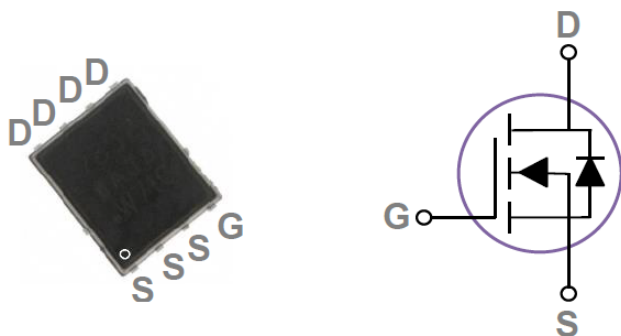


General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

DFN5*6 Pin Configuration



BVDSS	RDSON	ID
60V	5.6mΩ	85A

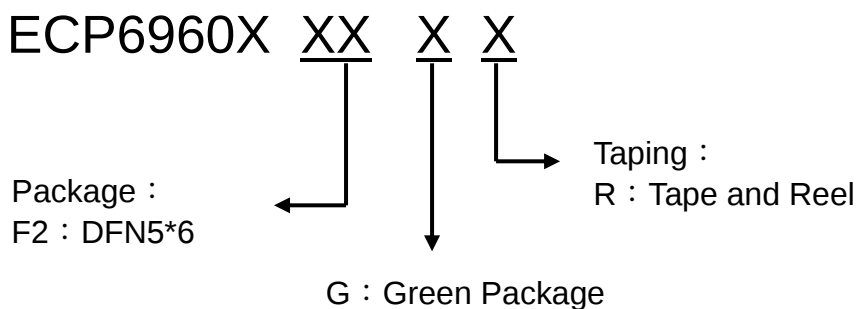
Features

- ◆ 60V, 85A, $R_{DS(ON)} = 5.6m\Omega$ @ $V_{GS} = 10V$
- ◆ Improved dv/dt capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green Device Available

Application

- ◆ Motor Drive
- ◆ Power Tools
- ◆ LED Lighting
- ◆ Quick Charger

Ordering Information



**Absolute Maximum Ratings** $T_c=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	60	V
VGS	Gate-Source Voltage	± 20	V
ID	Drain Current – Continuous ($T_C=25^{\circ}\text{C}$)	85	A
	Drain Current – Continuous ($T_C=100^{\circ}\text{C}$)	53.8	A
IDM	Drain Current – Pulsed ¹	340	A
EAS	Single Pulse Avalanche Energy ²	181	mJ
IAS	Single Pulse Avalanche Current ²	60.1	A
PD	Power Dissipation ($T_C=25^{\circ}\text{C}$)	135	W
	Power Dissipation – Derate above 25°C	1.09	W/ $^{\circ}\text{C}$
TSTG	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
TJ	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R θ JA	Thermal Resistance Junction to ambient	---	62	$^{\circ}\text{C}/\text{W}$
R θ JC	Thermal Resistance Junction to Case	---	0.92	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics $T_J=25^{\circ}\text{C}$, unless otherwise noted**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250uA	60	---	---	V
$\Delta\text{BVDSS}/\Delta\text{TJ}$	BVDSS Temperature Coefficient	Reference to 25°C , ID=1mA	---	0.036	---	V/ $^{\circ}\text{C}$
IDSS	Drain-Source Leakage Current	VDS=60V, VGS=0V, TJ=25 $^{\circ}\text{C}$	---	---	1	μA
		VDS=48V, VGS=0V, TJ=125 $^{\circ}\text{C}$	---	---	10	μA
IGSS	Gate-Source Leakage Current	VGS= $\pm 20\text{V}$, VDS=0V	---	---	± 100	nA

On Characteristics

RDS(ON)	Static Drain-Source On-Resistance ³	VGS=10V, ID=30A	---	4.6	5.6	m Ω
		VGS=4.5V, ID=15A	---	5.3	7.0	m Ω
VGS(th)	Gate Threshold Voltage	VGS=VDS, ID=250uA	1.2	1.6	2.5	V
$\Delta\text{VGS(th)}$	VGS(th) Temperature Coefficient		---	-5.08	---	mV/ $^{\circ}\text{C}$
gfs	Forward Transconductance	VDS=10V, ID=3A	---	15	---	S

Dynamic and switching Characteristics

Qg	Total Gate Charge ^{3, 4}	VDS=30V, VGS=4.5V, ID=10A	---	32.8	65	nC
Qgs	Gate-Source Charge ^{3, 4}		---	10.8	20	
Qgd	Gate-Drain Charge ^{3, 4}		---	11.6	22	
Td(on)	Turn-On Delay Time ^{3, 4}	VDD=15V, VGS=10V, RG=3.3 ID=1A	---	20	40	ns
Tr	Rise Time ^{3, 4}		---	14.2	28	
Td(off)	Turn-Off Delay Time ^{3, 4}		---	61.2	122	
Tf	Fall Time ^{3, 4}		---	16.8	34	
Ciss	Input Capacitance	VDS=25V, VGS=0V, F=1MHz	---	4740	7110	pF
Coss	Output Capacitance		---	325	488	
Crss	Reverse Transfer Capacitance		---	161	332	
Rg	Gate resistance	VGS=0V, VDS=0V, F=1MHz	---	1.6	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
IS	Continuous Source Current	VG=VD=0V, Force Current	---	---	85	A
ISM	Pulsed Source Current ³		---	---	170	A
VSD	Diode Forward Voltage ³	VGS=0V, IS=1A, TJ=25°C	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. VDD=25V, VGS=10V, L=0.1mH, IAS=60.1A., RG=25Ω, Starting TJ=25°C.
3. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

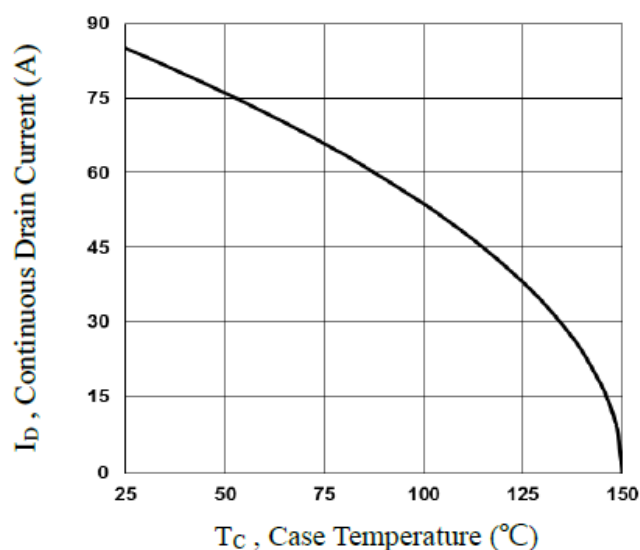


Fig.1 Continuous Drain Current vs. TC

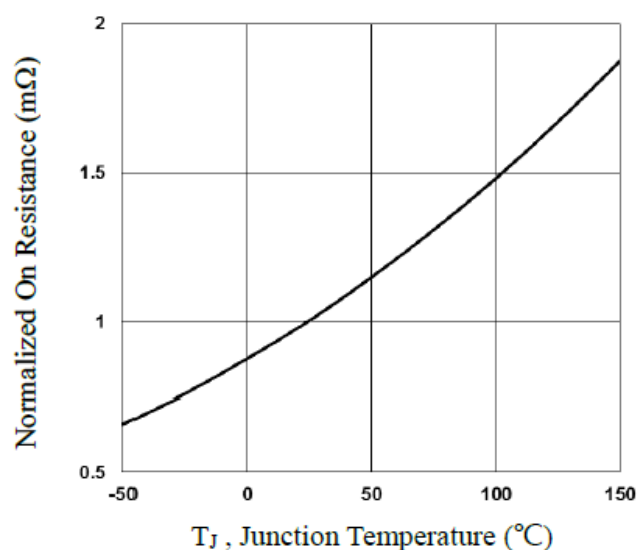


Fig.2 Normalized RDSON vs. TJ

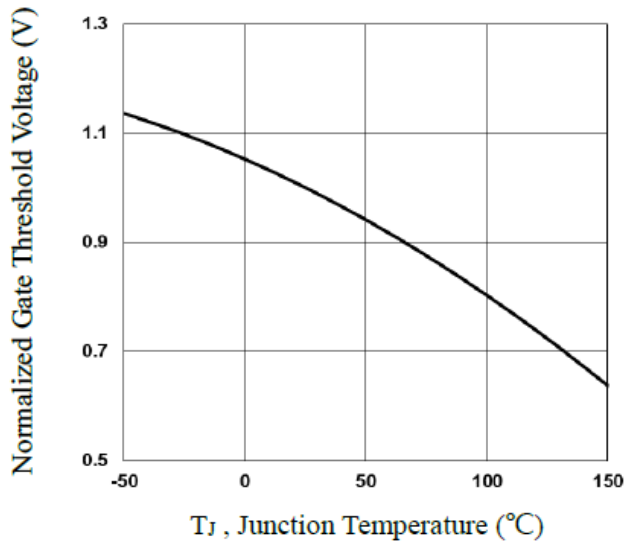


Fig.3 Normalized V_{th} vs. T_J

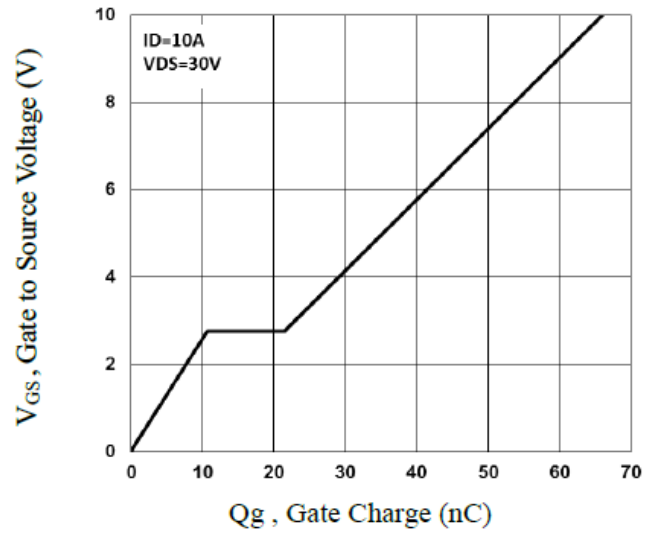


Fig.4 Gate Charge Waveform

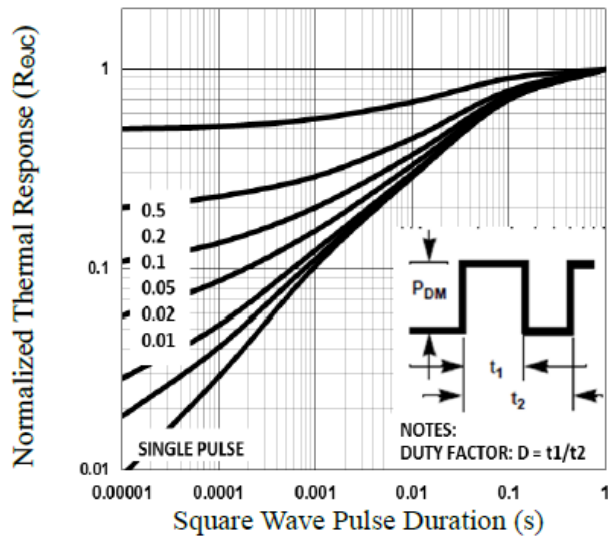


Fig.5 Normalized Transient Response

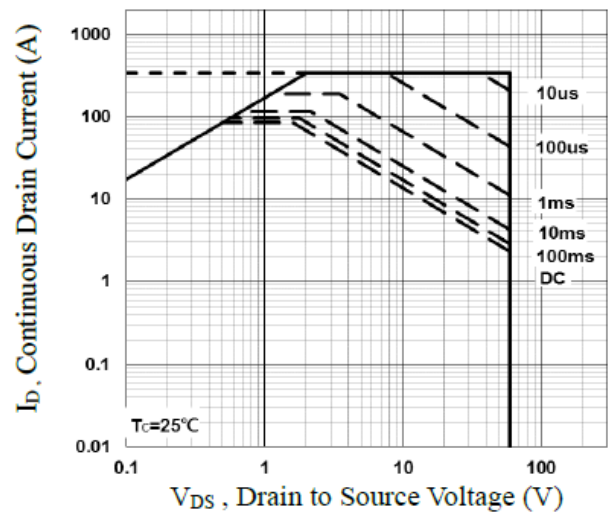


Fig.6 Maximum Safe Operation Area

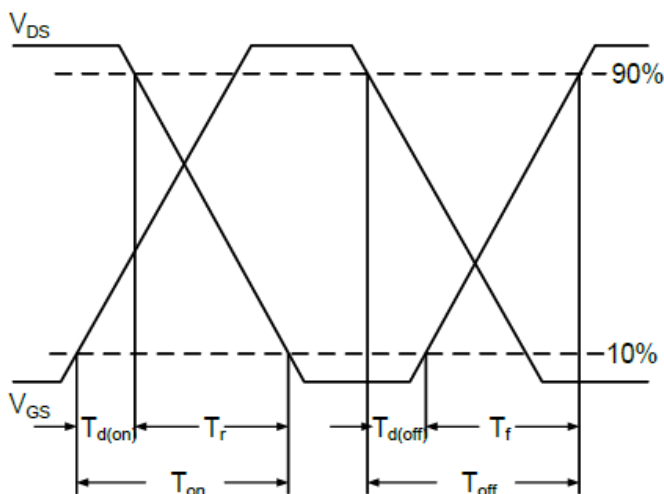


Fig.7 Switching Time Waveform

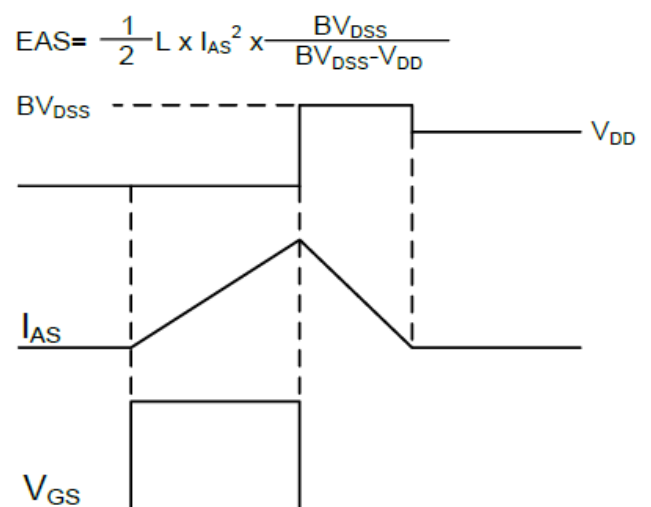
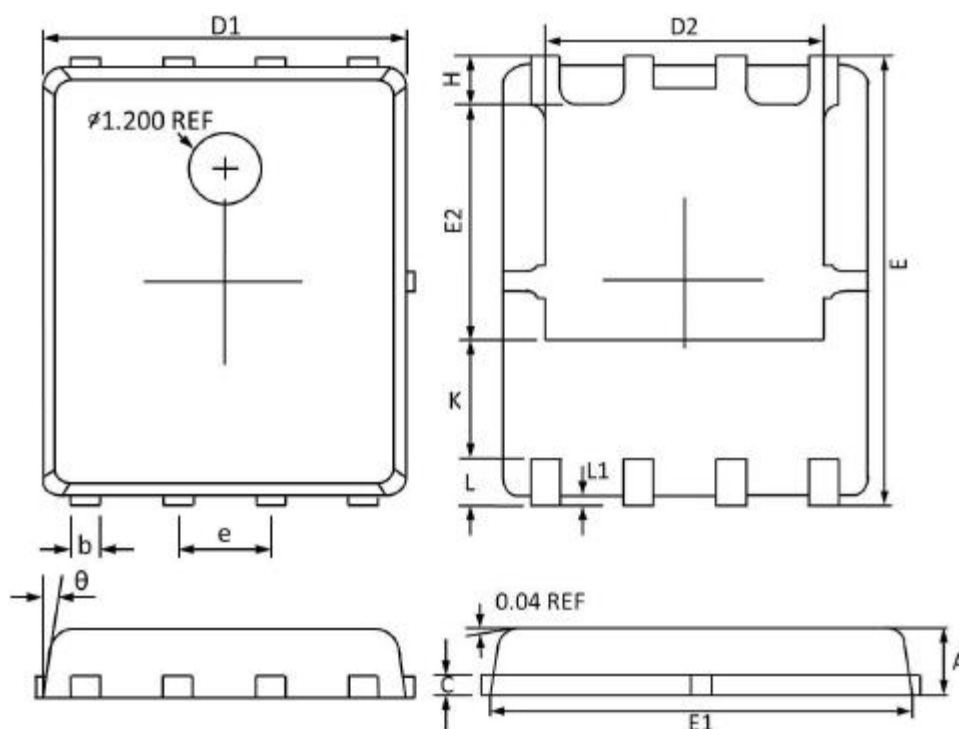


Fig.8 EAS Waveform

DFN5*6 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
θ	12°	0°	12°	0°