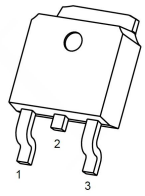
TO-252-2L Plastic-Encapsulate MOSFET

SZCJ

)4AL N-Channel Power MOSFET

TO-252-2L



1. GATE
2. DRAIN
3. SOURCE

Key Performance Parameters

$V_{BR(DSS)}$	$R_{DS(on)}$TYP	I_D
40V	3.8mΩ@10V	80A
	7.0mΩ@4.5V	

DESCRIPTION

The N-Channel enhancement mode power field effect transistors is using SGT 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.

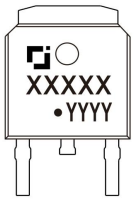
FEATURES

- 100% Avalanche tested
- Low drain-source on-resistance
- Low gate charge
- High current capability

APPLICATIONS

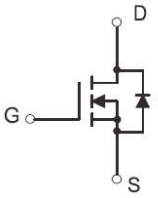
- DC/DC
- Switching application

MARKING



XXXXX = 6R0SN04AL
Solid dot = Pin1 indicator.
YYYY = Code.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C =25℃	I_D	80	A
	T_C =100℃		50.5	
Pulsed Drain Current		I_{DM}①②	320	A
Continuous Drain Current	T_A =25℃	I_D	15.3	A
	T_A =75℃		11.9	
Avalanche Current		I_{AS}③	18	A
Single Pulsed Avalanche Energy		E_{AS}③	81	mJ
Power Dissipation		P_D①	76	W
Operating Junction and Storage Temperature Range		T_J,T_{stg}	-55~+150	℃

Thermal Characteristics

Parameter	Symbol	Value		Unit
		Typ	Max	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.10	1.65	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$⑥	42	62.5	℃/W

Typical Characteristics

ELECTRICAL CHARACTERISTICS (T_J=25℃ unless otherwise specified)

Static Characteristics

Parameter	Symbol	Test Condition		Value			Unit
				Min	Typ	Max	
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA		40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=40V, V_{GS}=0V	T_J=25℃	-	-	1.0	μA
			T_J=125℃	-	-	100	
Gate-body leakage current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V		-	-	±100	nA
Gate-threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA		1.5	2.0	2.5	V
Static drain-source on-sate resistance	$R_{DS(on)}$④	V_{GS}=10V, I_D=20A	T_J=25℃	-	3.8	5.0	mΩ
			T_J=125℃	-	5.9	7.8	
		V_{GS}=4.5V, I_D=20A		-	7.0	9.8	
Forward transconductance	g_{FS}	V_{DS}=5V, I_D=20A		-	59	-	S

Dynamic Characteristics⑤

Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=20V, f=1MHz	-	1483	-	pF
Output capacitance	C_{oss}		-	362	-	
Reverse transfer capacitance	C_{rss}		-	17	-	
Gate resistance	R_g	f=1MHz	-	1.7	-	Ω
Total gate charge	Q_g	V_{GS}=4.5V, V_{DS}=20V, I_D=20A	-	10.1	-	nC
Total gate charge	Q_g	V_{GS}=10V, V_{DS}=20V, I_D=20A	-	21.8	-	
Gate charge at threshold	$Q_{G(th)}$		-	3.2	-	
Gate-source charge	Q_{gs}		-	4.9	-	
Gate-drain charge	Q_{gd}		-	3.6	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, V_{GS}=10V, I_D=20A, R_g=10Ω	-	8.4	-	ns
Turn-on rise time	t_r		-	8.2	-	
Turn-off delay time	$t_{d(off)}$		-	30.9	-	
Turn-off fall time	t_f		-	12.4	-	

Reverse Diode Characteristics

Drain-source diode forward voltage	V_{SD}④	V_{GS}=0V, I_S=20A	-	-	1.0	V
Continuous drain-source diode forward current	I_S①		-	-	80	A
Pulsed drain-source diode forward current	I_{SM}①②		-	-	320	A
Reverse recovery time	t_{rr}	V_{DD}=20V, I_S=20A, di/dt=100A/μs	-	14.5	-	ns
Reverse recovery charge	Q_{rr}		-	6.8	-	nC

Notes:

①.T_C=25℃ Limited only by maximum temperature allowed.

②.P_W ≤10μs, Duty cycle ≤1%.

③.EAS condition: V_{DD}=30V, V_{GS}=10V, L=0.5mH, R_g=25Ω Starting T_J=25℃.

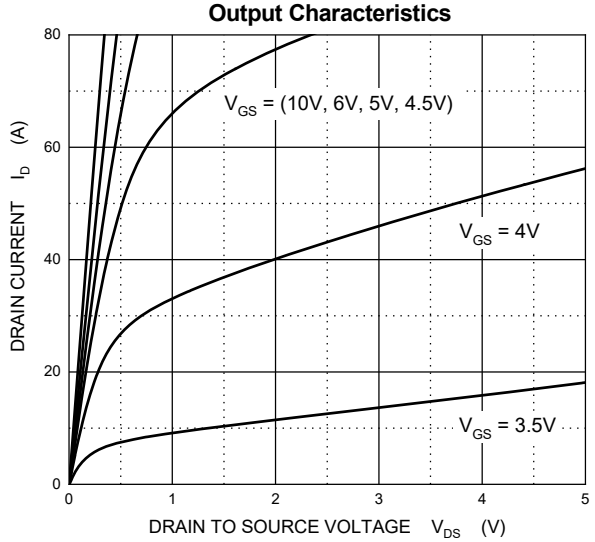
④.Pulse Test : Pulse Width ≤380μs, duty cycle ≤2%.

⑤.Guaranteed by design, not subject to production.

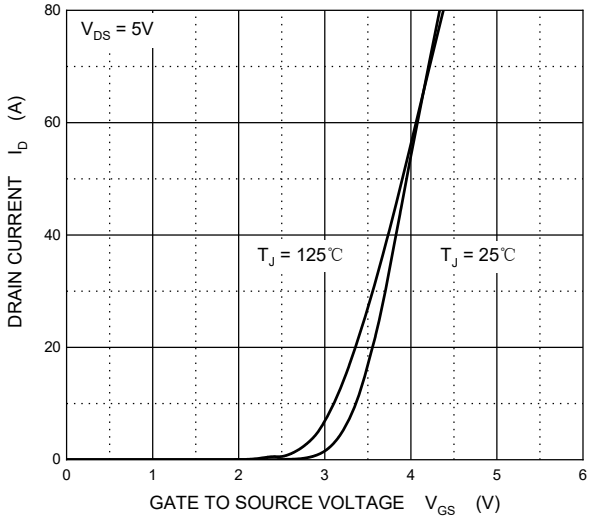
⑥.Device mounted on 1 in^2 FR-4 board with 2oz. double-sided Copper, in a still air environment with T_A=25℃.

Typical Characteristics

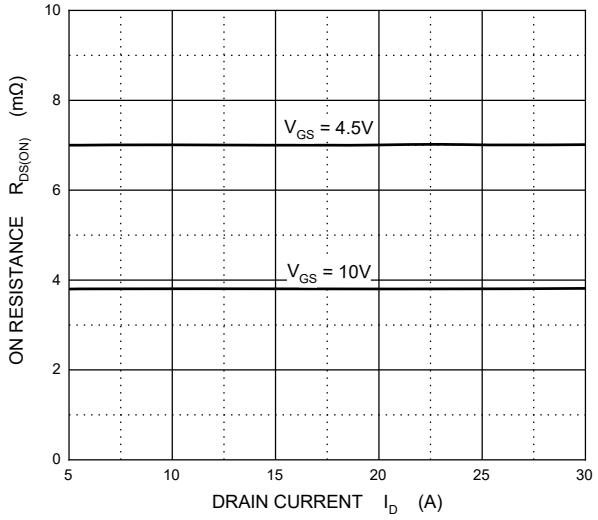
Output Characteristics



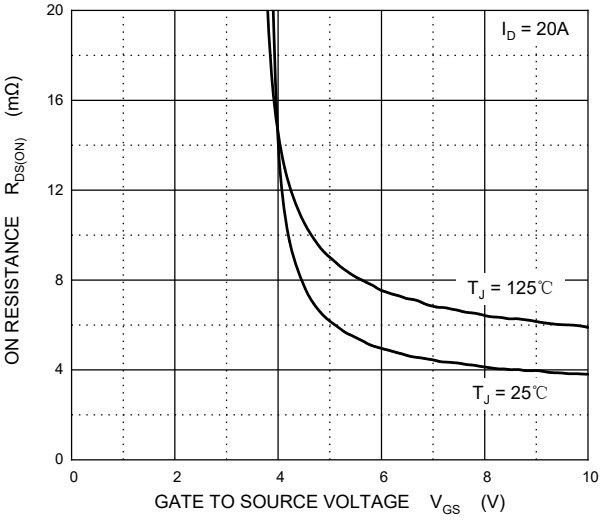
Transfer Characteristics



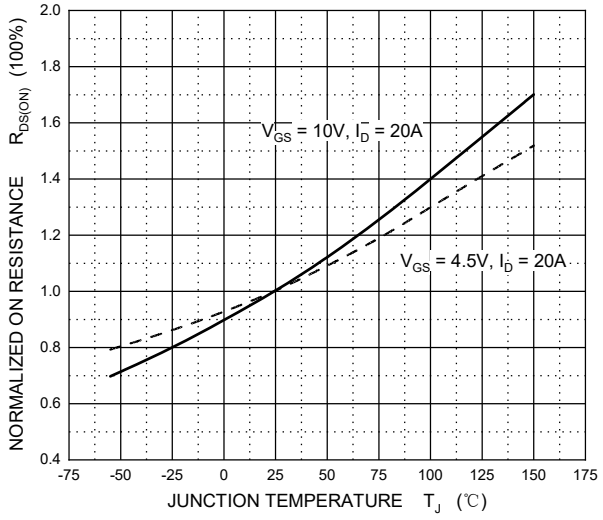
On Resistance vs. Drain Current



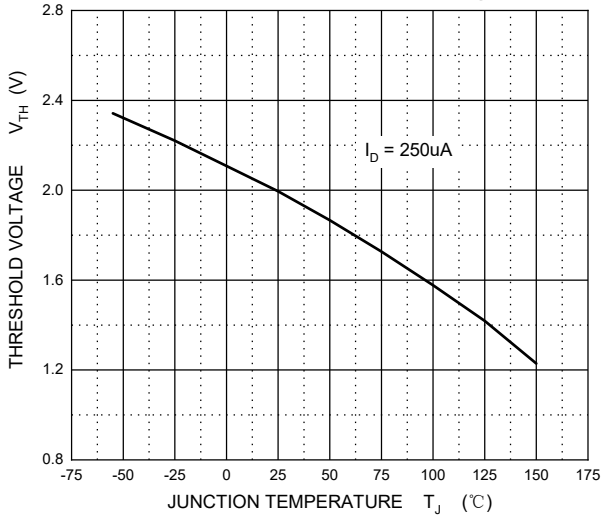
On Resistance vs. Gate-Source Bias



On Resistance vs. Junction Temperature

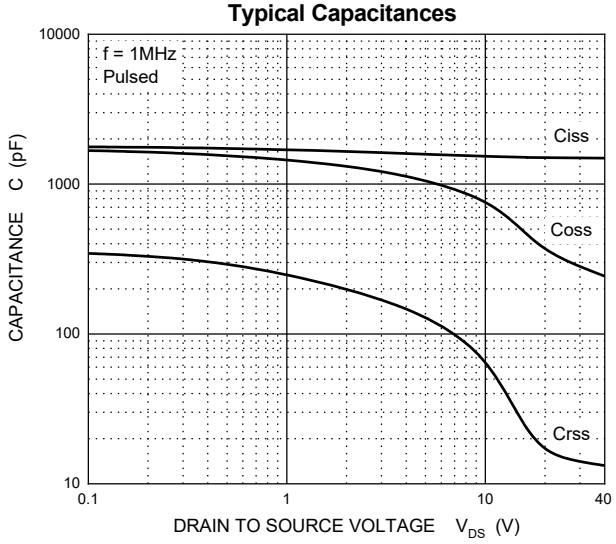


Gate-Source Threshold Voltage

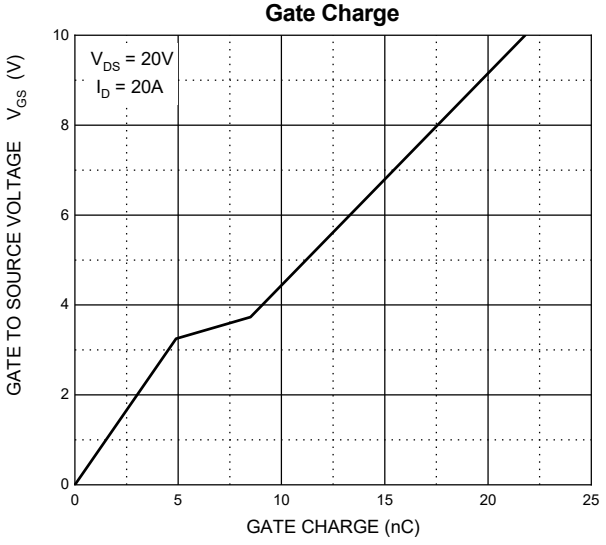


Typical Characteristics

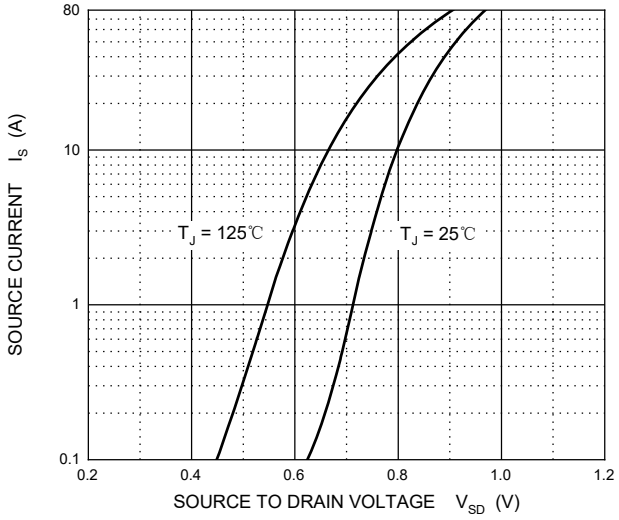
Typical Capacitances



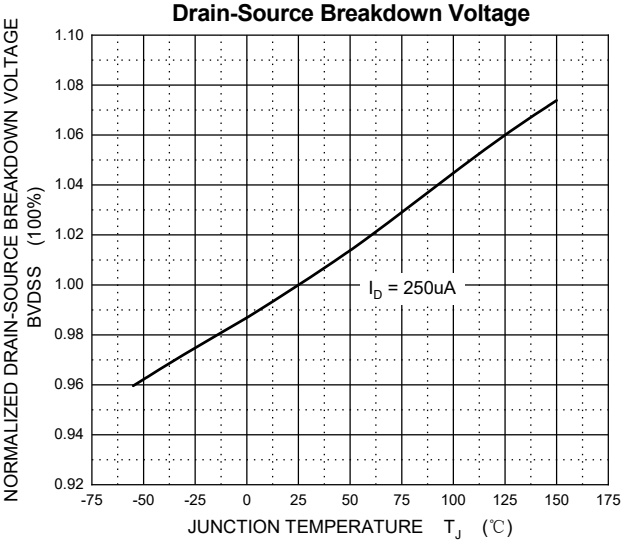
Gate Charge



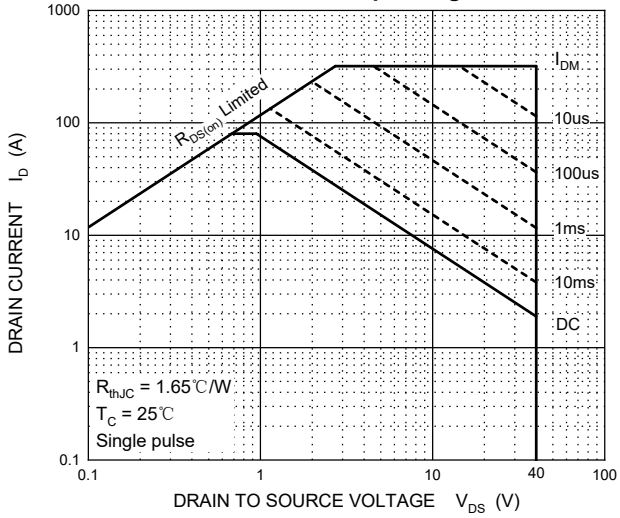
Source-Drain Diode Forward Characteristics



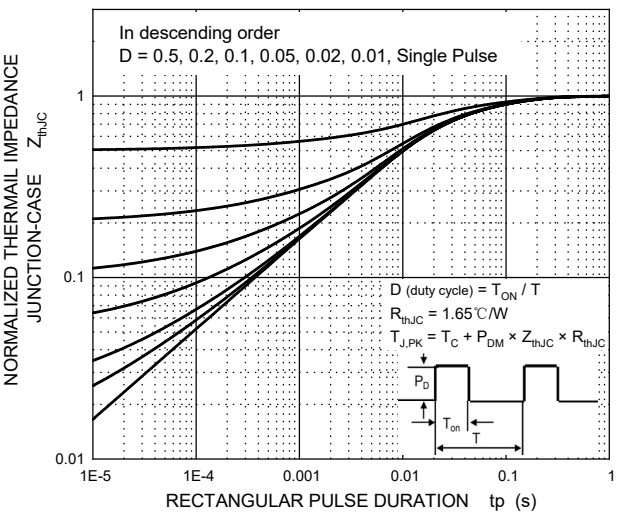
Drain-Source Breakdown Voltage



Maximum Safe Operating Area

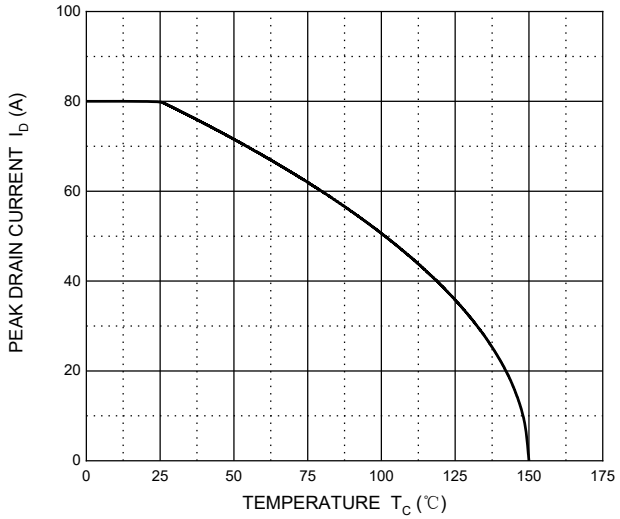


Transient Thermal Impedance, Junction-Case

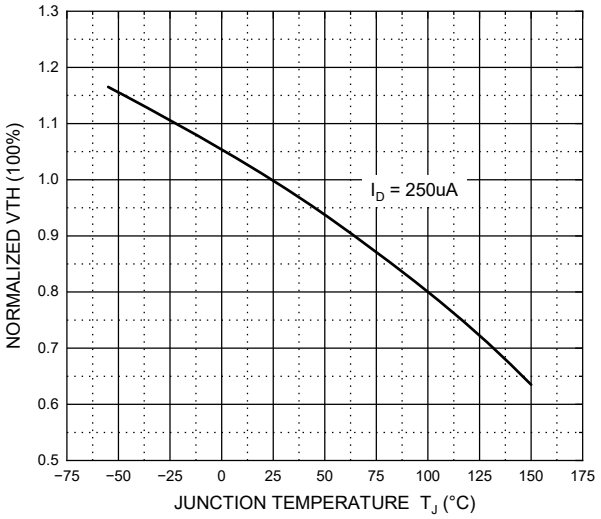


Typical Characteristics

ID vs. TC

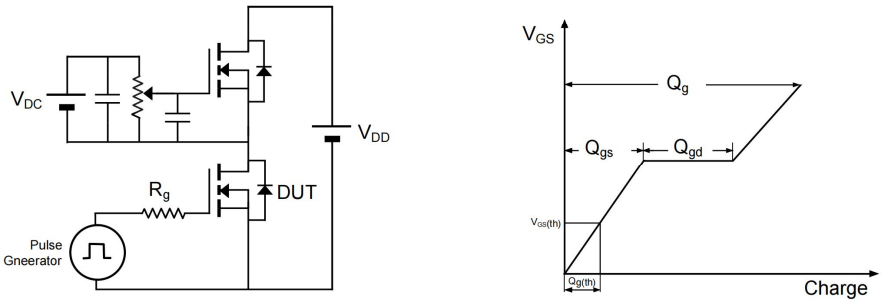


Normalized Threshold Voltage vs. Junction Temperature

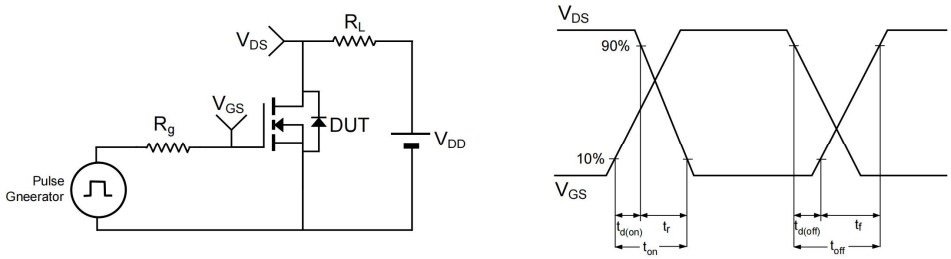


Test Circuit And Waveforms

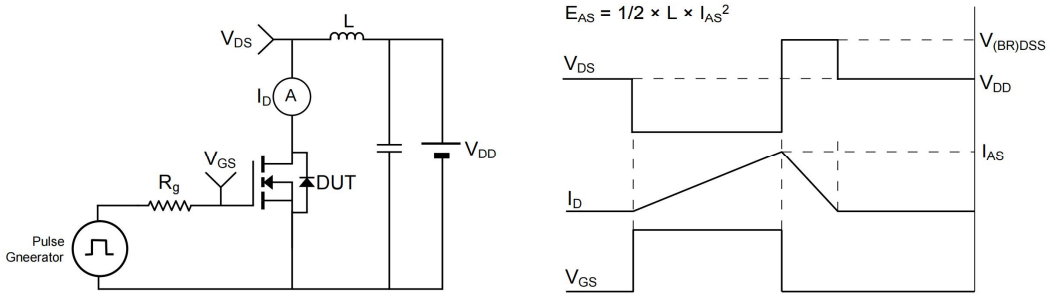
Gate Charge



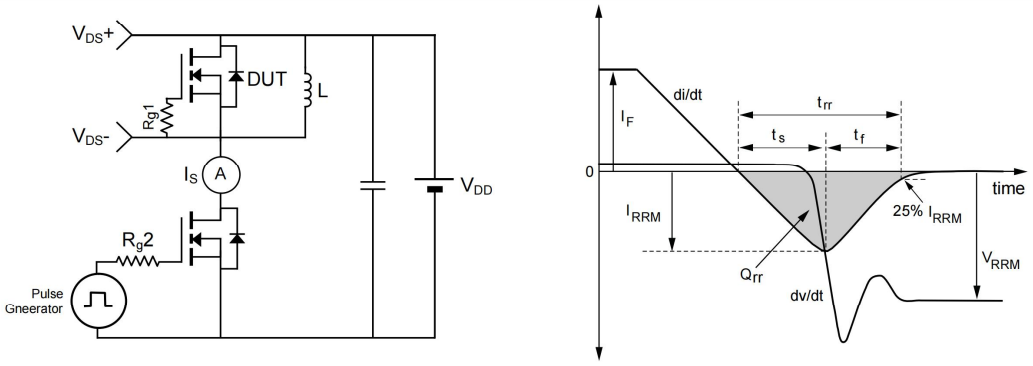
Resistive Load Switching Time



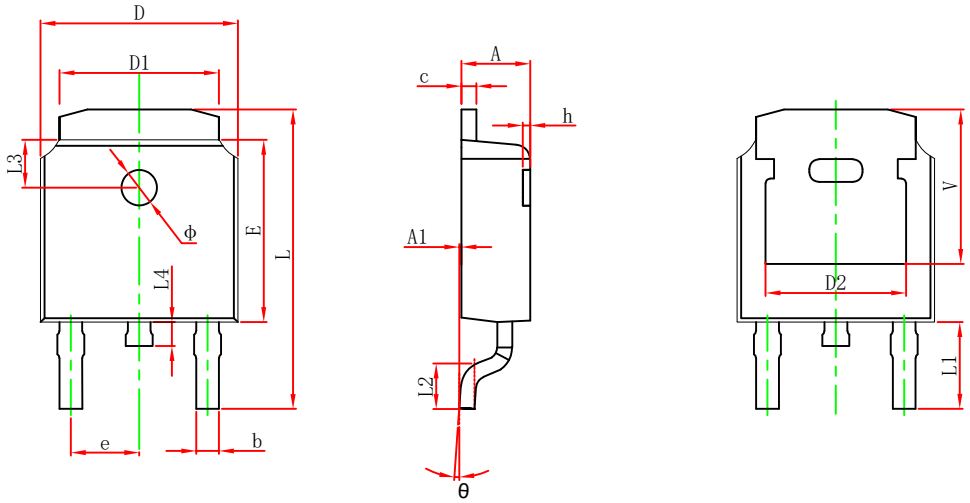
Un-clamped Inductive Load Switching



Drain-Source Body Diode Reverse Recovery

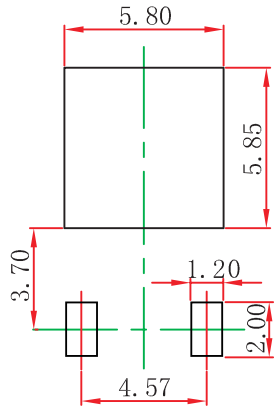


TO-252-2L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

TO-252-2L Suggested Pad Layout



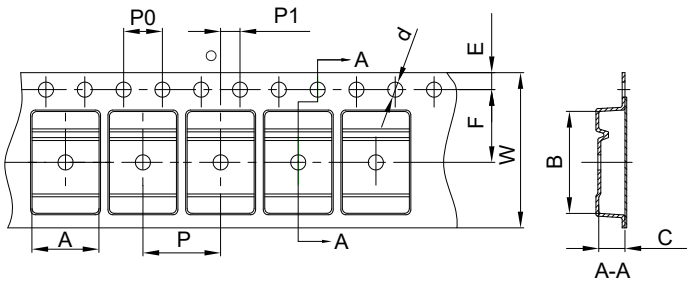
Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

NOTICE

SZCJ reserves the right to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein. SZCJ does not assume any liability arising out of the application or use of any product described herein.

TO-252-2L Tape and Reel

TO-252-2L Embossed Carrier Tabe

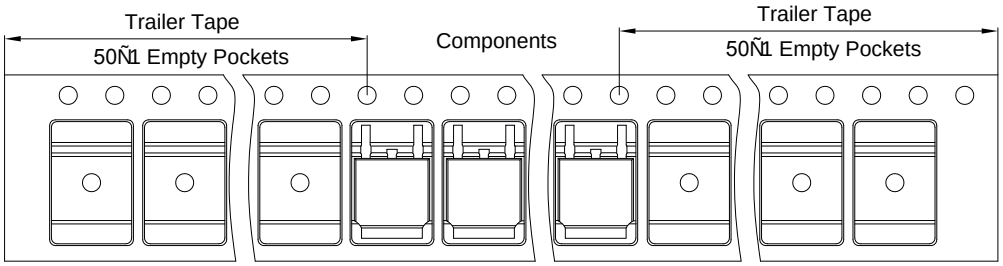


Packaging Description:

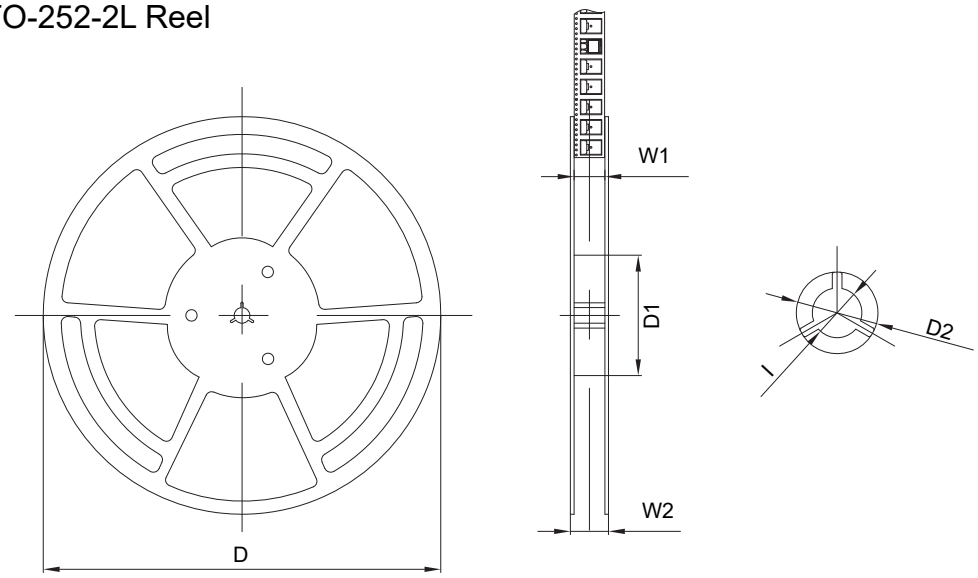
TO-252-2L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Hear Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2500 units per 13″ or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Φ1.55	1.75	7.50	4.00	8.00	2.00	16.00

TO-252-2L Tape Leader and Trailer



TO-252-2L Reel



Dimensions are in millimeter						
Reel	D	D1	D2	W1	W2	I
13" Dia	330.00	100.00	Φ21.00	16.40	21.40	Φ13.00

Reel	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)
2500 pcs	13 inch	5000 pcs	360×360×65	25000 pcs	378×358×382