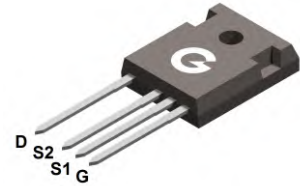
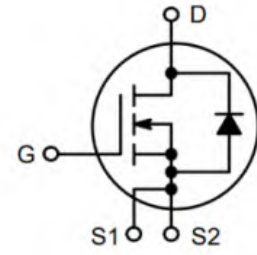


Features

- High blocking voltage with low on-resistance
- High-speed switching with low capacitances
- Low Switching Losses
- Sense pin for optimized switching performance
- RoHS compliant with Halogen-free

HF



TO-247-4L

Applications

- Solar inverters
- High voltage DC/DC converters
- EV-charging
- Switch Mode Power Supplies

Mechanical Data

- Case: TO-247-4L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
GSC120R014U4	TO-247-4L	30 pcs / Tube	GSC120R014U4

Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	1200	V
Gate-to-Source Voltage (transient)	V _{GSS}	-10/+22	V
Gate-to-Source Voltage (static)		-5/+18	V
Continuous Drain Current (T _C = 25°C)	I _D	142	A
Continuous Drain Current (T _C = 100°C)		100	A
Pulsed Drain Current	I _{DM}	380	A
Single Pulse Avalanche Energy ²	E _{AS}	450	mJ
Power Dissipation (T _C = 25°C)	P _D	750	W
Operating Junction Temperature Range	T _J	-55 ~ +175	°C
Storage Temperature Range	T _{STG}	-55 ~ +175	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	R _{θJC}	-	-	0.2	°C/W
Thermal Resistance Junction-to-Air	R _{θJA}	-	-	42	°C/W

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 100\mu A$	1200	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 1200V, V_{GS} = 0V$	-	-	10	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS} = 22V, V_{DS} = 0V$	-	-	100	nA
		$V_{GS} = -10V, V_{DS} = 0V$	-	-	-100	nA
On Characteristics						
$R_{DS(ON)}$	Drain-Source On-resistance *1	$V_{GS} = 18V, I_D = 60A, T_J = 25^\circ\text{C}$	-	14	18	m Ω
		$V_{GS} = 18V, I_D = 60A, T_J = 175^\circ\text{C}$	-	22	-	
		$V_{GS} = 15V, I_D = 60A, T_J = 25^\circ\text{C}$	-	18	24	
		$V_{GS} = 15V, I_D = 60A, T_J = 175^\circ\text{C}$	-	24	-	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 30mA$	2.1	-	3.5	V
R_G	Gate Resistance	$V_{GS} = 0V, f = 1MHz$	-	3	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	$V_{GS} = 0V$	-	5030	-	pF
C_{OSS}	Output Capacitance	$V_{DS} = 800V$	-	300	-	
C_{RSS}	Reverse Transfer Capacitance	$f = 1MHz$	-	14	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *3	$V_{DD} = 800V$ $V_{GS} = -5/18V$ $I_D = 60A$ $R_G = 2.5\Omega$	-	24	-	ns
t_r	Turn-on Rise Time *3		-	24	-	
$t_{d(OFF)}$	Turn-Off Delay Time *3		-	53	-	
t_f	Turn-Off Fall Time *3		-	14	-	
E_{on}	Turn-On Energy *3	$R_G = 2.5\Omega$	-	845	-	μJ
E_{off}	Turn-Off Energy *3		-	312	-	
Q_G	Total Gate-Charge	$V_{DD} = 800V$	-	245	-	nC
Q_{GS}	Gate to Source Charge	$V_{GS} = -5/18V$	-	85	-	
Q_{GD}	Gate to Drain (Miller) Charge	$I_D = 60A$	-	61	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *1	$I_{SD} = 60A, V_{GS} = -5V, T_J = 25^\circ\text{C}$	-	4.1	-	V
		$I_{SD} = 60A, V_{GS} = -5V, T_J = 175^\circ\text{C}$	-	3.6	-	
t_{rr}	Reverse Recovery Time	$I_F = 60A, V_R = 800V$	-	27	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt = 1000A/\mu s$	-	265	-	nC

Notes:

- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 120V, V_{GS} = 18V, L = 1mH$
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

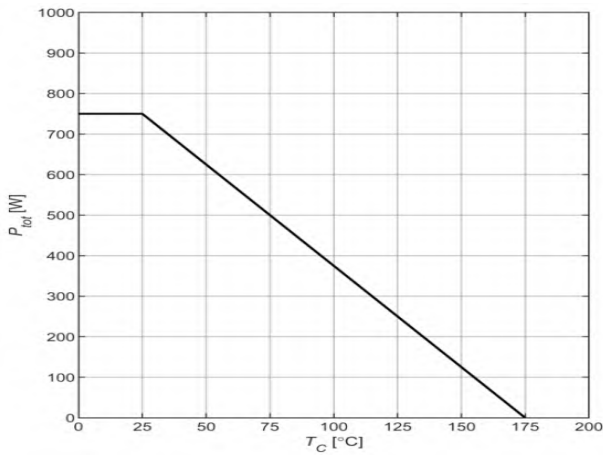


Fig 1 Power Dissipation

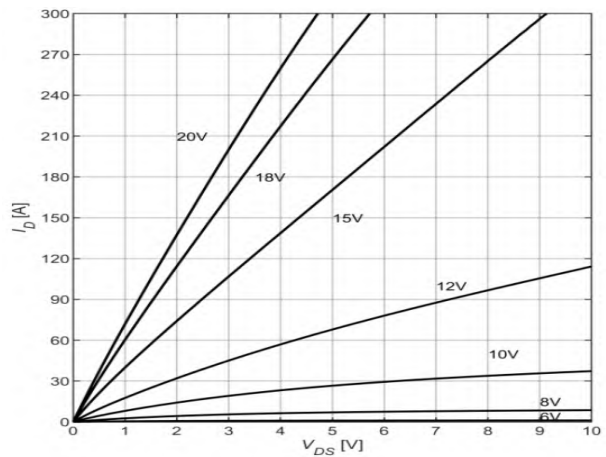


Fig 2 Typical Output Characteristics ($T_J = -55^\circ\text{C}$)

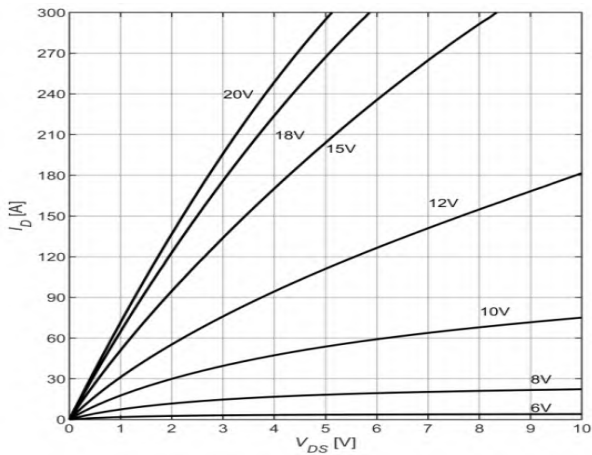


Fig 3 Typical Output Characteristics ($T_J = 25^\circ\text{C}$)

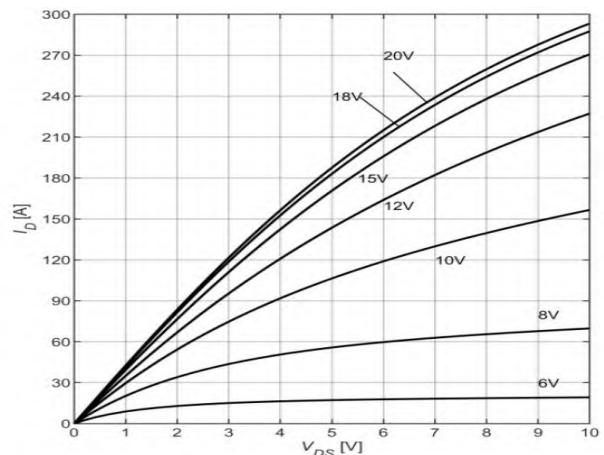


Fig 4 Typical Output Characteristics ($T_J = 175^\circ\text{C}$)

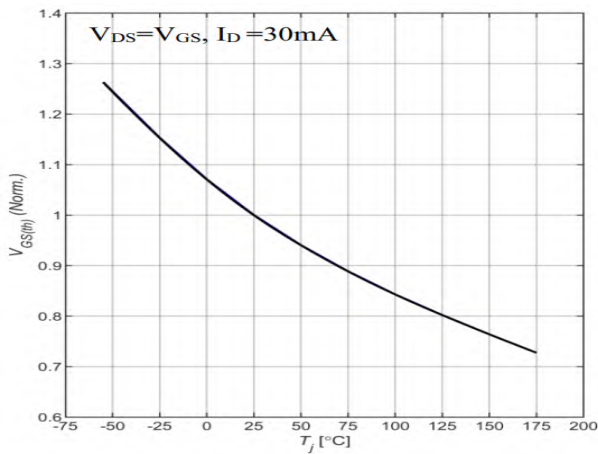


Fig 5 Normalized $V_{GS(th)}$ vs. Junction Temperature

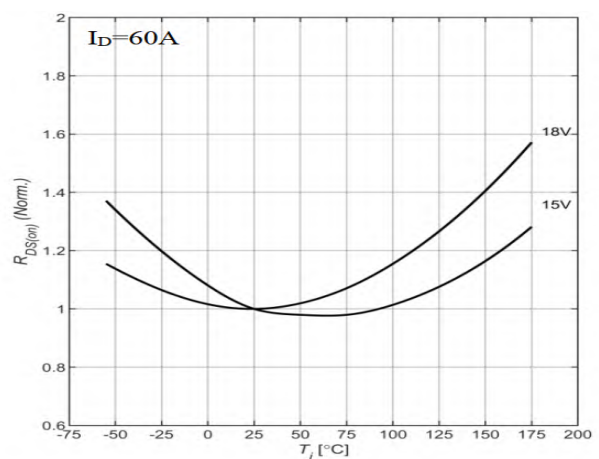


Fig 6 Normalized On-Resistance vs. Junction Temperature

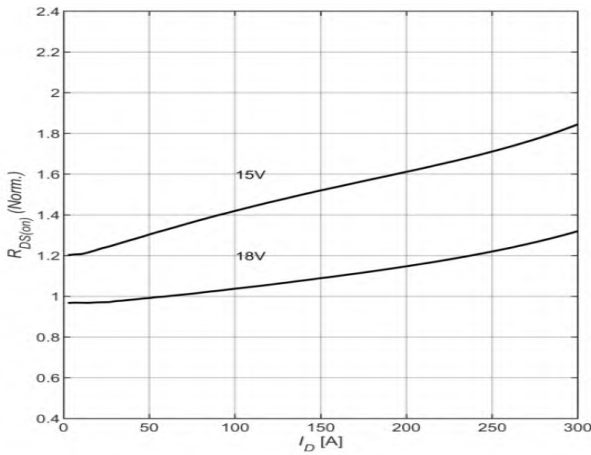


Fig 7 Normalized On-Resistance vs. Drain Current

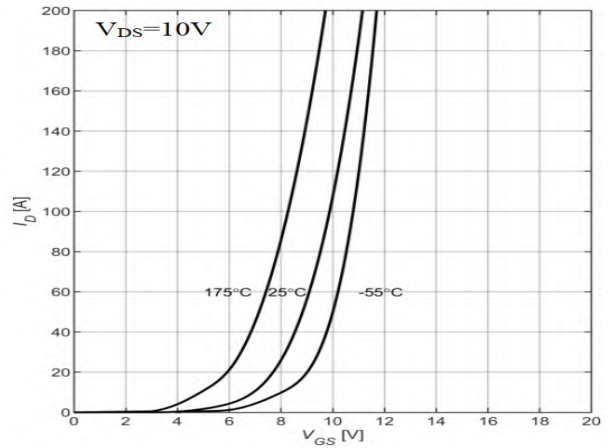


Fig 8 Transfer Characteristics

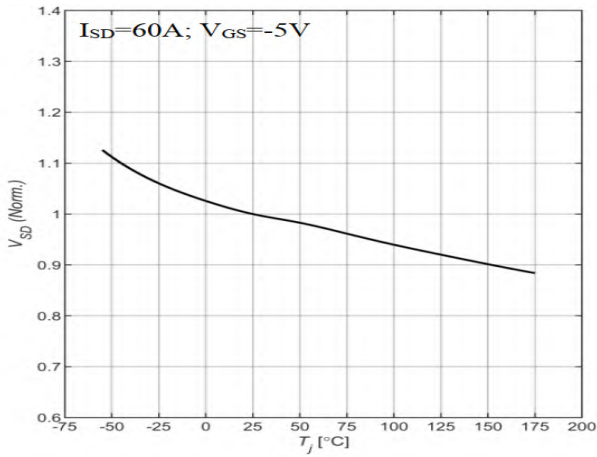


Fig 9 Normalized Diode Forward Voltage vs. Junction Temperature

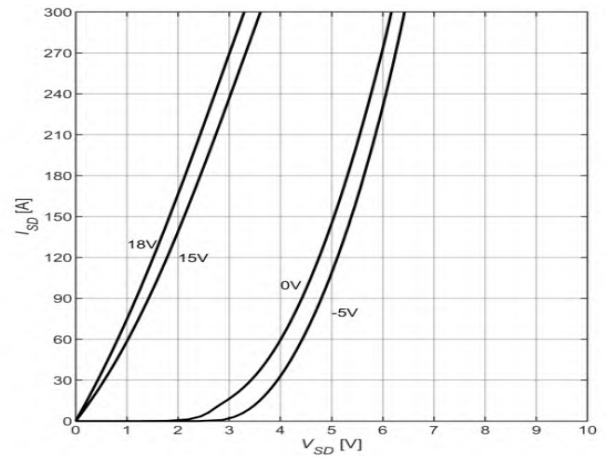


Fig 10 Body-Diode Characteristics ($T_J = -55^\circ\text{C}$)

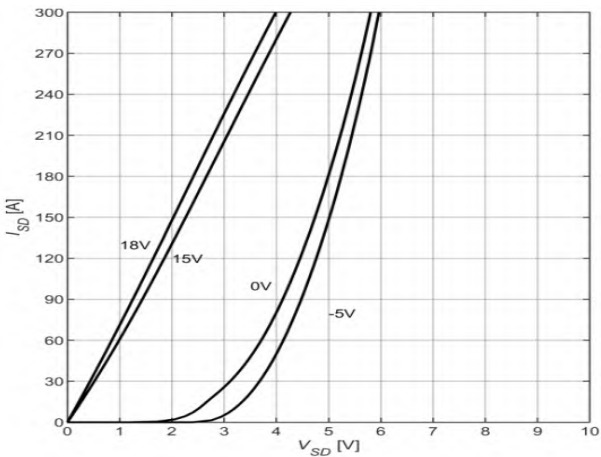


Fig 11 Body-Diode Characteristics ($T_J = 25^\circ\text{C}$)

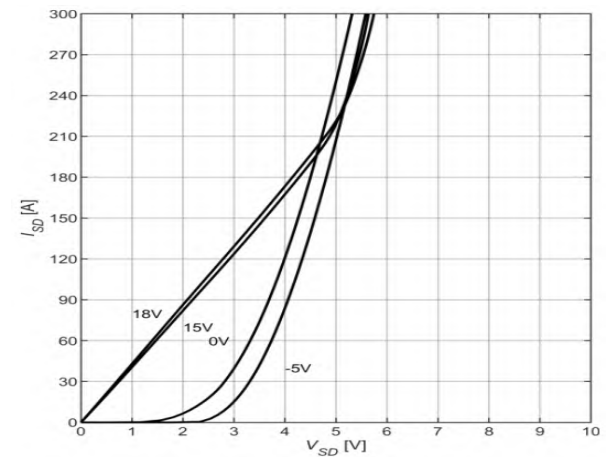


Fig 12 Body-Diode Characteristics ($T_J = 175^\circ\text{C}$)

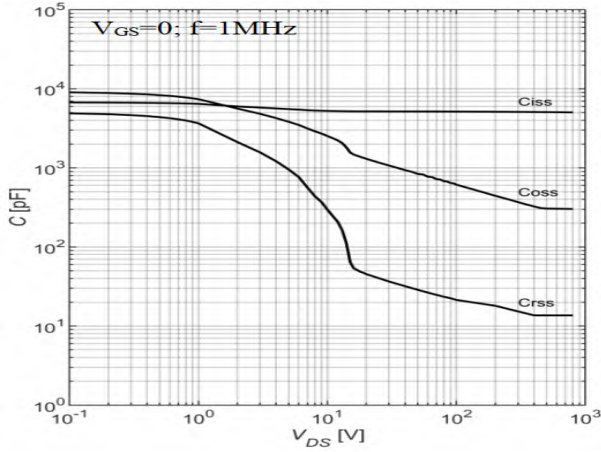


Fig 13 Capacitance Characteristics

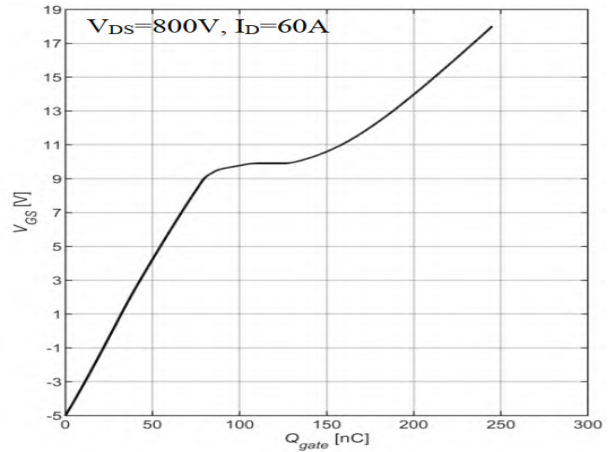


Fig 14 Gate-Charge Characteristics

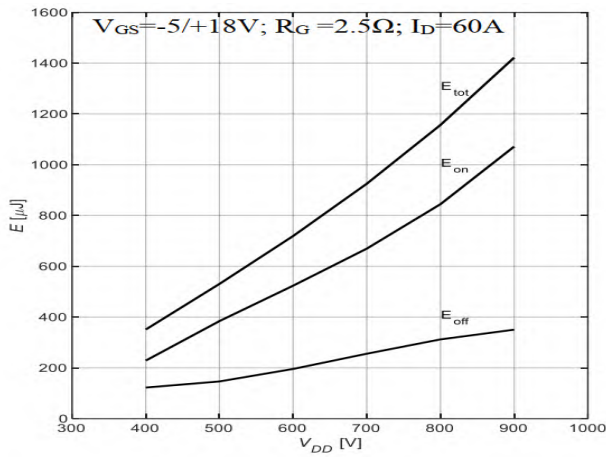


Fig 15 Output Capacitor Stored Energy

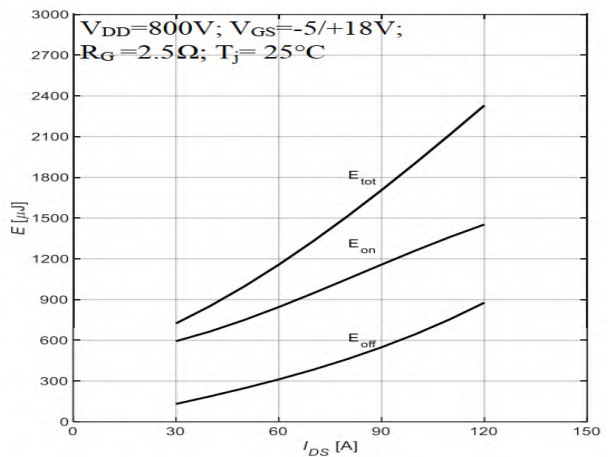


Fig 16 Clamped Inductive Switching Energy vs. Drain Current

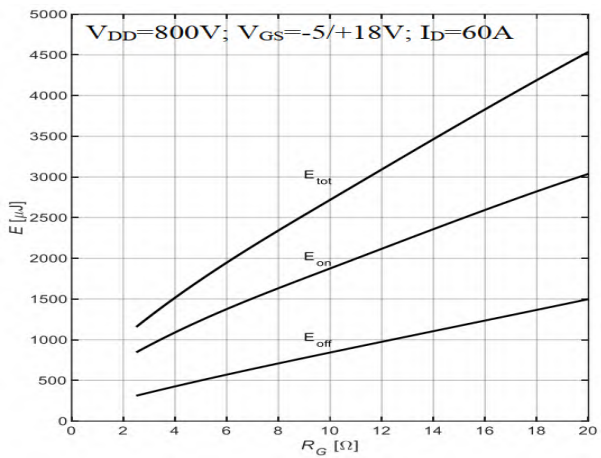


Fig 17 Clamped Inductive Switching Energy vs. R_G

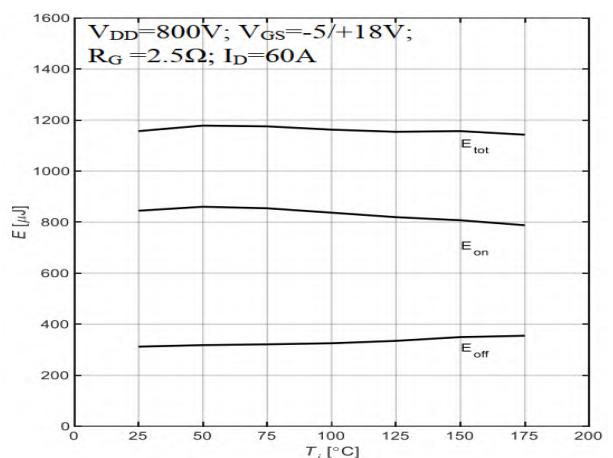


Fig 18 Clamped Inductive Switching Energy vs. Junction Temperature

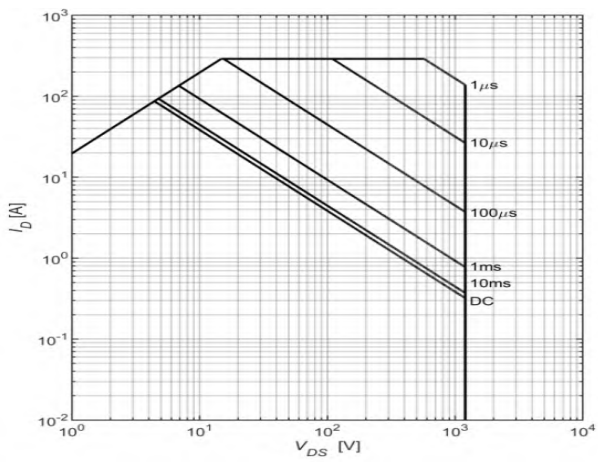


Fig 19 Safe Operating Area

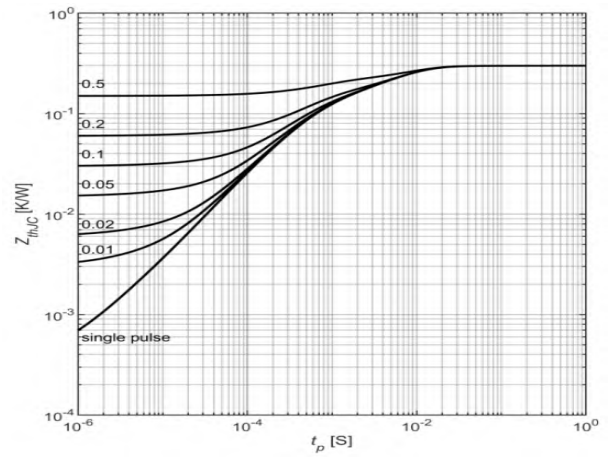


Fig 20 Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)

