

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.

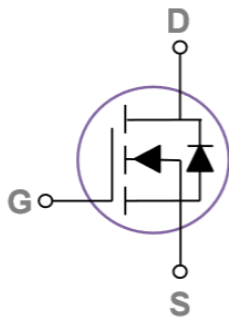
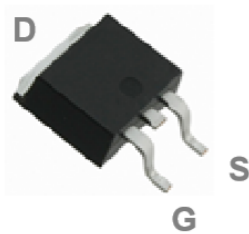
Features

- ◆ 100V, 70A, $R_{DS(ON)} = 7.8\text{m}\Omega @ V_{GS} = 10\text{V}$
- ◆ Improved dv/dt capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green Device Available

Application

- ◆ Notebook
- ◆ Load Switch
- ◆ LED applications
- ◆ Quick Charger

TO252 Pin Configuration



BVDSS	RDSON	ID
100V	7.8mΩ	70A

Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	+20 / -12	V
I_D	Drain Current – Continuous (Tc=25°C)	70	A
	Drain Current – Continuous (Tc=100°C)	44.3	A
I_{DM}	Drain Current – Pulsed ¹	280	A
EAS	Single Pulse Avalanche Energy ²	231	mJ
IAS	Single Pulse Avalanche Current ²	68	A
P_D	Power Dissipation (Tc=25°C)	104	W
	Power Dissipation – Derate above 25°C	0.84	W/°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
T_J	Operating Junction Temperature Range	-50 to 150	°C



Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.2	$^{\circ}C/W$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/T_J$	BVDSS Temperature Coefficient	Reference to 25°C, $I_D=1mA$	---	0.049	---	V/°C
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^{\circ}C$	---	---	1	μA
		$V_{DS}=80V, V_{GS}=0V, T_J=125^{\circ}C$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	100	μA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=18A$	---	6.5	7.8	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	9.0	11.6	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.5	2.5	V
$\Delta V_{GS(th)}$	VGS(th) Temperature Coefficient		---	-5.5	---	$mV/^{\circ}C$
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	15	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{3, 4}	$V_{DS}=80V, V_{GS}=10V, I_D=10A$	---	53.5	80	nC
Q_{gs}	Gate-Source Charge ^{3, 4}		---	7.5	12	
Q_{gd}	Gate-Drain Charge ^{3, 4}		---	13.3	20	
$T_{d(on)}$	Turn-On Delay Time ^{3, 4}	$V_{DD}=50V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	14.6	30	ns
T_r	Rise Time ^{3, 4}		---	32.8	66	
$T_{d(off)}$	Turn-Off Delay Time ^{3, 4}		---	62.2	125	
T_f	Fall Time ^{3, 4}		---	28.4	56	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	---	3250	6500	pF
C_{oss}	Output Capacitance		---	867	1730	
C_{rss}	Reverse Transfer Capacitance		---	58	116	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	1.25	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	70	A
I_{SM}	Pulsed Source Current		---	---	140	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}C$	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=68A., R_G=25\Omega, \text{Starting } T_J=25^\circ C.$
3. The data tested by pulsed , pulse width $\leq 300us$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

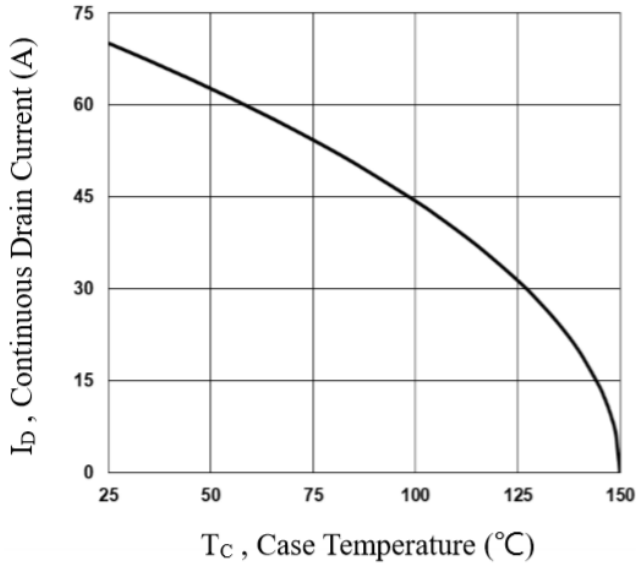


Fig.1 Continuous Drain Current vs. T_C

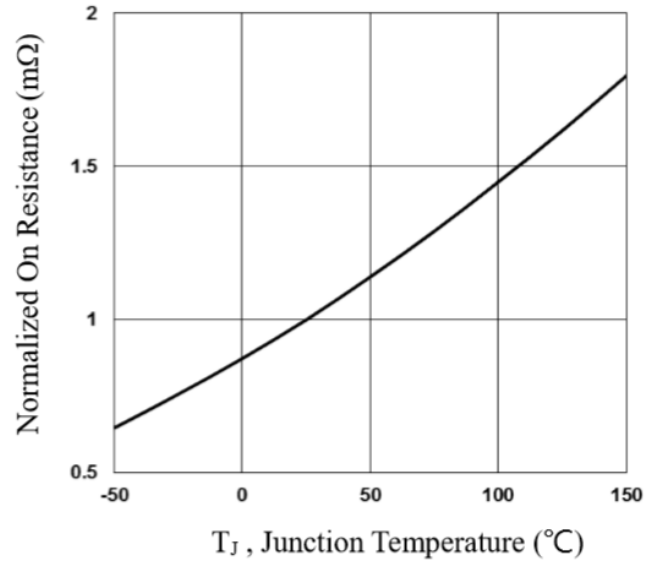


Fig.2 Normalized RDSON vs. T_J

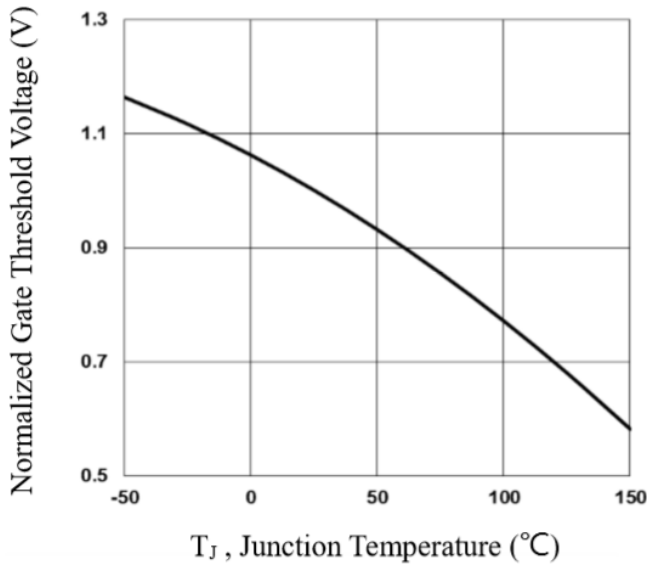


Fig.3 Normalized V_{th} vs. T_J

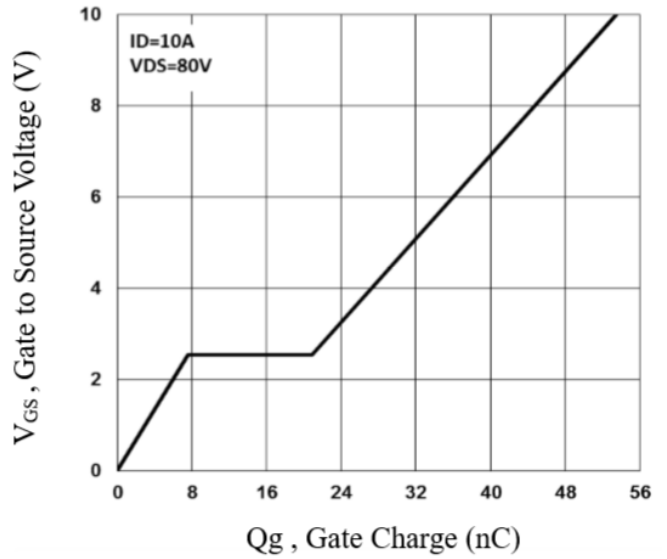


Fig.4 Gate Charge Waveform

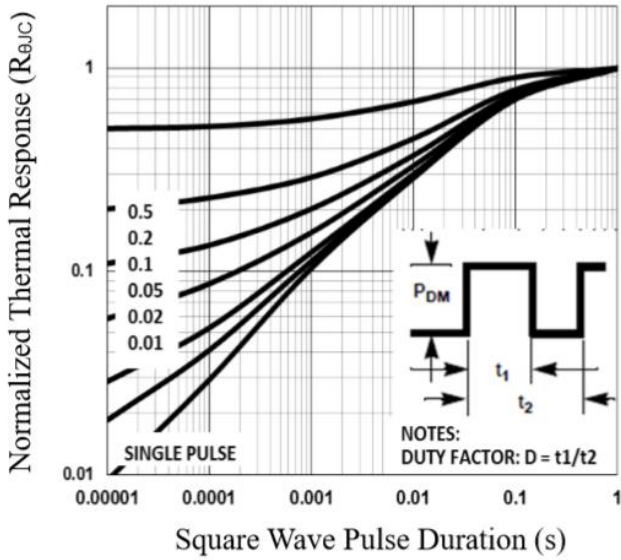


Fig.5 Normalized Transient Impedance

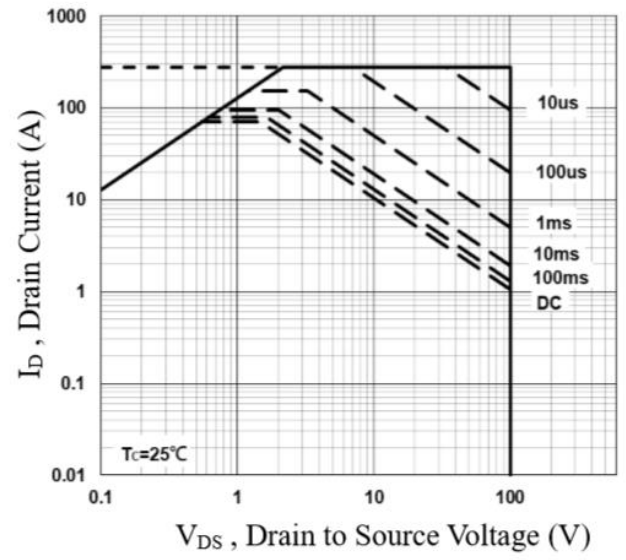


Fig.6 Maximum Safe Operation Area

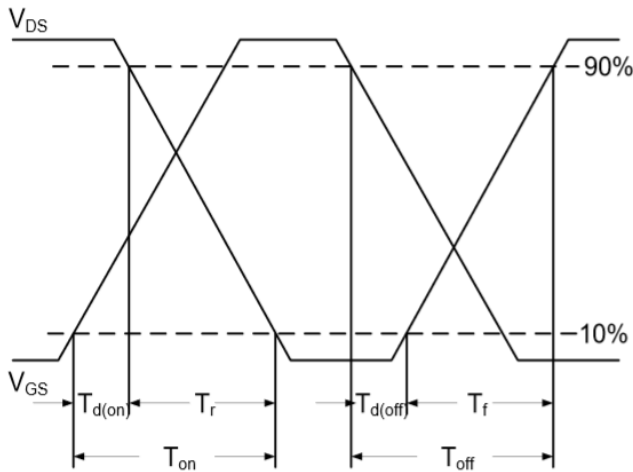


Fig.7 Switching Time Waveform

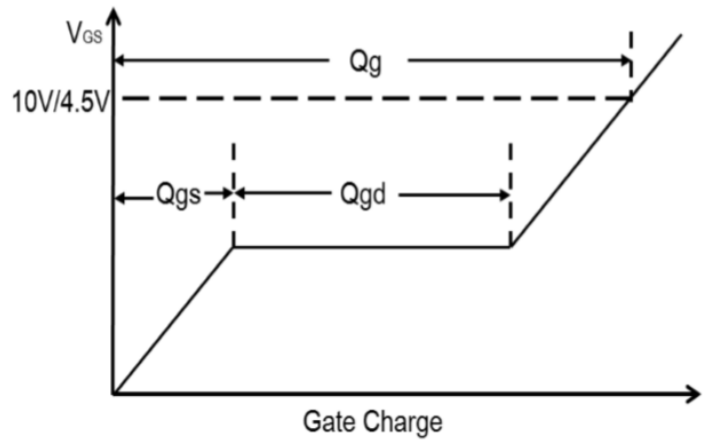


Fig.8 Gate Charge Waveform

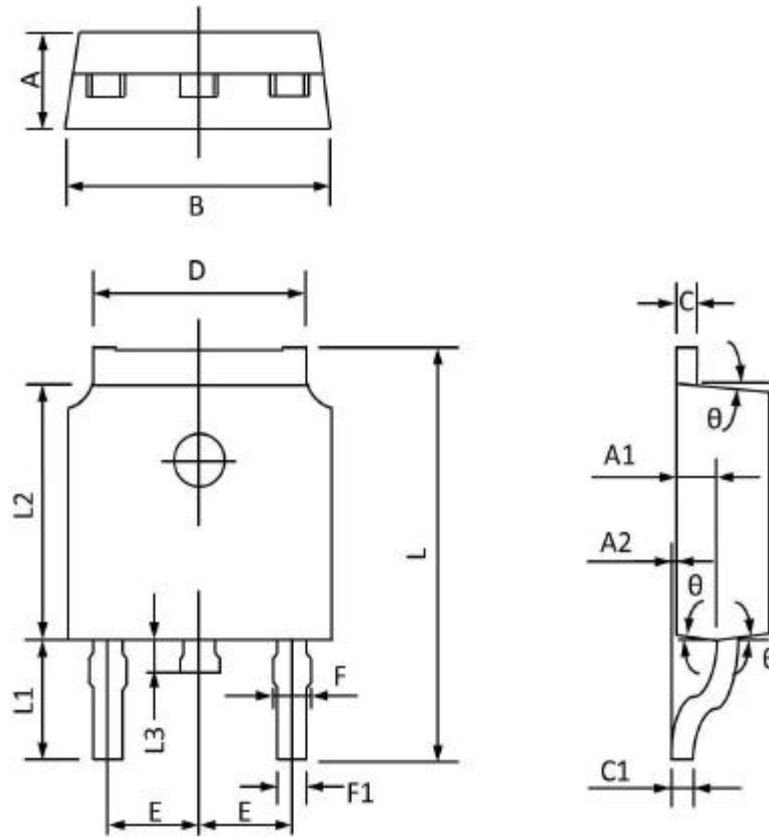
Ordering Information

ECP0978 XX X

R : Tape & Reel

AD=TO252

TO252 Package Outline Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	2.400	2.200	0.094	0.087
A1	1.110	0.910	0.044	0.036
A2	0.150	0.000	0.006	0.000
B	6.800	6.400	0.268	0.252
C	0.580	0.450	0.023	0.018
C1	0.580	0.460	0.023	0.018
D	5.500	5.100	0.217	0.201
E	2.386	2.186	0.094	0.086
F	0.940	0.600	0.037	0.024
F1	0.860	0.500	0.034	0.020
L	10.400	9.400	0.409	0.370
L1	3.000	2.400	0.118	0.094
L2	6.200	5.400	0.244	0.213
L3	1.200	0.600	0.047	0.024
θ	9°	3°	9°	3°