

MOSFET

150A ,30V ,3.4mΩ N-CHANNEL MOSFET

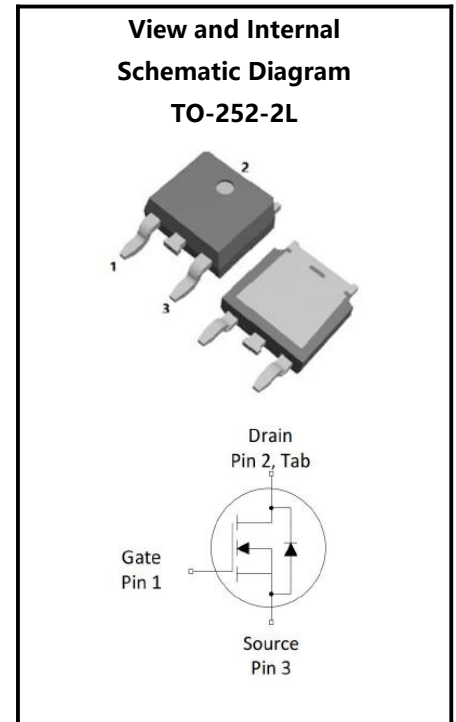
Features

- ◆ Low gate charge
- ◆ Low Ciss
- ◆ Fast switching
- ◆ 100% avalanche tested

Applications

- ◆ Synchronous Rectification for AC/DC Quick Charger
- ◆ Battery management
- ◆ UPS(Uninterruptible Power Supplies)

Parameter	Values	Unit
BV_{dss}	30	V
I_d	150	A
$R_{dson(max)}$	3.4	mΩ
$V_{GS(th)}$ (typ)	1.4	V



Ordering Code	Marking	Package	Packaging
X3P4N030TLE2B	X3P4N030TLE2B	TO-252-2L	Tape and reel

Absolute Maximum Ratings($T_C=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Voltage	V_{DSS}	-	-	30	V	-
Gate-Source Voltage	V_{GS}	-20	-	20	V	-
Continuous Drain Current (Note 1)	I_D	-	-	150	A	$T_C=25^{\circ}\text{C}$
		-	-	97	A	$T_C=100^{\circ}\text{C}$
Pulsed Drain Current(Note 2)	I_{DM}	-	-	600	A	-
Single Pulse Avalanche Energy	E_{AS}	-	-	306	mJ	$L=0.5\text{mH}, V_D=24\text{V}, T_C=25^{\circ}\text{C}$
Maximum Power Dissipation	P_D	-	-	130	W	$T_C=25^{\circ}\text{C}$
		-	-	3	W	$T_A=25^{\circ}\text{C}$
Operating Junction and Storage Temperature Range	T_{j}, T_{STG}	-55	-	150	$^{\circ}\text{C}$	-

Thermal Characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Thermal resistance , Junction to Case	$R_{th(J-C)}$	-	0.96	-	$^{\circ}\text{C}/\text{W}$	-
Thermal resistance , Junction to Ambient	$R_{th(J-A)}$	-	41	-	$^{\circ}\text{C}/\text{W}$	-

Electrical Characteristics (T_j=25°C, unless otherwise noted)

Static characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Breakdown Voltage	BV _{DSS}	30	-	-	V	V _{GS} =0V, I _D =250μA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	μA	V _{DS} =30V, V _{GS} =0V
Gate-Body Leakage Current, Forward	I _{GSSF}	-	-	100	nA	V _{GS} =20V, V _{DS} =0V
Gate-Body Leakage Current, Reverse	I _{GSSR}	-	-	-100	nA	V _{GS} =-20V, V _{DS} =0V
Gate-Source Threshold Voltage	V _{GS(th)}	1.0	-	2.2	V	V _{DS} =V _{GS} , I _D =250μA
Drain-Source On-State Resistance	R _{DS(on)}	-	2.6	3.4	mΩ	V _{GS} =10V, I _D =20A
		-	3.8	6.0	mΩ	V _{GS} =4.5V, I _D =20A
Gate Resistance	R _g	-	2.5	-	Ω	V _{GS} =0V, V _{DS} =0V, f=1MHz
Forward Transconductance	g _{fs}	-	33	-	S	V _{DS} =3V, I _D =20A

Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	C _{iss}	-	3900	-	pF	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ
Output Capacitance	C _{oss}	-	387	-		
Reverse Transfer Capacitance	C _{rss}	-	375	-		
Turn-On Delay Time	t _{d(on)}	-	18	-	ns	V _{DD} =15V, R _G =10Ω, V _{GS} =10V, I _D =20A
Turn-On Rise Time	t _r	-	74	-		
Turn-Off Delay Time	t _{d(off)}	-	188	-		
Turn-Off Fall Time	t _f	-	105	-		

Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	Q _g	-	83	-	nC	V _{DS} =24V, I _D =20A, V _{GS} =10V
Gate-Source Charge	Q _{gs}	-	16	-		
Gate-Drain Charge	Q _{gd}	-	17	-		

Reverse diode

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	I _S	-	-	150	A	-
Pulsed Diode Forward Current	I _{SM}	-	-	600	A	-
Diode Forward Voltage	V _{SD}	-	-	1.2	V	I _S =20A, V _{GS} =0V
Reverse Recovery Time	t _{rr}	-	44	-	ns	V _{GS} =0V, I _S =1A
Reverse Recovery Charge	Q _{rr}	-	35	-	nC	di/dt=100A/μs, T _j =25°C

Notes

1. Computed continuous current assumes the condition of T_{j,Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{j,Max} = 150°C.

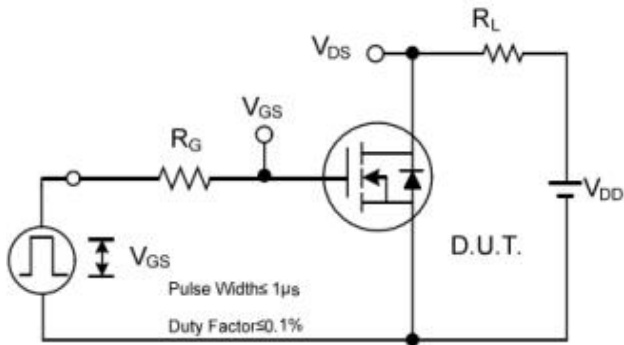
RATING AND CHARACTERISTIC CURVES



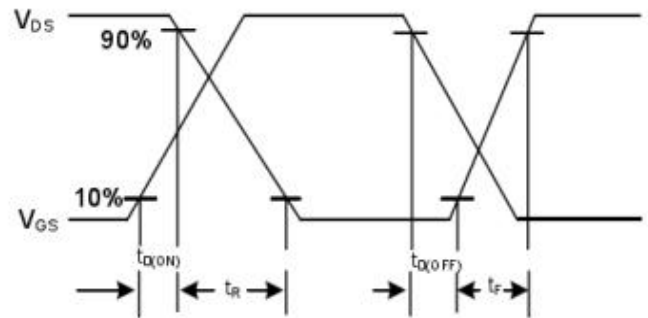
Peak Diode Recovery dv/dt Test Circuit



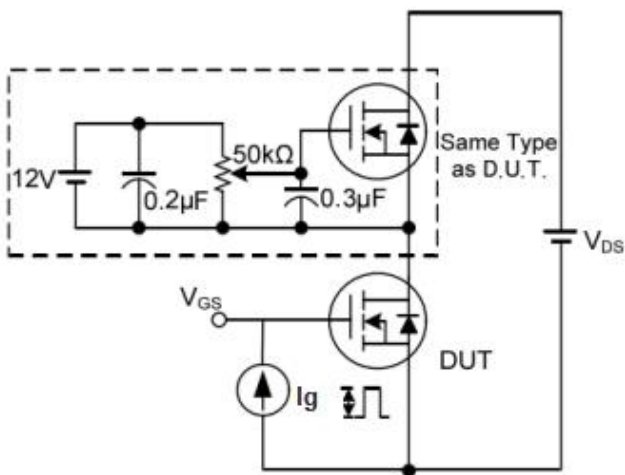
Peak Diode Recovery dv/dt Waveforms



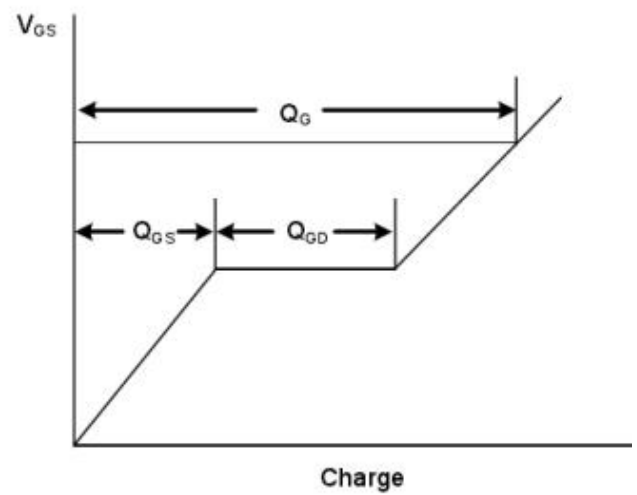
Switching Test Circuit



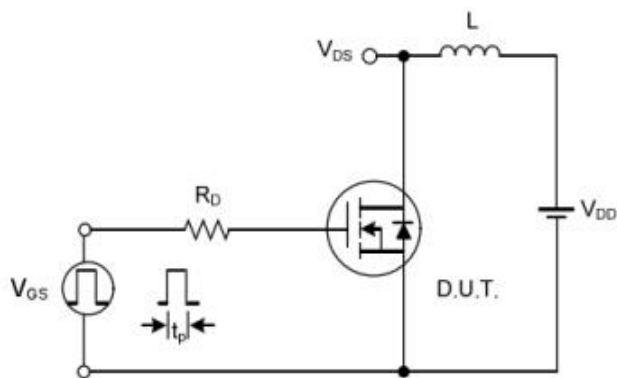
Switching Waveforms



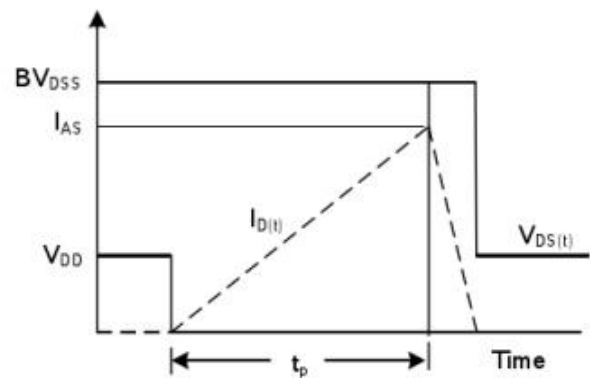
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

RATING AND CHARACTERISTIC CURVES

Figure.1 Output Characteristics $T_J=25^\circ\text{C}$

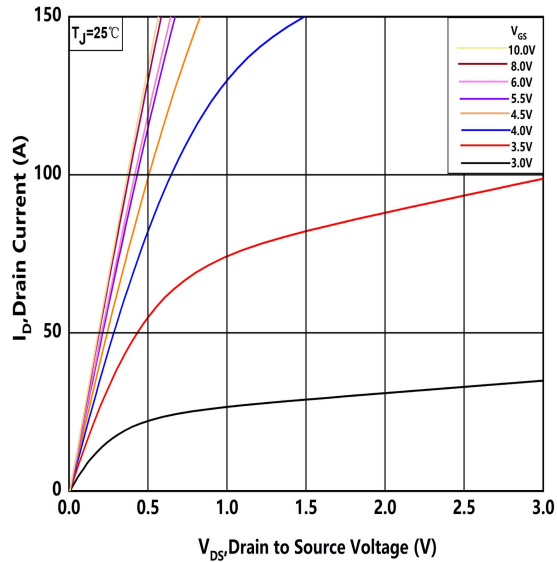


Figure.2 Transfer Characteristic for Various Junction Temperatures

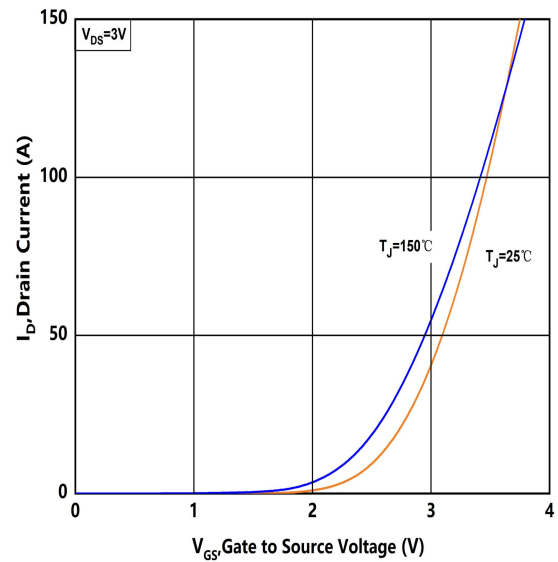


Figure.3 On-Resistance vs Drain Current For Various Gate Voltage

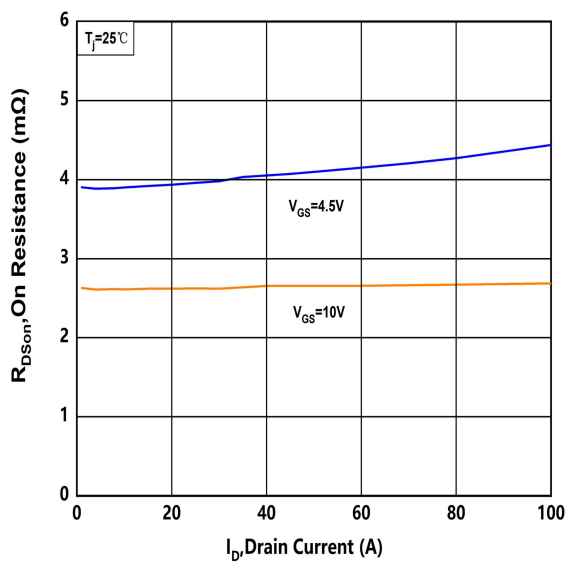


Figure4 Typical On-Resistance vs Junction Temperature

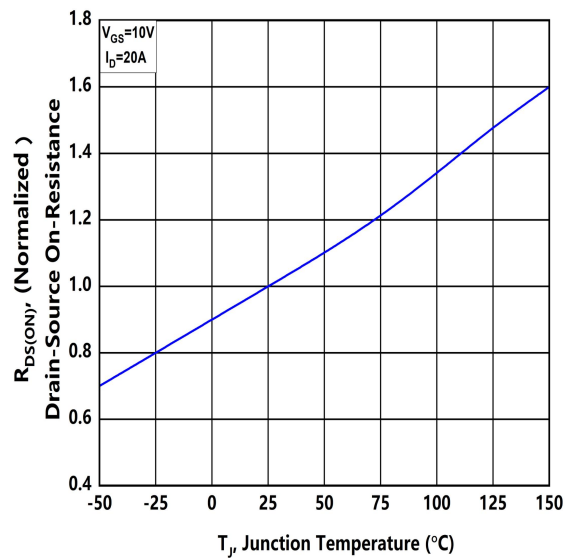


Figure.5 Typical Threshold Voltage vs Junction Temperature

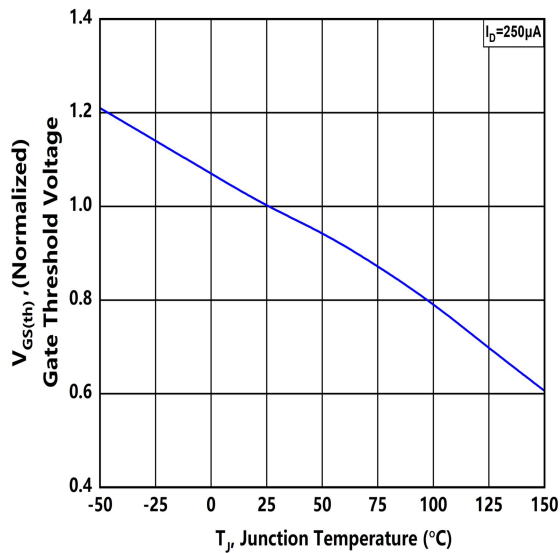


Figure.6 Typical Breakdown Voltage vs Junction Temperature

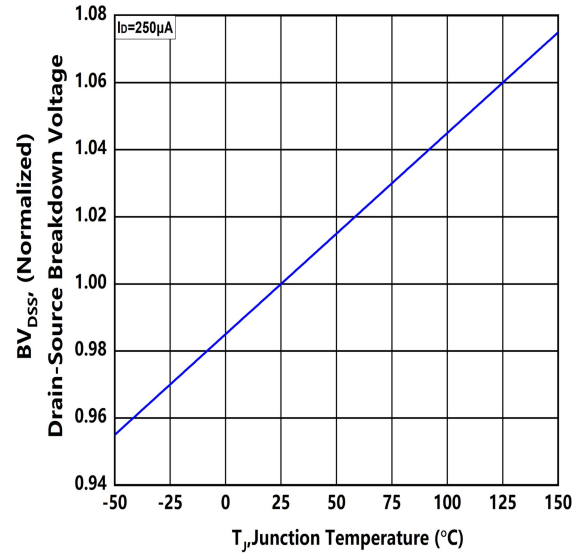


Figure.7 Typical Capacitance vs Drain to Source Voltage

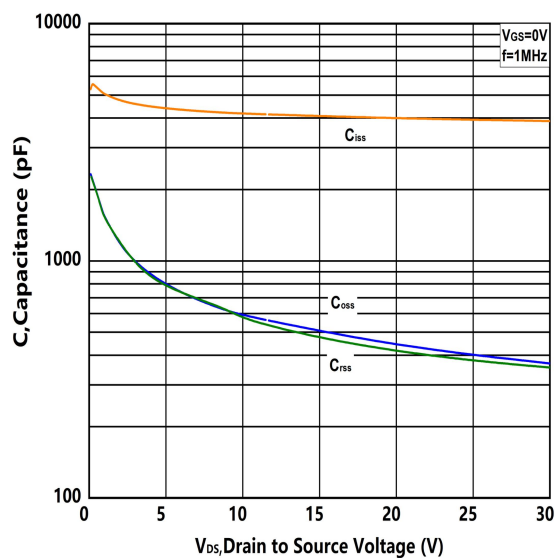


Figure.8 Typical Gate Charge vs Gate to Source Voltage

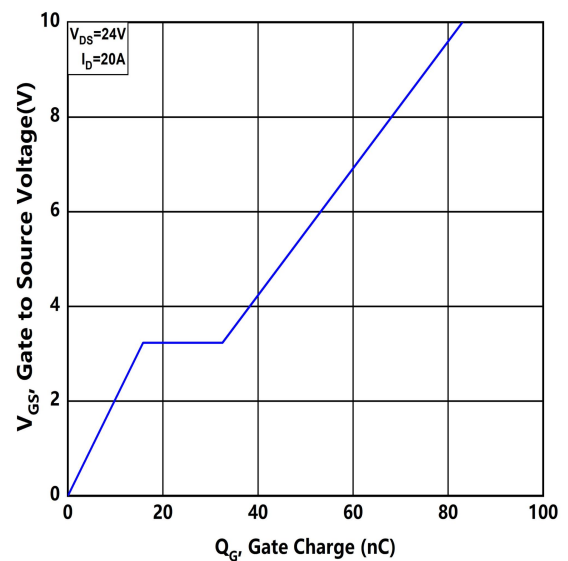


Figure.9 Typical Body Diode Characteristics

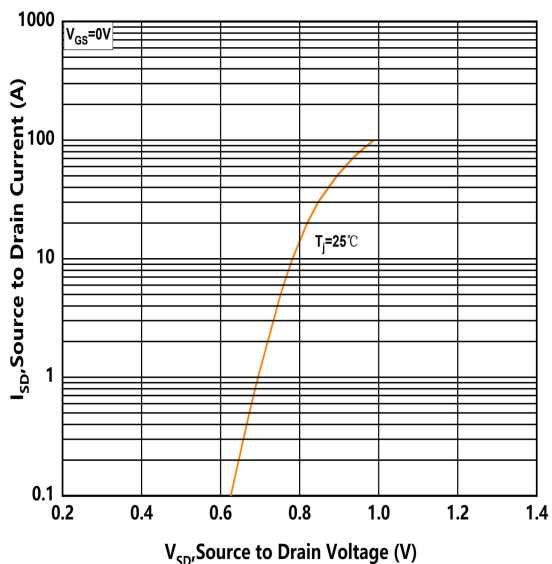


Figure.10 Maximum Power Dissipation Derating vs Case Temperature

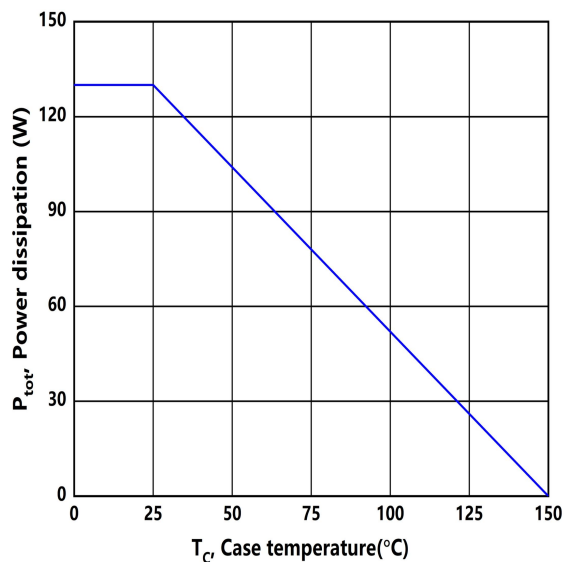


Figure.11 Continuous Drain Current Derating vs Case Temperature

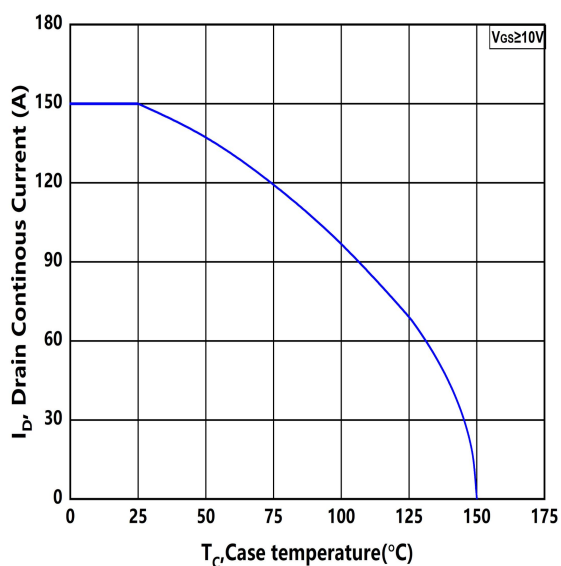


Figure.12 Safe Operating Area

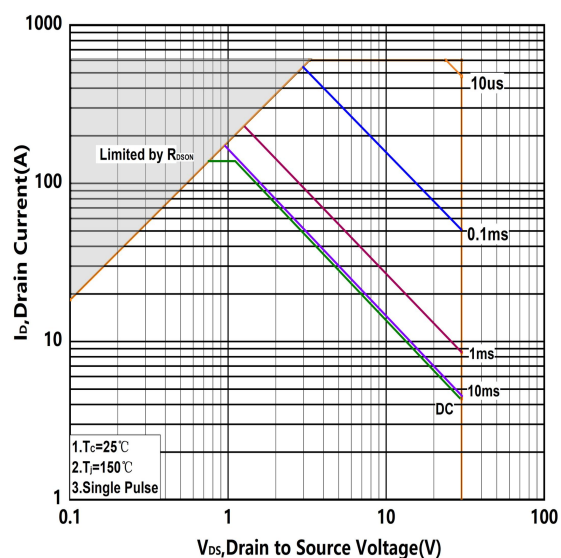
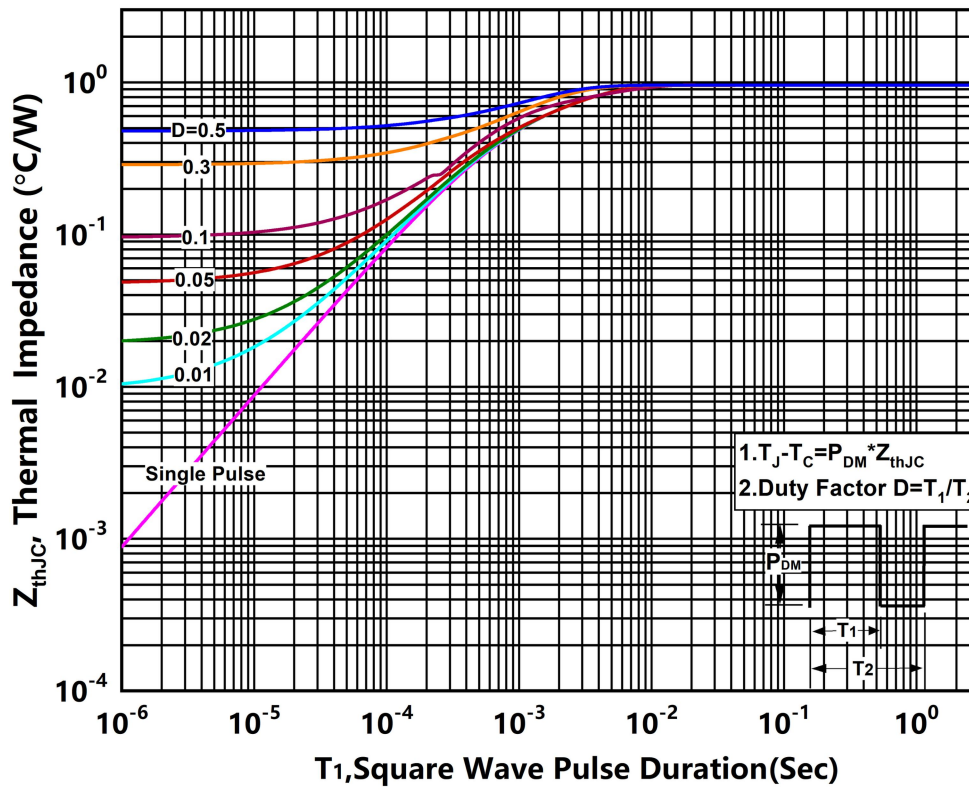
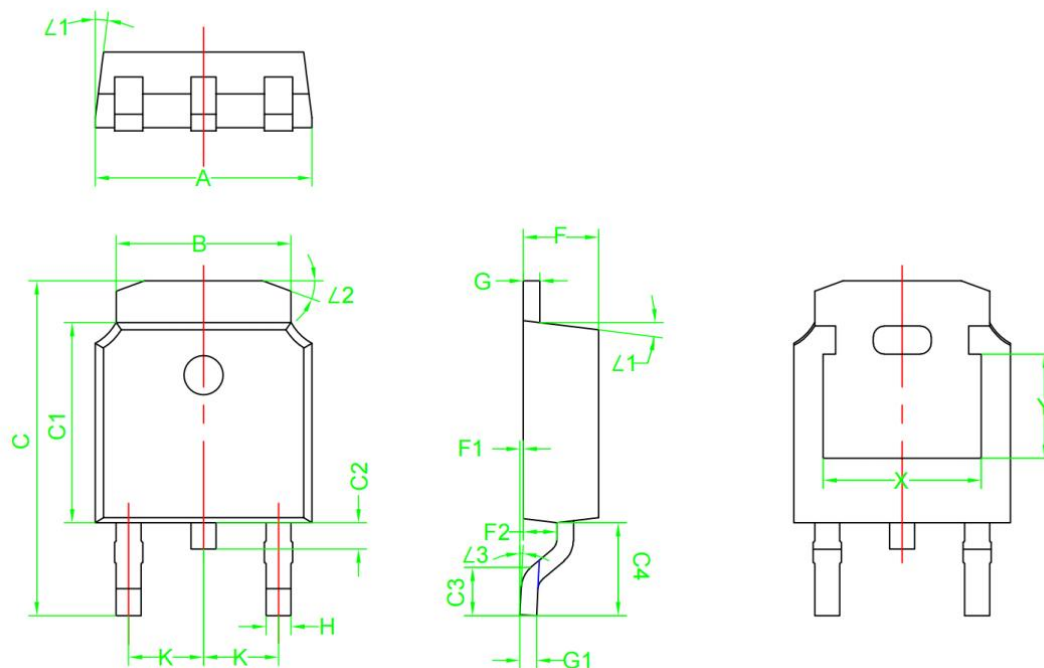


Figure.14 Transient Thermal Impedance (Junction - Case)



Package Outline:TO-252-2L



DIMENSIONS(unit:mm)		
Symbol	MIN	MAX
A	6.500	6.700
B	5.230	5.430
C	10.000	10.400
C1	6.000	6.200
C2	0.600	0.900
F	2.200	2.400
F1	0	0.100
F2	0.930	1.130
G	0.460	0.560
∠1	6°	8°
H	0.710	0.810
K	2.250	2.350
∠2	15°	20°
C3	1.350	1.650
G1	0.460	0.560
∠3	0°	5°
C4	2.800REF	
X	4.650	4.850
Y	3.000	3.200