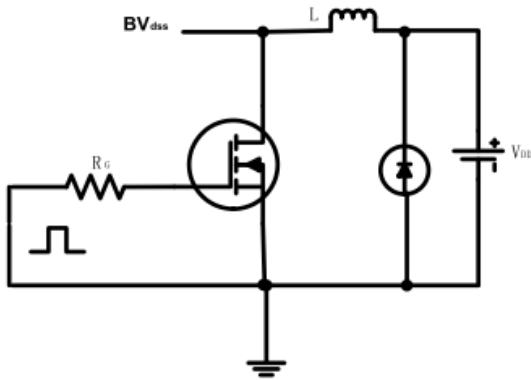
Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	60	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	240		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J =25°C, I _S =40A, V _{GS} =0V ③
t _{rr}	Reverse Recovery Time	—	33	—	nS	T _J =25°C, I _F =60A
Q _{rr}	Reverse Recovery Charge	—	61	—	nC	di/dt=100A/μs ③
ton	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _s + L _D)				

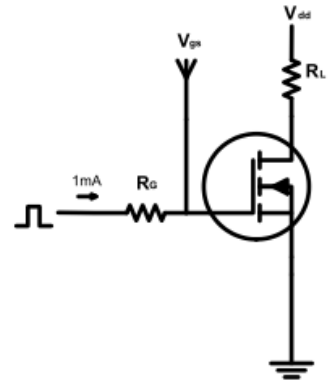
Notes:

- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: L =0.3mH, V_{DD} = 30V, I_D=37A
- ③ Pulse width≤300μS, duty cycle≤1.5% ; R_G = 25Ω Starting T_J = 25°C

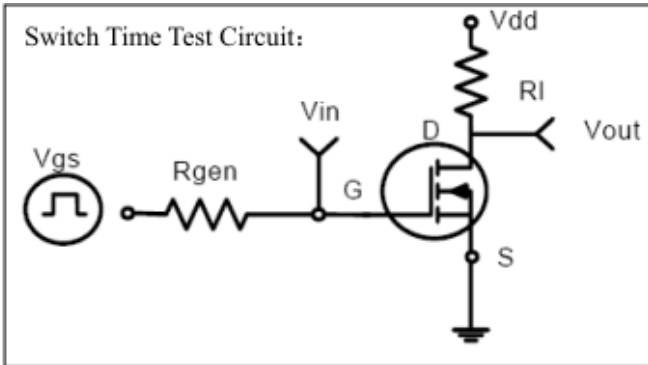
EAS test circuit:



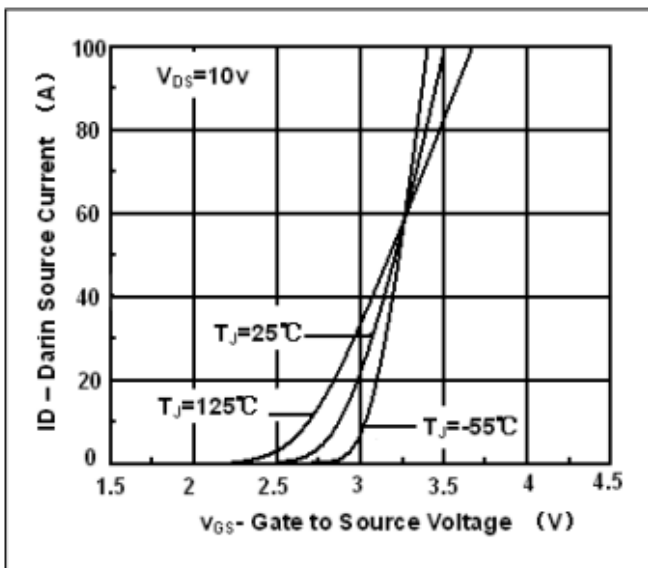
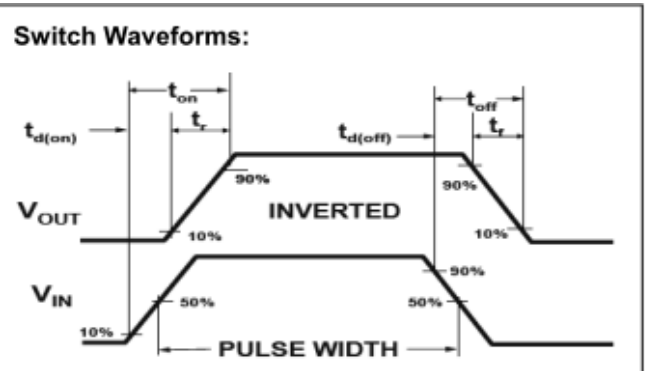
Gate charge test circuit:



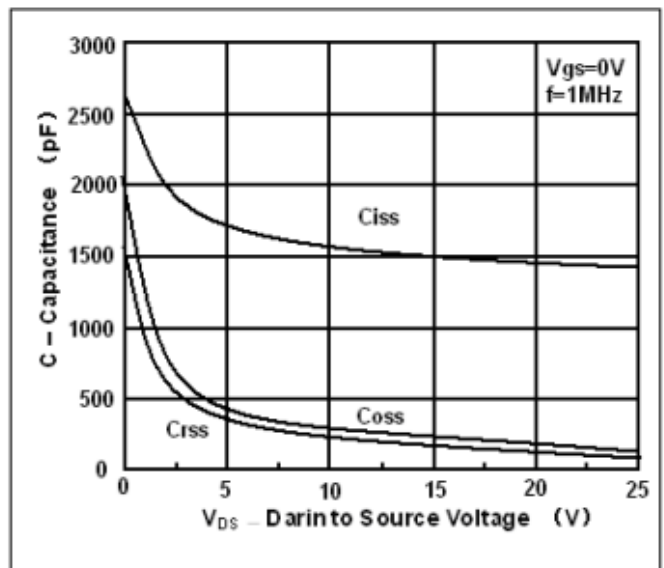
Switch Time Test Circuit:



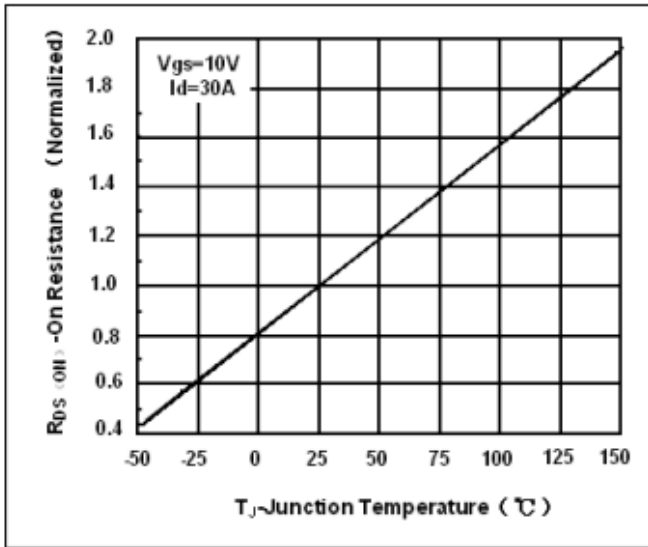
Switch Waveforms:



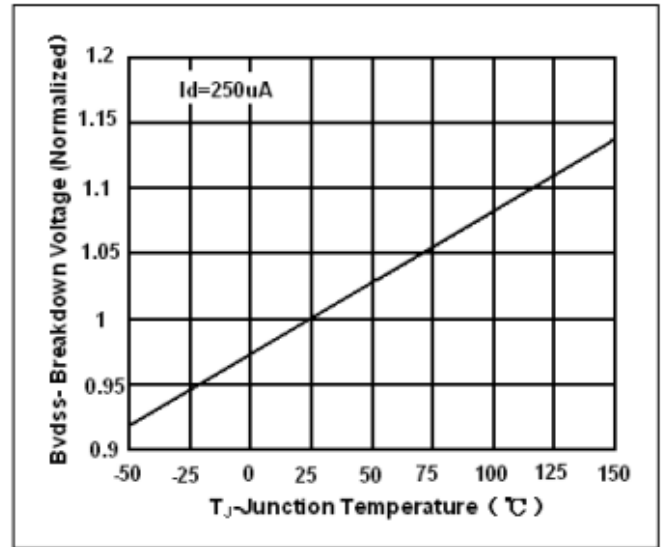
Transfer Characteristic



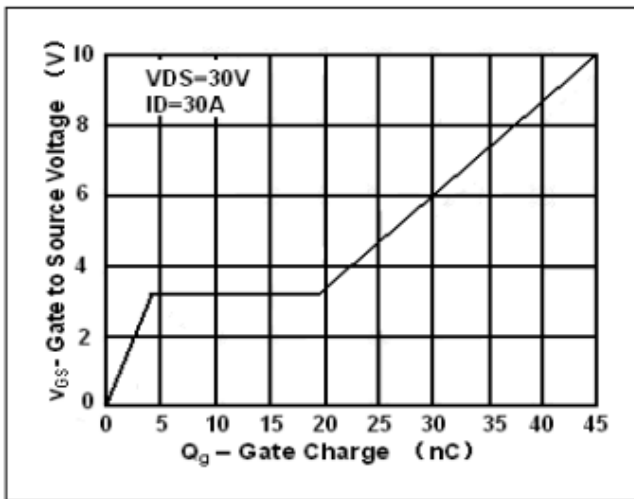
Capacitance



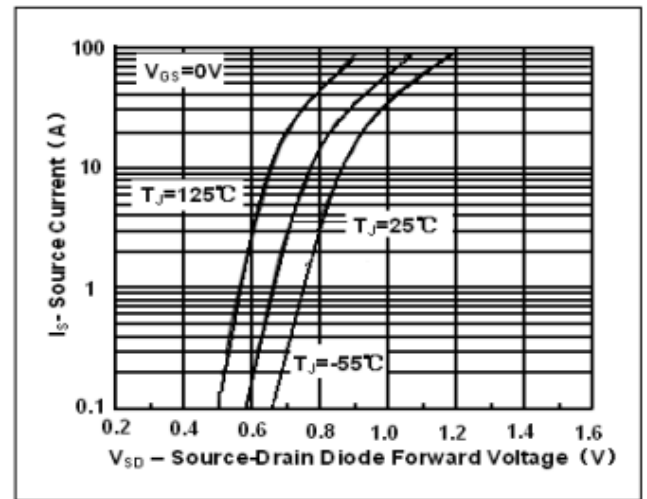
On Resistance vs. Junction Temperature



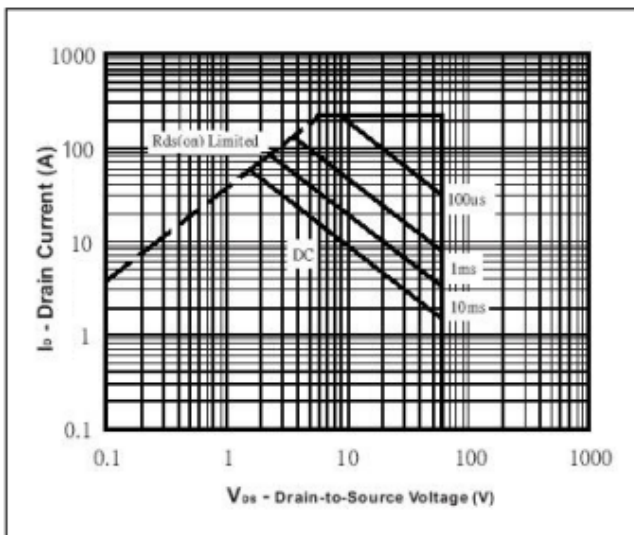
Breakdown Voltage vs. Junction Temperature



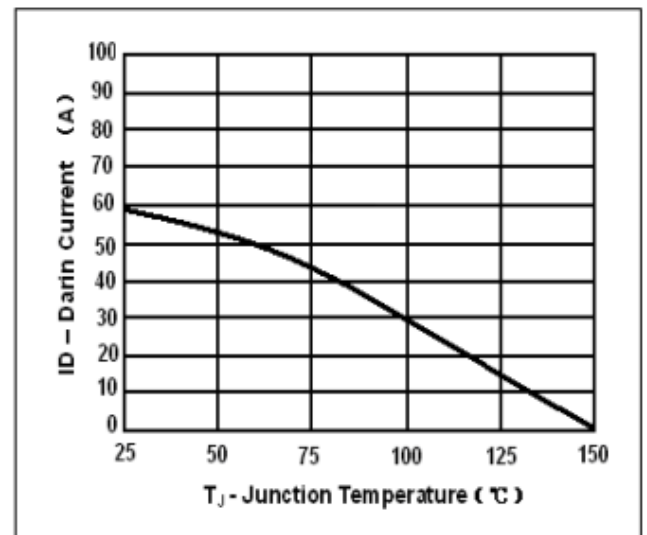
Gate Charge



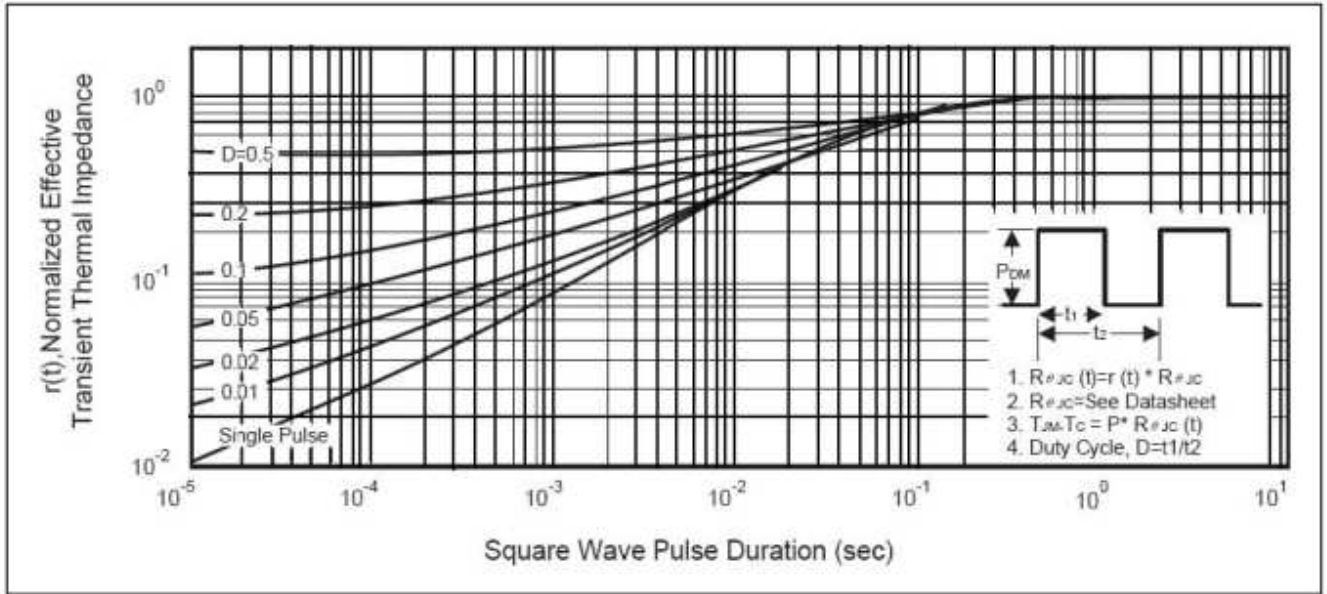
Source-Drain Diode Forward Voltage



Safe Operation Area



Max Drain Current vs. Junction Temperature



Transient Thermal Impedance Curve

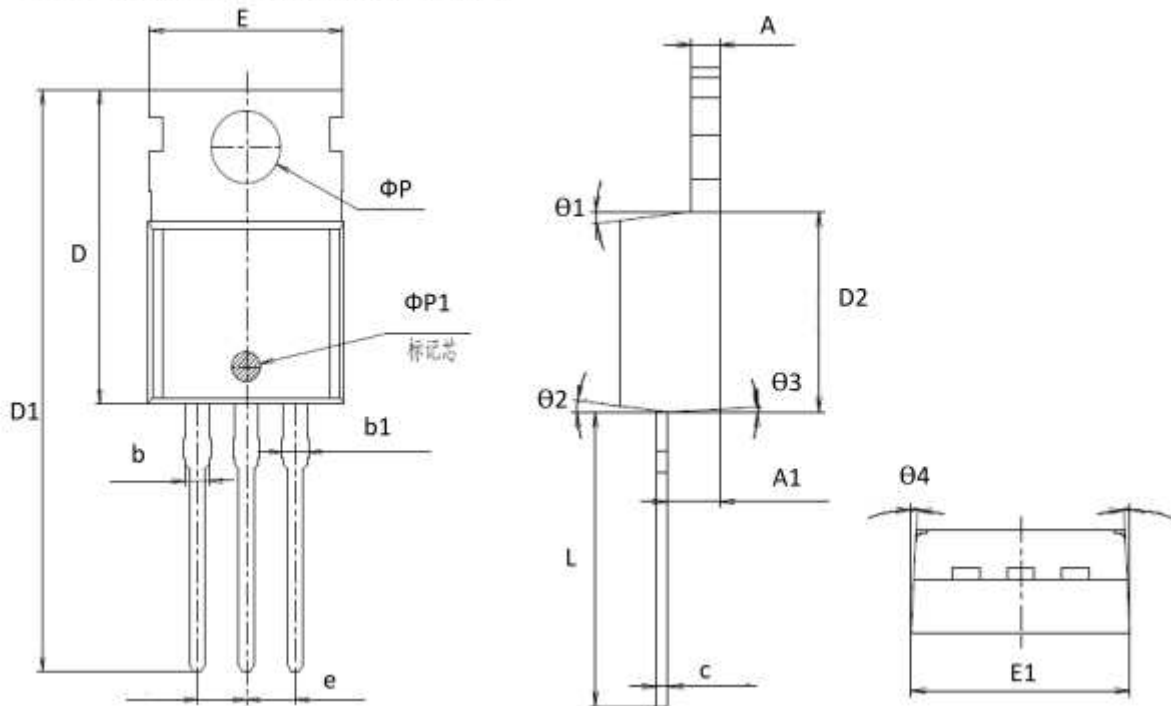
Ordering and Marking Information

EC736014 X X
 | |
 TO220=A T : Tube

Part Number	Package	Marking	Marking Information
EC736014AT	TO220		

Package Outline Dimension

TO220 PACKAGE OUTLINE DIMENSION_GN



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	-	1.300	-	-	0.051	-
A1	2.200	2.400	2.600	0.087	0.094	0.102
b	-	1.270	-	-	0.050	-
b1	1.270	1.370	1.470	0.050	0.054	0.058
c	-	0.500	-	-	0.020	-
D	-	15.600	-	-	0.614	-
D1	-	28.700	-	-	1.130	-
D2	-	9.150	-	-	0.360	-
E	9.900	10.000	10.100	0.390	0.394	0.398
E1	-	10.160	-	-	0.400	-
ΦP	-	3.600	-	-	0.142	-
ΦP1	-	1.500	-	-	0.059	-
e	2.54BSC			0.1BSC		
L	12.900	13.100	13.300	0.508	0.516	0.524
θ1	-	7°	-	-	7°	-
θ2	-	7°	-	-	7°	-
θ3	-	3°	-	5°	7°	9°
θ4	-	3°	-	1°	3°	5°