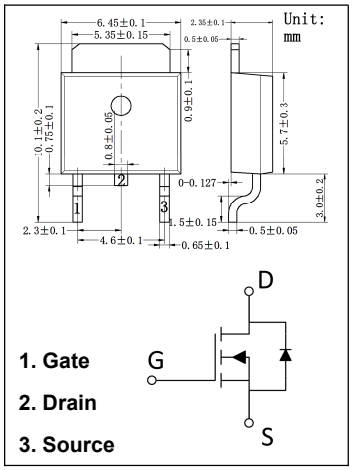
SHENZHEN LONG JING MICRO-ELECTRONICS CO., LTD.

TO-252 Plastic-Encapsulate MOSFETS

LJD70140EL



Automotive N-Channel 100 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	100
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.0150
$R_{DS(on)}$ (Ω) at V_{GS} = 4.5 V	0.0190
I_D (A)	30
Configuration	Single
Package	TO-252

FEATURES

- TrenchFET® power MOSFET
- Package with low thermal resistance
- 100 % R_g and UIS tested
- AEC-Q101 qualified

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

SYMBOL	PARAMETER		LIMIT	UNIT
V_{DS}	Drain-Source Voltage		100	V
V_{GS}	Gate-Source Voltage		± 20	
I_D	Continuous Drain Current	T_C = 25 °C [a]	30	A
		T_C = 125 °C	27	
I_S	Continuous Source Current (Diode Conduction) [a]		30	
I_{DM}	Pulsed Drain Current [b]		120	
I_{AS}	Single Pulse Avalanche Current	L = 0.1 mH	34	
E_{AS}	Single Pulse Avalanche Energy		58	mJ
P_D	Maximum Power Dissipation [b]	T_C = 25 °C	71	W
		T_C = 125 °C	23	
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55 to +175	°C

THERMAL RESISTANCE RATINGS

SYMBOL	PARAMETER		LIMIT	UNIT
R_{thJA}	Junction-to-Ambient	PCB Mount [c]	50	°C/W
R_{thJC}	Junction-to-Case (Drain)		2.1	

Notes

a. Package limited.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
c. When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)							
SYMBOL	**PARAMETER**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static							
V_{DS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 µA		100	-	-	V
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA		1.5	-	2.5	
I_{GSS}	Gate-Source Leakage	V_{DS} = 0 V, V_{GS} = ± 20 V		-	-	± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0 V	V_{DS} = 100 V	-	-	1.0	µA
		V_{GS} = 0 V	V_{DS} = 100 V, T_J = 125 °C	-	-	50	
		V_{GS} = 0 V	V_{DS} = 100 V, T_J = 175 °C	-	-	250	
$I_{D(on)}$	On-State Drain Current [a]	V_{GS} = 10 V	V_{DS} ≥ 5 V	30	-	-	A
$R_{DS(on)}$	Drain-Source On-State Resistance [a]	V_{GS} = 10 V	I_D = 30 A	-	0.0120	0.0150	Ω
		V_{GS} = 10 V	I_D = 30 A, T_J = 125 °C	-	-	0.0255	
		V_{GS} = 10 V	I_D = 30 A, T_J = 175 °C	-	-	0.0320	
		V_{GS} = 4.5 V	I_D = 20 A	-	0.0145	0.0190	
g_{fs}	Forward Transconductance [b]	V_{DS} = 15 V, I_D = 25 A		-	58	-	S
Dynamic [b]							
C_{iss}	Input Capacitance	V_{GS} = 0 V	V_{DS} = 25 V, f = 1 MHz	-	1565	2100	pF
C_{oss}	Output Capacitance			-	800	1100	
C_{rss}	Reverse Transfer Capacitance			-	65	100	
Q_g	Total Gate Charge [c]	V_{GS} = 10 V	V_{DS} = 50 V, I_D = 30 A	-	26.5	40	nC
Q_{gs}	Gate-Source Charge [c]			-	5.5	-	
Q_{gd}	Gate-Drain Charge [c]			-	5.5	-	
R_g	Gate Resistance	f = 1 MHz		1.1	2.3	3.5	Ω
$t_{d(on)}$	Turn-On Delay Time [c]	V_{DD} = 50 V, R_L = 1.67 Ω I_D ≅ 30 A, V_{GEN} = 10 V, R_g = 1 Ω		-	7	15	ns
t_r	Rise Time [c]			-	19	30	
$t_{d(off)}$	Turn-Off Delay Time [c]			-	18	30	
t_f	Fall Time [c]			-	59	95	
Source-Drain Diode Ratings and Characteristics [b]							
I_{SM}	Pulsed Current [a]			-	-	120	A
V_{SD}	Forward Voltage	I_F = 30 A, V_{GS} = 0 V		-	0.94	1.5	V

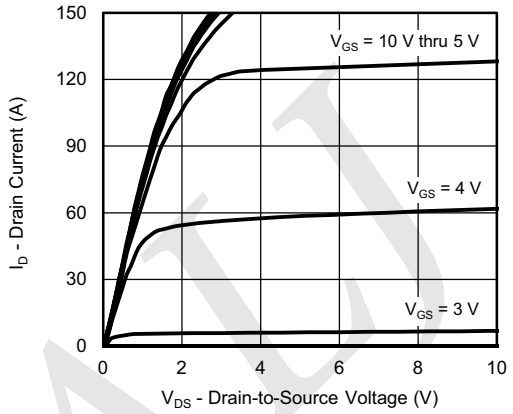
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

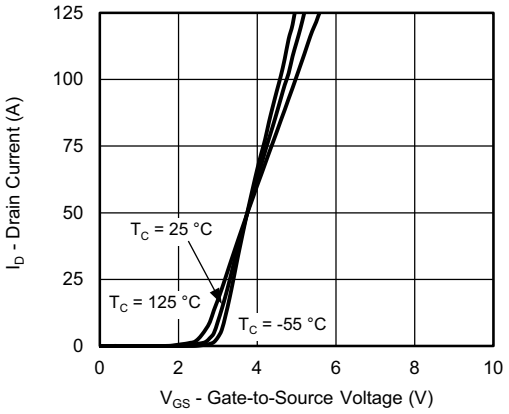
b. Guaranteed by design, not subject to production testing.

c. Independent of operating temperature.

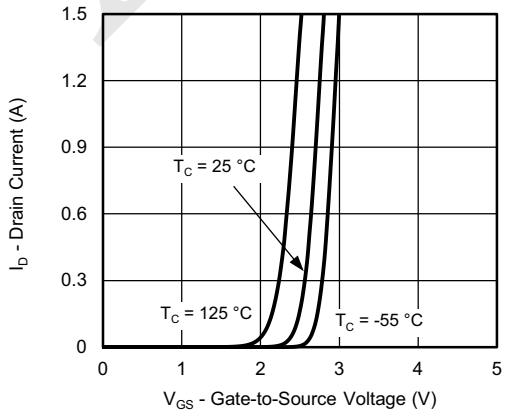
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



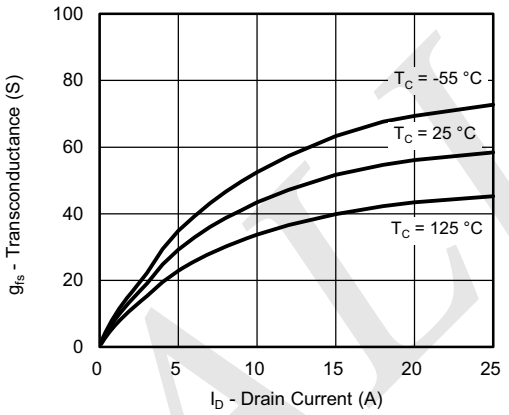
Output Characteristics



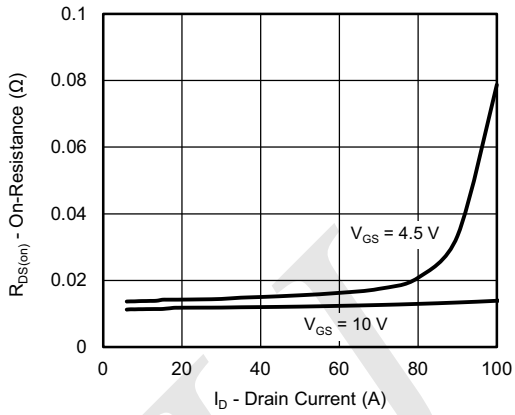
Transfer Characteristics



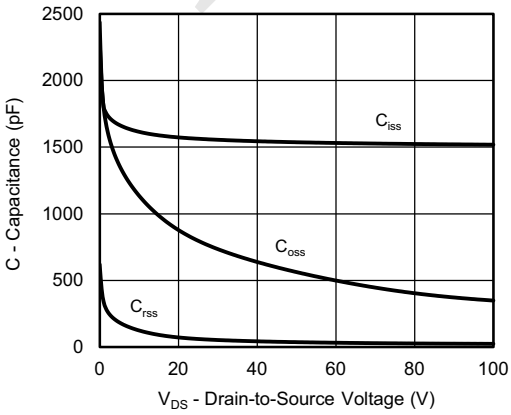
Transfer Characteristics



Transconductance

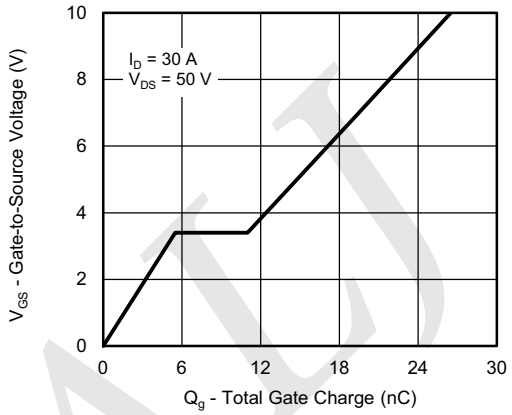


On-Resistance vs. Drain Current

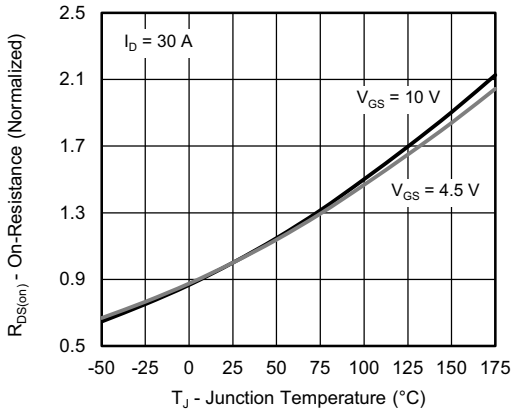


Capacitance

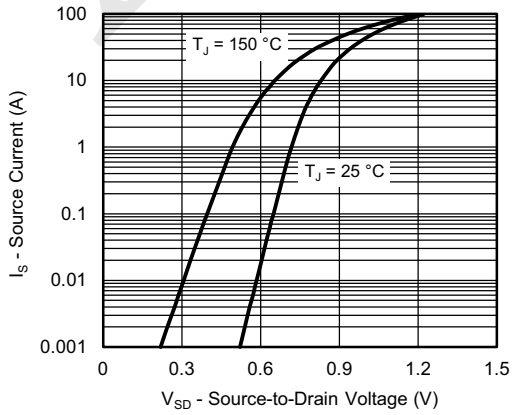
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



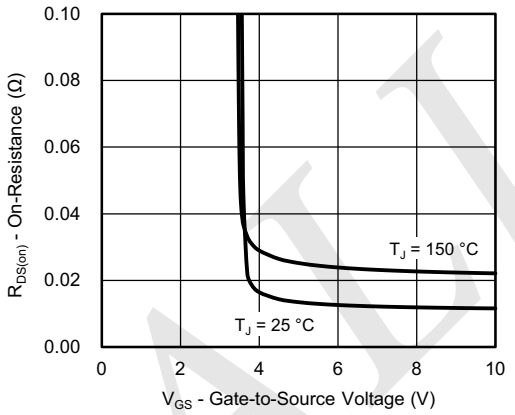
Gate Charge



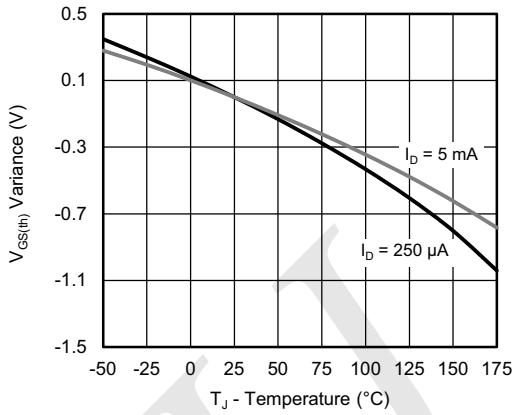
On-Resistance vs. Junction Temperature



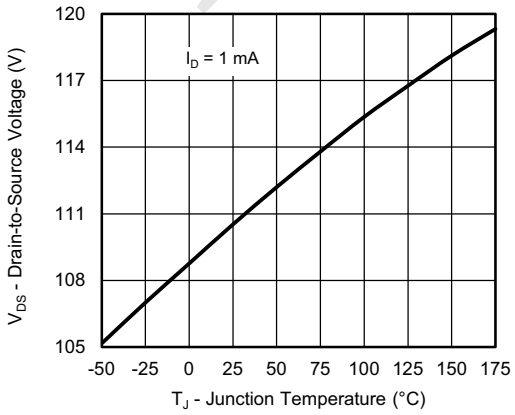
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

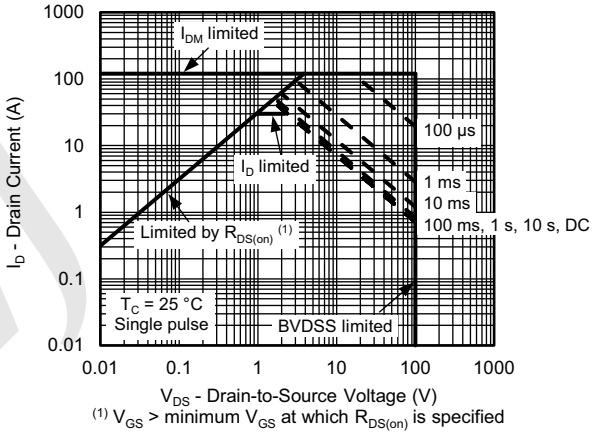


Threshold Voltage

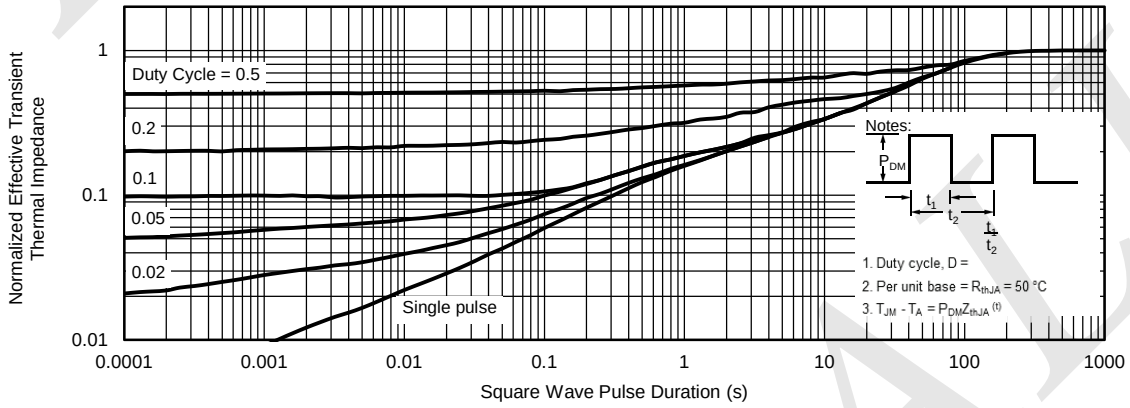


Drain Source Breakdown vs. Junction Temperature

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)

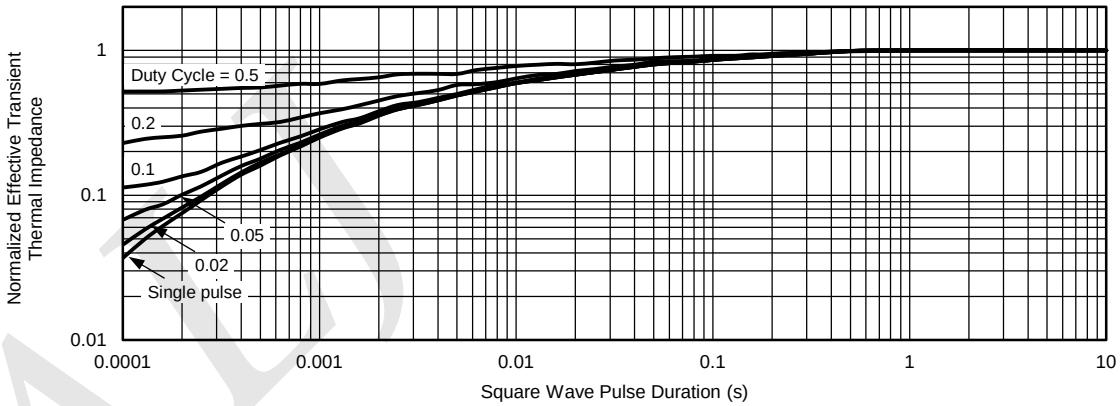


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



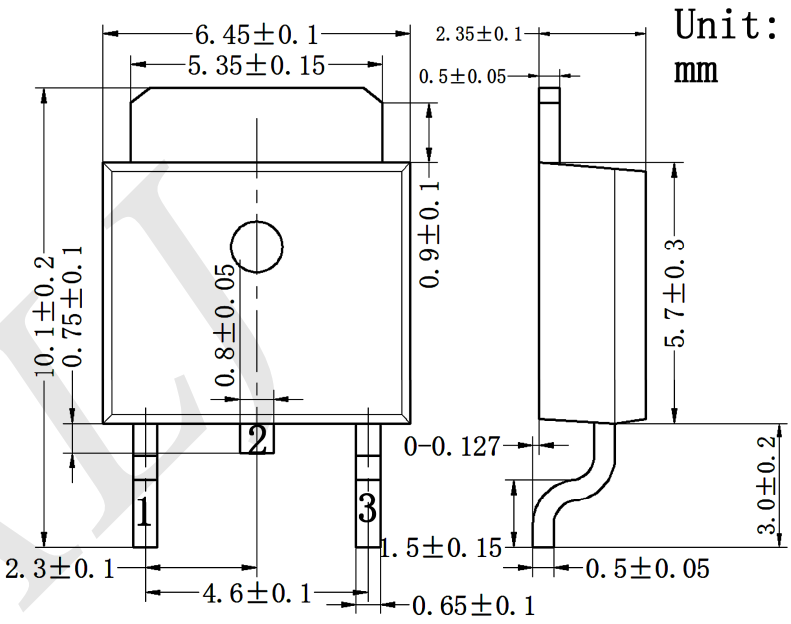
Normalized Thermal Transient Impedance, Junction-to-Case

Note

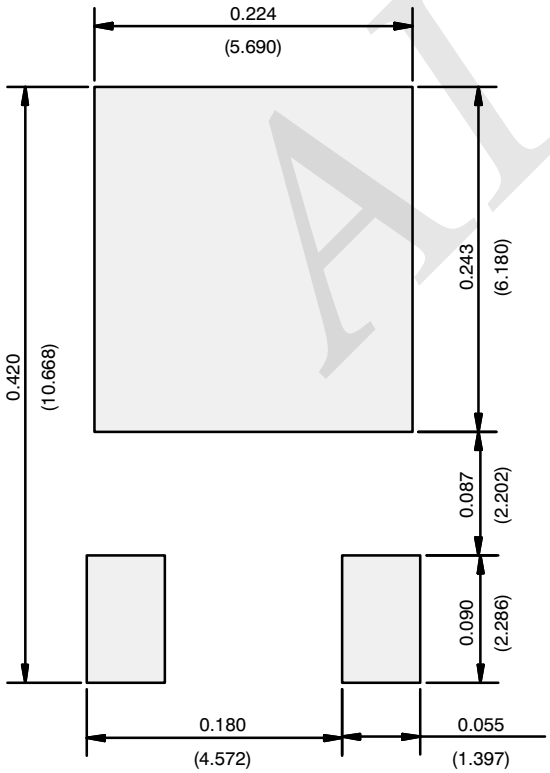
- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Case (25 °C)

  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

TO-252 Case Outline



RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)