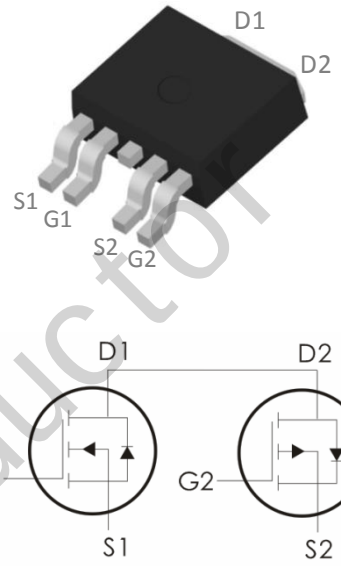
Description：

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.



Features：

N-Channel:V_{DS}=40V,I_D=20A,$R_{DS(ON)}$<25m Ω @V_{GS}=10V

$R_{DS(ON)}$<35m Ω @V_{GS}=4.5V

P-Channel: V_{DS}=-40V,I_D=-12A,$R_{DS(ON)}$<40m Ω @V_{GS}=10V

$R_{DS(ON)}$<52m Ω @V_{GS}=4.5V

1) Low gate charge.
2) Green device available.
3) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
4) Excellent package for good heat dissipation.

Absolute Maximum Ratings：(T_C=25℃ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current- T_C=25℃	20	-12	A
	Continuous Drain Current-T_C=100℃	12	-7	
I_{DM}	Pulsed Drain Current note1	70	-48	A
P_D	Power Dissipation T_C=25℃	28	20	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		℃

Thermal Characteristics：

Symbol	Parameter	Max		Units
N $R_{\theta JC}$	Thermal Resistance,Junction to Case[1]	---	4.5	℃/W
P $R_{\theta JC}$	Thermal Resistance,Junction to Case[1]	---	6	

N-CH Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=400V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics[3]						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=8A	---	17	25	mΩ
		V_{GS}=4.5V,I_D=5A	---	25	35	
Dynamic Characteristics[4]						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	620	---	pF
C_{oss}	Output Capacitance		---	65	---	
C_{rss}	Reverse Transfer Capacitance		---	55	---	
Switching Characteristics[4]						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=20V, R_L=2.5Ω R_{GEN}=3Ω, V_{GS}=10V	---	4	---	ns
t_r	Rise Time[2,3]		---	3	---	ns
$t_{d(off)}$	Turn-Off Delay Time[2,3]		---	15	---	ns
t_f	Fall Time[2,3]		---	2	---	ns
Q_g	Total Gate Charge[2,3]	V_{GS}=8V, V_{DS}=20V, I_D=10A	---	12	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	3.2	---	nC
Q_{gd}	Gate-Drain “Miller” Charge[2,3]		---	3.1	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage[3]	V_{GS}=0V,I_S=3A	---	---	1.2	V
I S	Continuous Source Current	V_G=V_D =0V Force Current	---	---	20	A

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

Typical Performance Characteristics-N

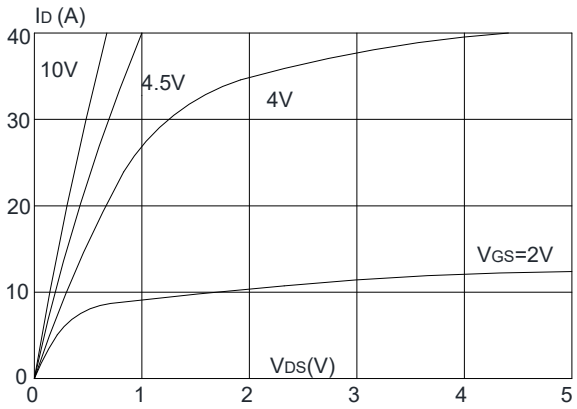


Figure1: Output Characteristics

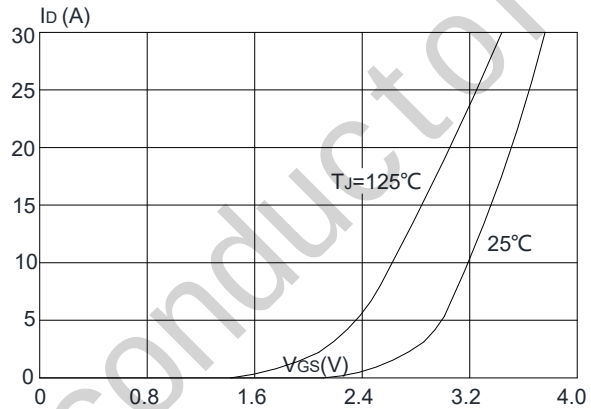


Figure 2: Typical Transfer Characteristics

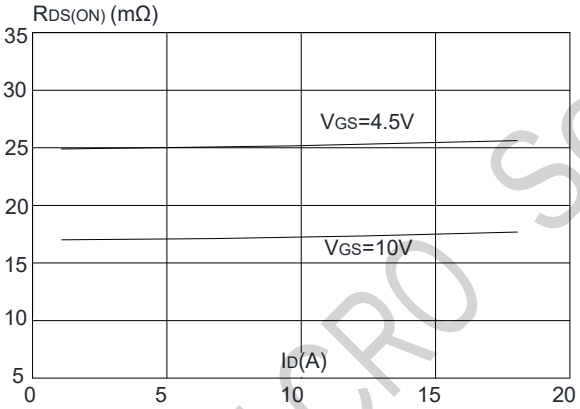


Figure 3: On-resistance vs. Drain Current

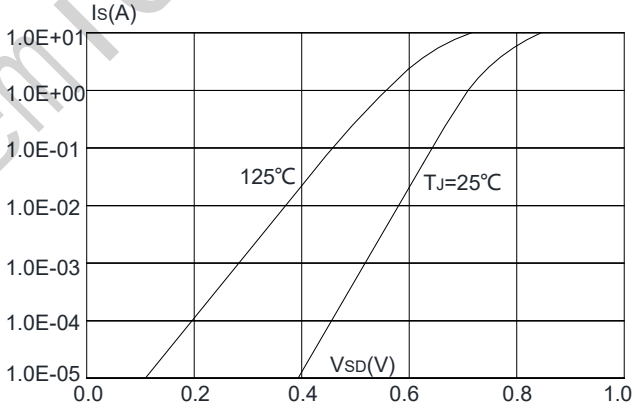


Figure 4: Body Diode Characteristics

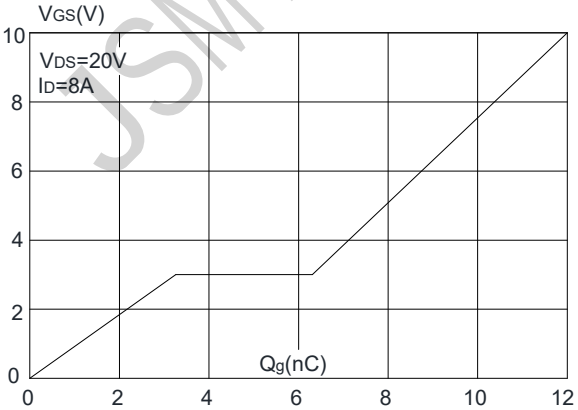


Figure 5: Gate Charge Characteristics

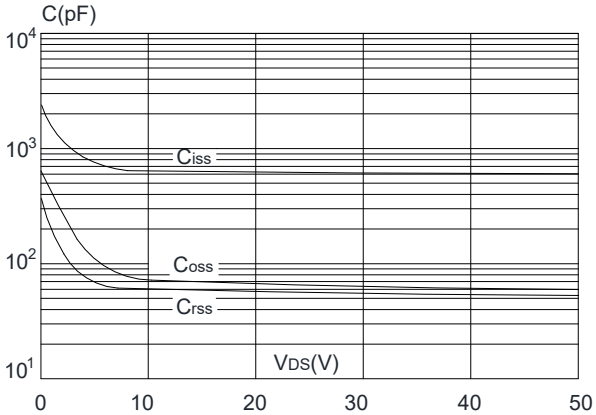


Figure 6: Capacitance Characteristics

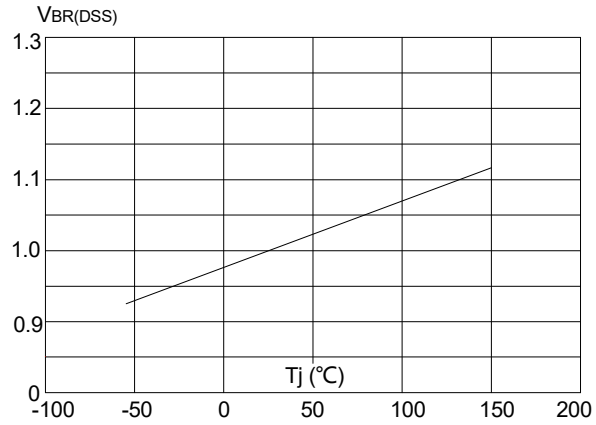


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

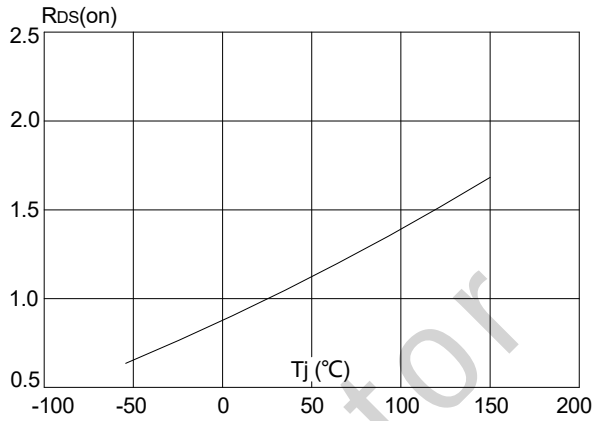


Figure 8: Normalized on Resistance vs. Junction Temperature

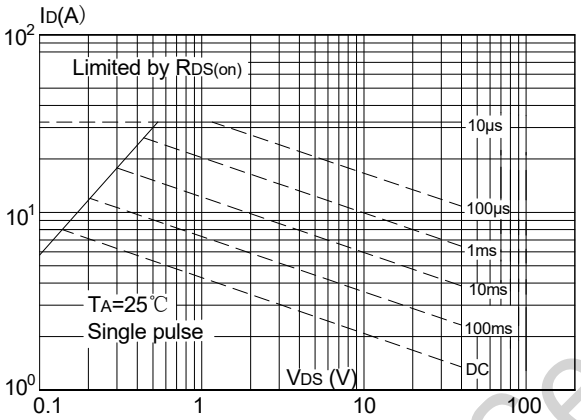


Figure 9: Maximum Safe Operating Area

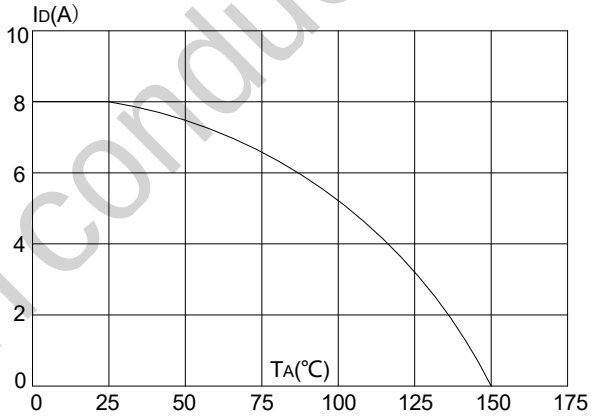


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

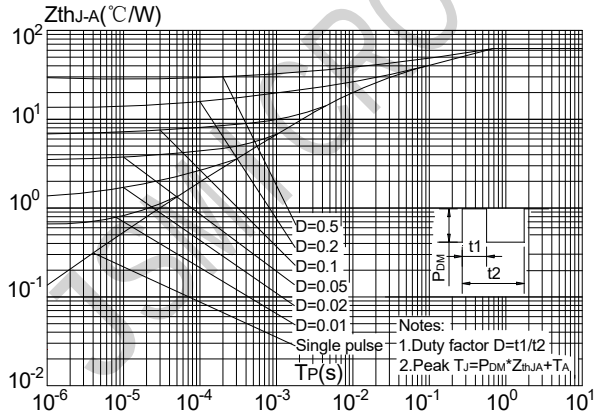


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-CH Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-40V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics[3]						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1.2	-1.6	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[2,]	V_{GS}=-10V,I_D=-5A	---	30	40	mΩ
		V_{GS}=4.5V,I_D=-4A	---	42	52	
G_{FS}	Forward Transconductance	V_{DS}=-10V, I_D=-3A	---	9	---	S
Dynamic Characteristics[4]						
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	---	1020	1570	pF
C_{oss}	Output Capacitance		---	100	150	
C_{rss}	Reverse Transfer Capacitance		---	78	118	
Switching Characteristics[4]						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=-20V, I_D=- 1A, R_{GEN}=25Ω, V_{GS}=-4.5V	---	20	40	ns
t_r	Rise Time[2,3]		---	12	24	ns
$t_{d(off)}$	Turn-Off Delay Time[2,3]		---	46	80	ns
t_f	Fall Time[2,3]		---	6	12	ns
Q_g	Total Gate Charge[2,3]	V_{GS}=-4.5V, V_{DS}=20V, I_D=-5A	---	9	15	nC
Q_{gs}	Gate-Source Charge[2,3]		---	2.5	5	nC
Q_{gd}	Gate-Drain “Miller” Charge[2,3]		---	3.2	7	nC
Drain-Source Diode Characteristics						
V_{SD}	Source -Drain Diode Forward Voltage	V GS=0V,I S=-1A	---	---	-1.0	V
Is	Continuous Source Current	VG=VD=0V , Force Current	---	---	-12	A
Ism	Pulsed Source Current		---	---	-24	A

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

Typical Performance Characteristics-P

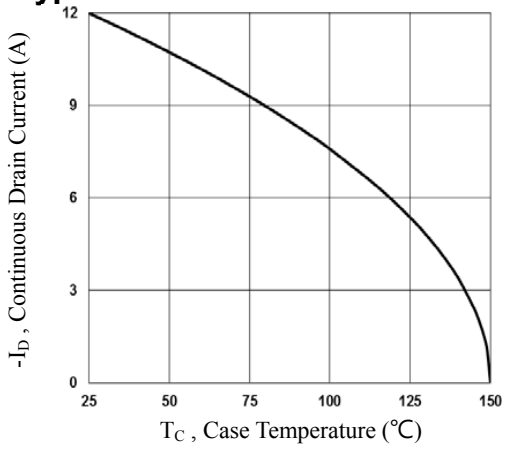


Fig.1 Continuous Drain Current vs. T_C

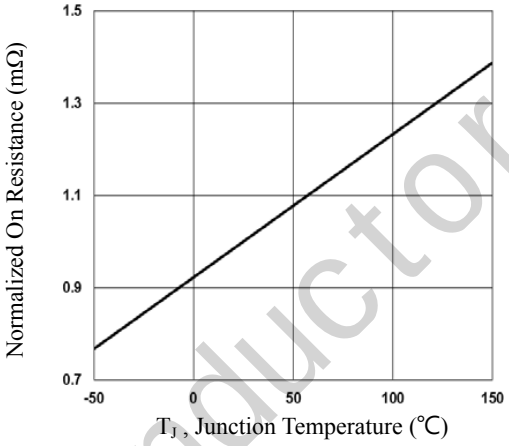


Fig.2 Normalized RDSON vs. T_J

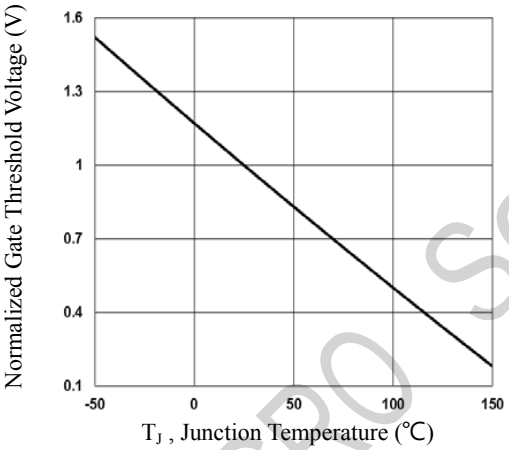


Fig.3 Normalized V_{th} vs. T_J

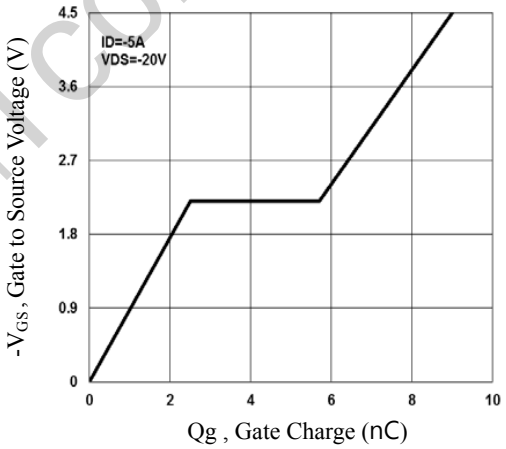


Fig.4 Gate Charge Waveform

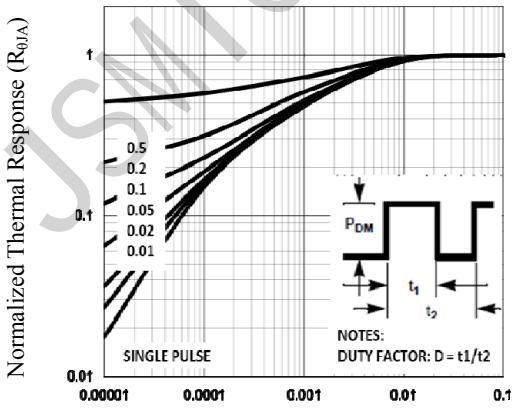


Fig.5 Normalized Transient Impedance

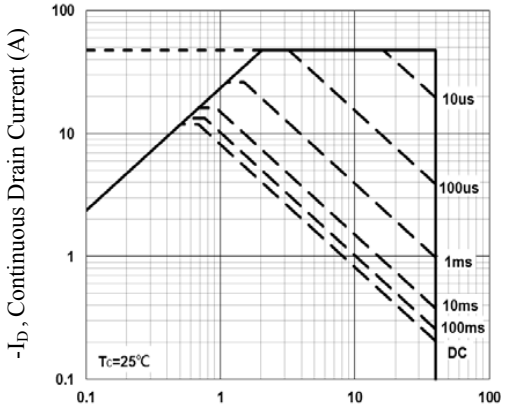
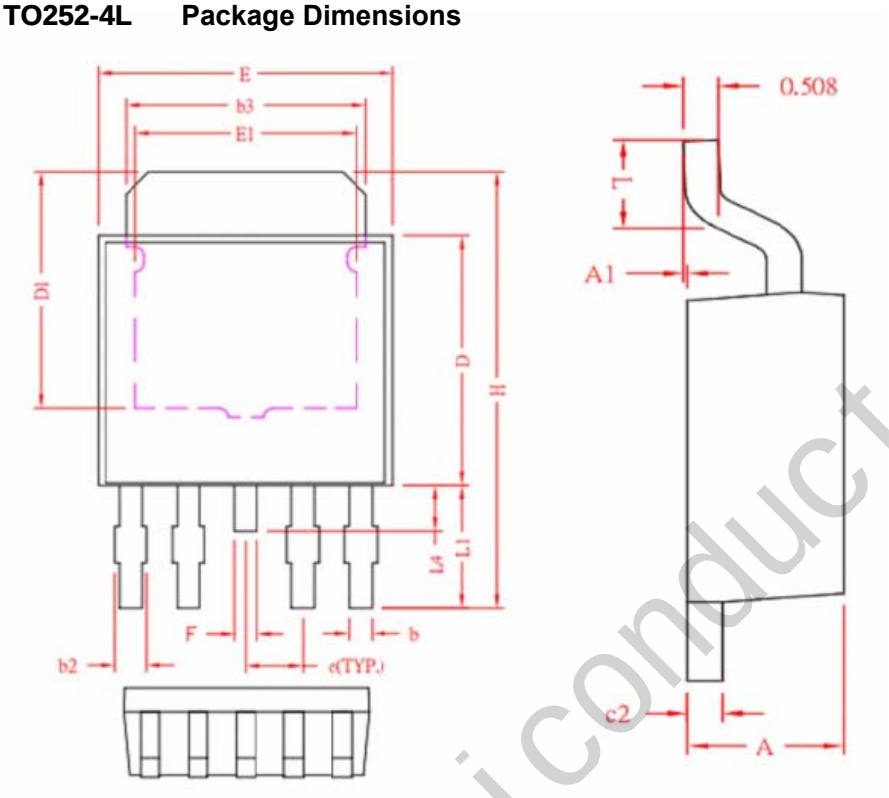


Fig.6 Maximum Safe Operation Area

外形尺寸图 / TO252-4L Package Dimensions



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0	0.08	0.15
b	0.45	0.53	0.60
b2	0.50	0.65	0.80
b3	5.20	5.35	5.50
c2	0.45	0.50	0.55
D	5.40	5.60	5.80
D1	4.57	-	-
E	6.40	6.60	6.80
E1	3.81	-	-
e	1.27 REF.		
F	0.40	0.50	0.60
H	9.40	9.80	10.20
L	1.40	1.59	1.77
L1	2.40	2.70	3.00
L4	0.80	1.00	1.20