HC0630

60V N-Channel MOSFET

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.

Features

V_{DS}	60V
I_D (at V_{GS}=10V)	25A
$R_{DS(ON)}$ (at V_{GS}=10V)	30mΩ(Max)

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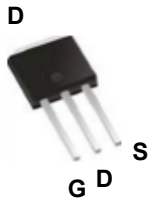

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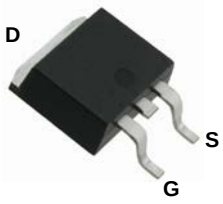
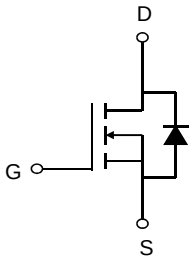




Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	TC=25°C	I_D	25	A
	TC=100°C	I_D	18	A
Drain Current – Pulsed		IDM	120	A
Maximum Power Dissipation		P_D	40	W
Single pulse avalanche energy(1)		E_{AS}	140	mJ
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		3.1	℃ /W
Thermal Resistance junction-to-Ambient	$R_{\theta JA}$		62	℃ /W

Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.2	1.7	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=15A		25	30	mΩ
		V_{GS}=4.5V, I_D=10A		30	38	mΩ
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, F=1.0MHz		1350		pF
C_{oss}	Output Capacitance			68		pF
C_{rss}	Reverse Transfer Capacitance			45		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V,I_D=1A, V_{GS}=10V, R_G=6Ω		16		nS
t_r	Turn-on Rise Time			15		nS
$t_{d(off)}$	Turn-Off Delay Time			28		nS
t_f	Turn-Off Fall Time			7.5		nS
Q_g	Total Gate Charge	V_{DS}=30V,I_D=20A, V_{GS}=10V		16		nC
Q_{gs}	Gate-Source Charge			2.2		nC
Q_{gd}	Gate-Drain Charge			3.8		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=10A		0.72	1.4	V
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2.0		Ω

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=48V,V_{GS}=10V,L=0.5mH,IAS=25A., Starting TJ=25℃
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

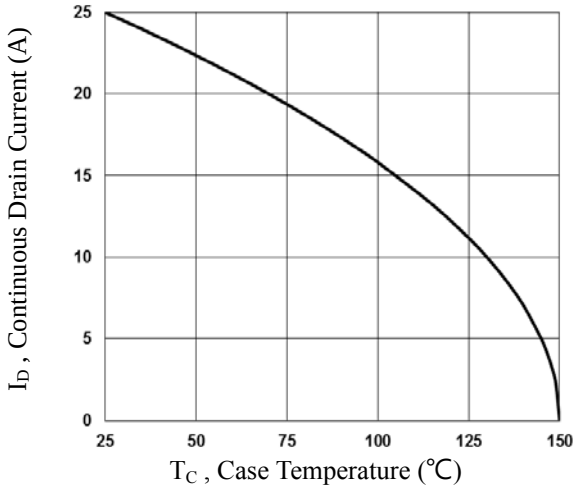


Fig.1 Continuous Drain Current vs. T_C

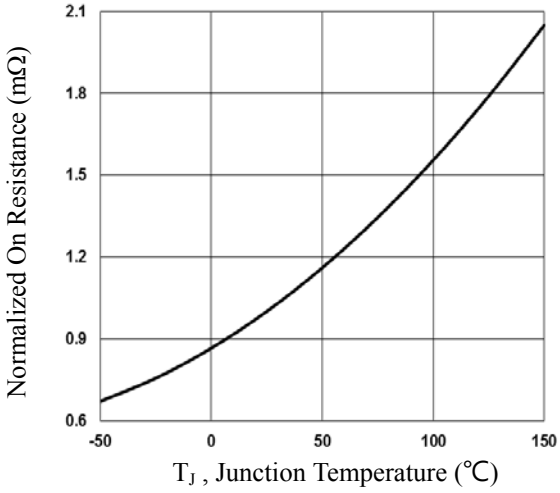


Fig.2 Normalized RDSON vs. T_J

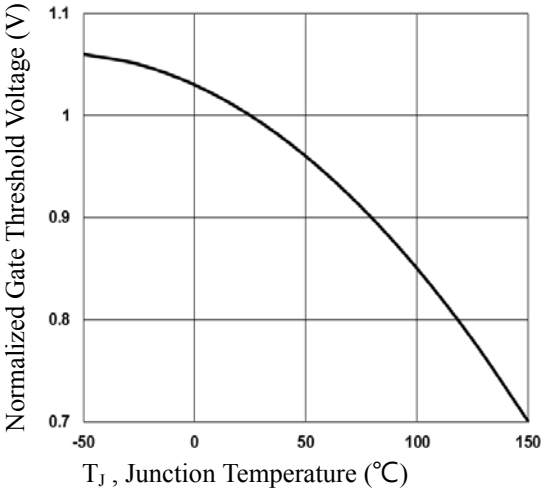


Fig.3 Normalized V_{th} vs. T_J

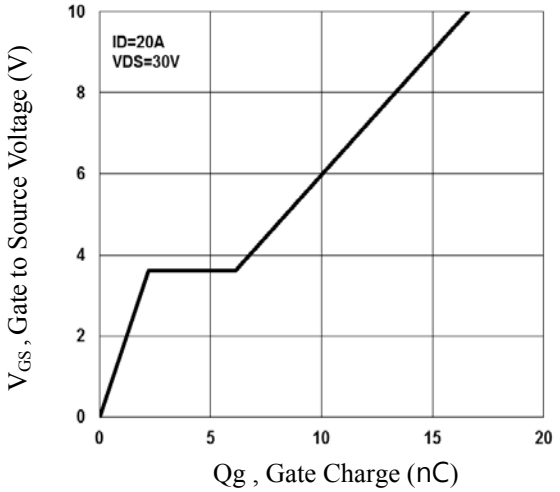


Fig.4 Gate Charge Waveform

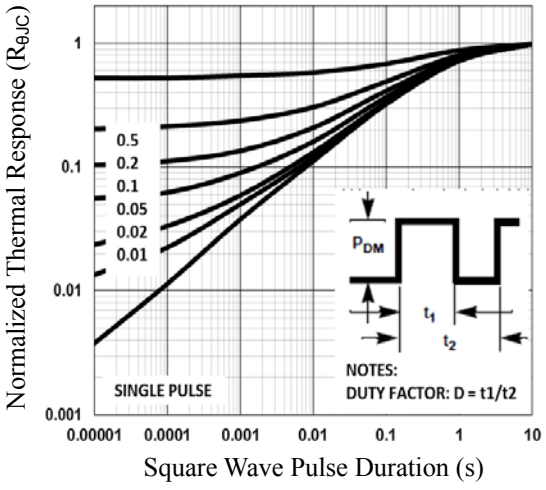


Fig.5 Normalized Transient Impedance

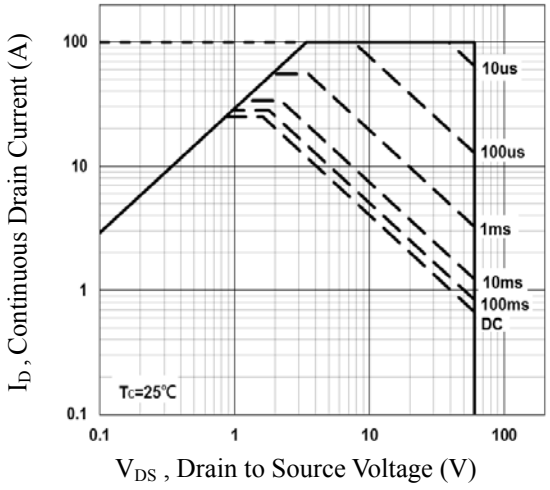


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

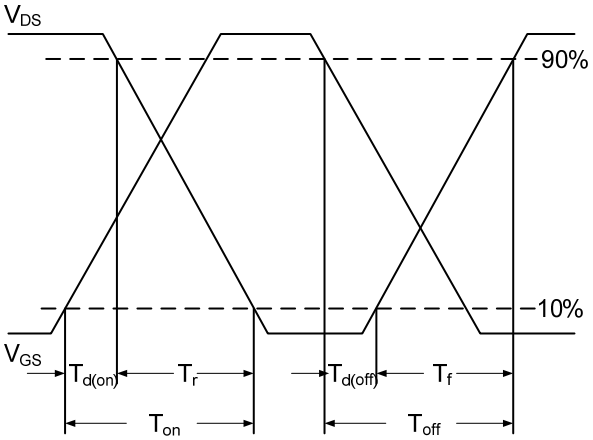


Fig.7 Switching Time Waveform

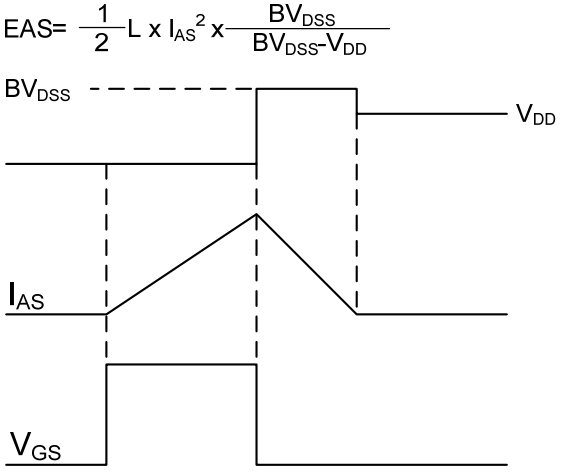
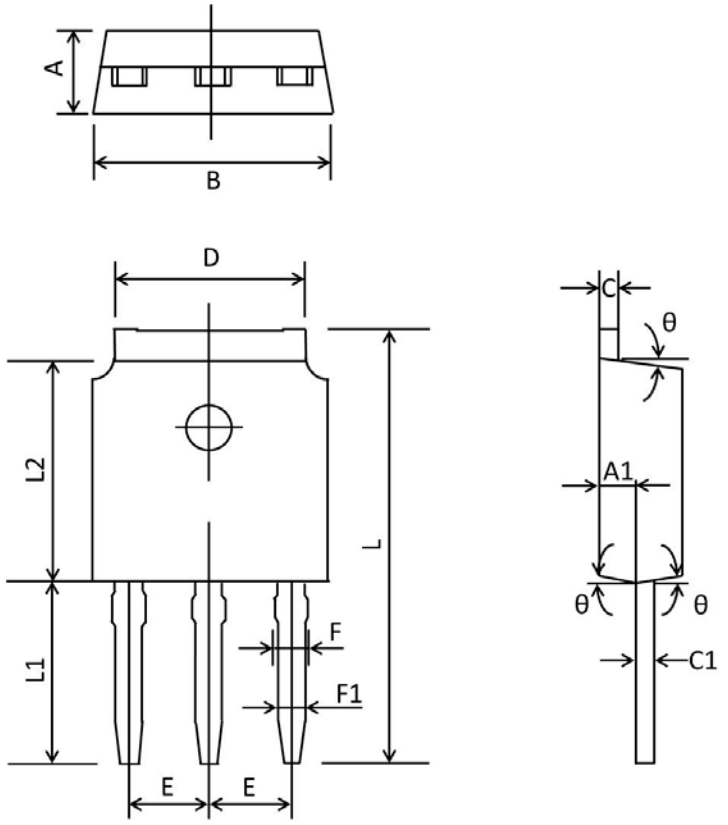


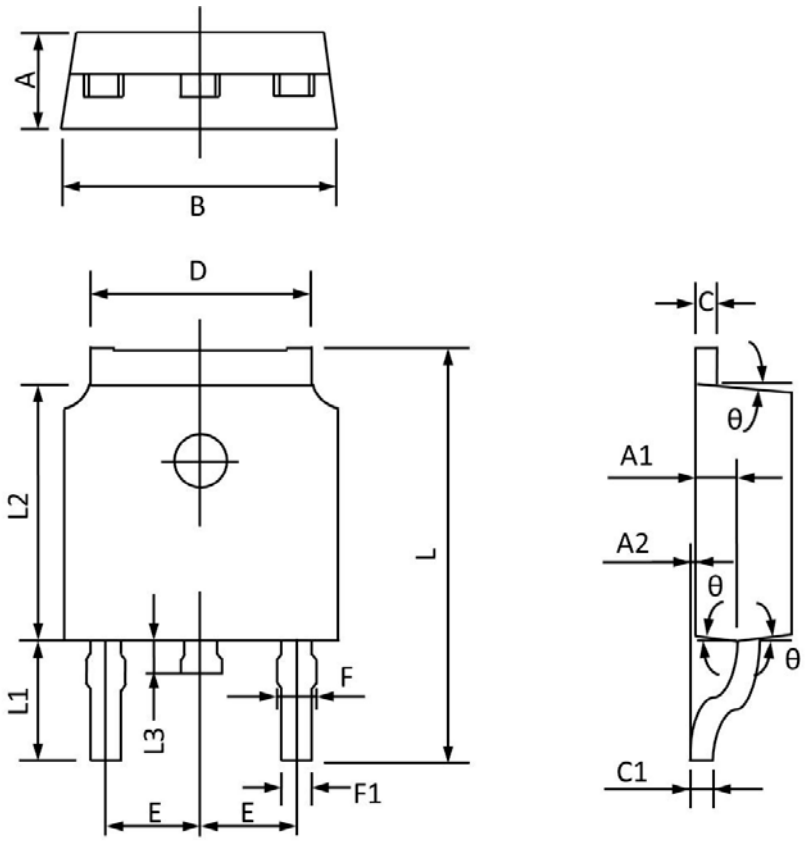
Fig.8 EAS Waveform

TO251 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	11.70	12.30	0.461	0.484
L1	4.8	5.2	0.189	0205
L2	6.00	6.20	0.236	0.244
θ	3°	9°	3°	9°

TO252 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°