P-Channel Enhancement Mode Power MOSFET

Description

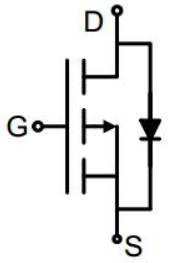
The G030P04STL uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

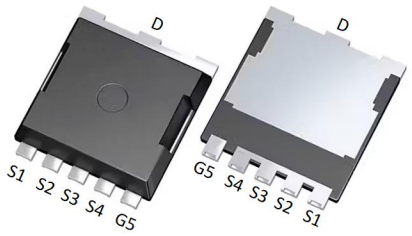
- V_{DS} -40V
- I_D (at V_{GS} = -10V) -190A
- $R_{DS(ON)}$ (at V_{GS} = -10V) < 2.4mΩ
- $R_{DS(ON)}$ (at V_{GS} = -4.5V) < 3.7mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



sTOLL

Ordering Information

Device	Package	Marking	Packaging
G030P04STL	sTOLL	G030P04	2000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-40	V
Continuous Drain Current	T_C = 25ºC	I_D	-190	A
	T_C = 100ºC		-120	
Pulsed Drain Current (note1)		I_{DM}	-760	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	174	W
Single pulse avalanche energy （note2）		E_{AS}	840	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	ºC/W
Thermal Resistance, Junction-to-Case	R_{thJC}	0.72	ºC/W

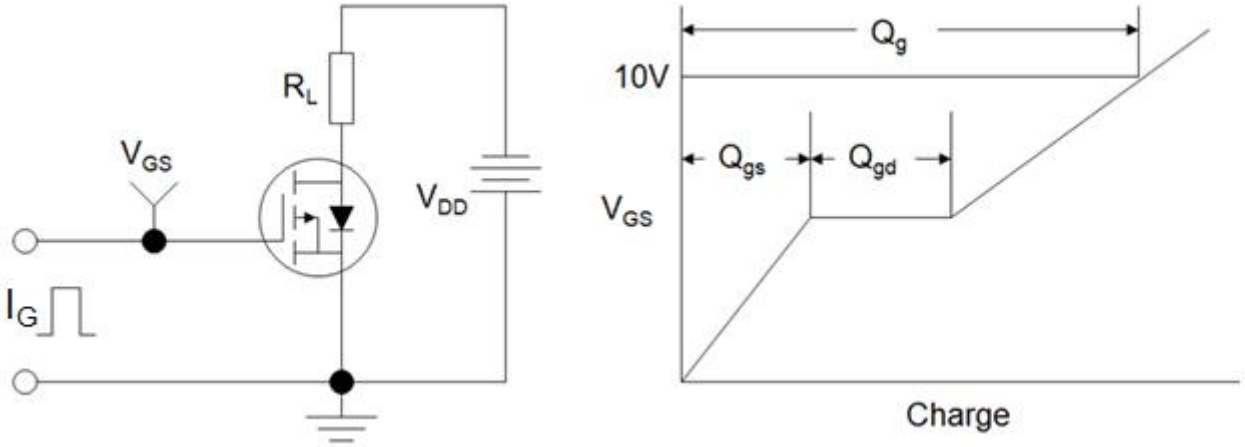
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
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	--	--	-1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.4	-2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -30A	--	1.9	2.4	mΩ
		V_{GS} = -4.5V, I_D = -30A	--	3.0	3.7	
Forward Transconductance	g_{FS}	V_{DS} = -5V,I_D = -30A	--	83	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -20V, f = 1.0MHz	--	12200	--	pF
Output Capacitance	C_{oss}		--	1800	--	
Reverse Transfer Capacitance	C_{rss}		--	1400	--	
Total Gate Charge	Q_g	V_{DD} = -20V, I_D = -30A, V_{GS} = -10V	--	206	--	nC
Gate-Source Charge	Q_{gs}		--	41	--	
Gate-Drain Charge	Q_{gd}		--	26	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = -20V, I_D = -30A, R_G = 1.6Ω	--	44	--	ns
Turn-on Rise Time	t_r		--	49	--	
Turn-off Delay Time	$t_{d(off)}$		--	138	--	
Turn-off Fall Time	t_f		--	44	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	-190	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = -30A, V_{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q_{rr}	I_F = -30A, V_{GS} = 0V di/dt=-100A/us	--	198	--	nC
Reverse Recovery Time	T_{rr}		--	77	--	ns

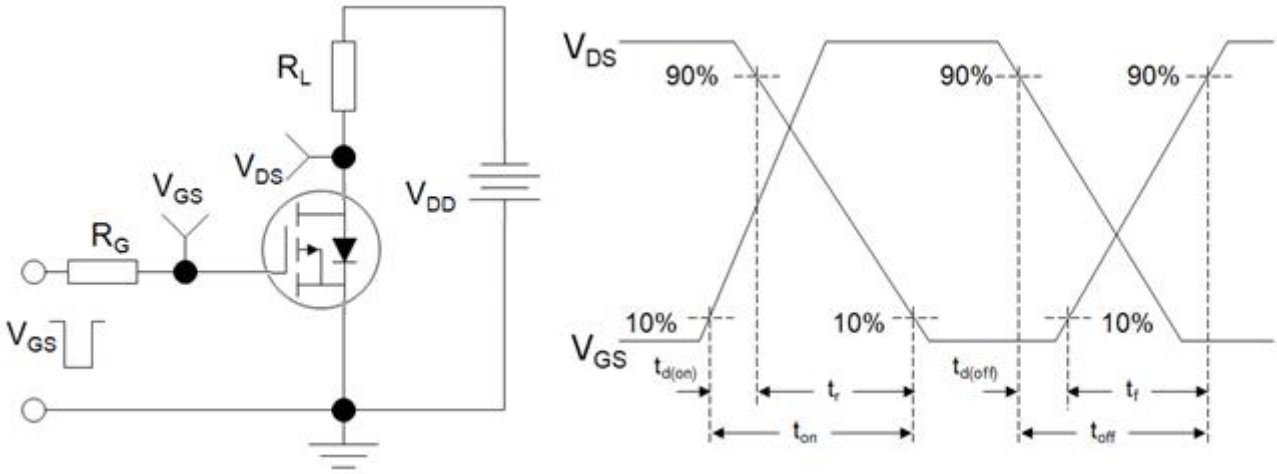
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=-40V,VGS=-10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 2300mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

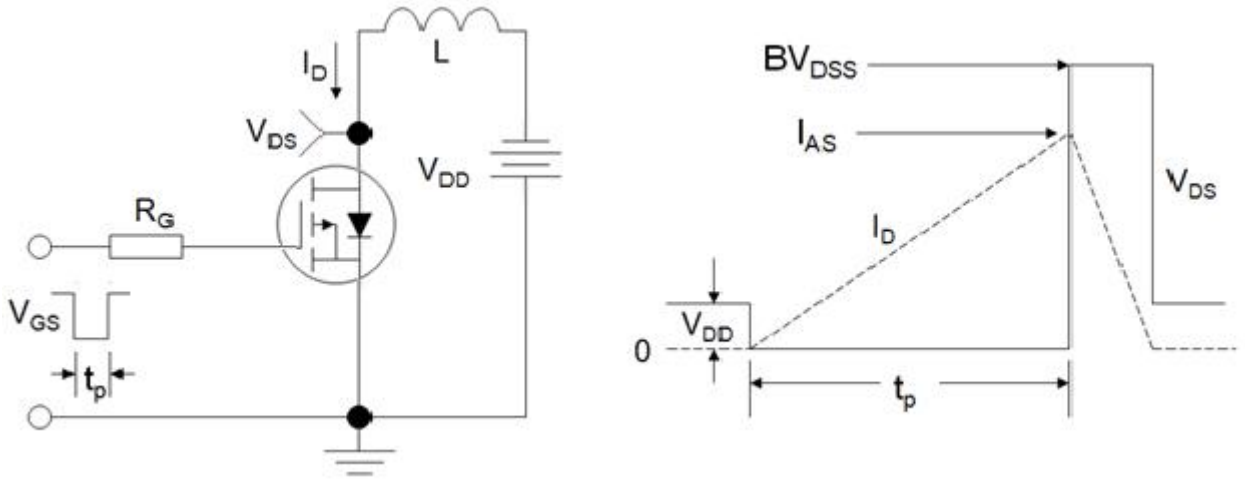
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

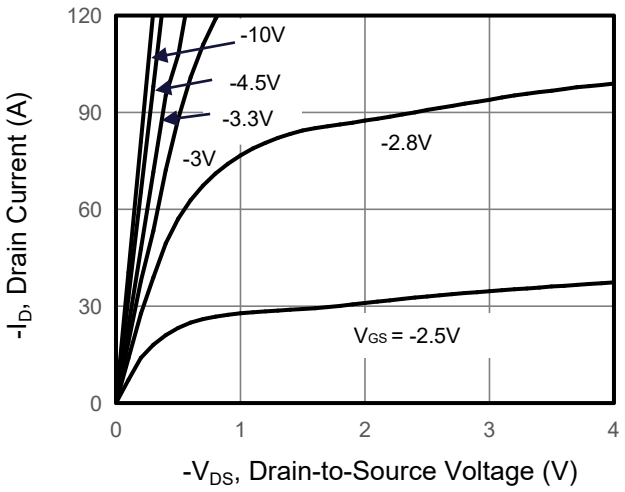


Figure 2. Transfer Characteristics

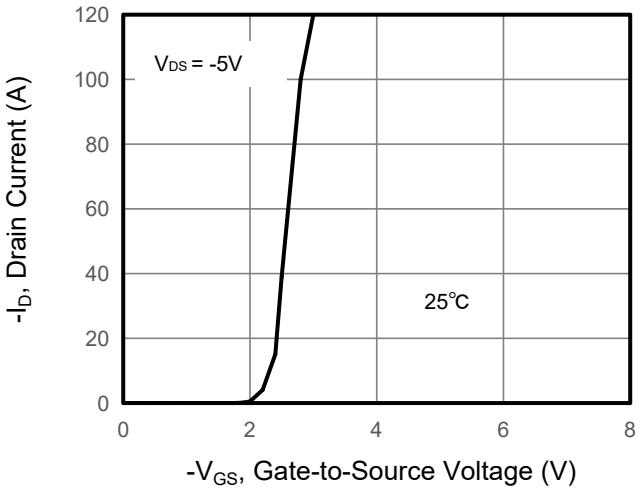


Figure 3.Drain Source On Resistance

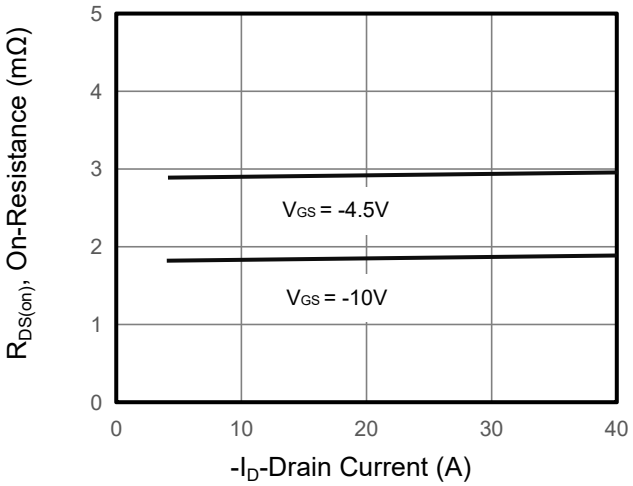


Figure 4. Gate Charge

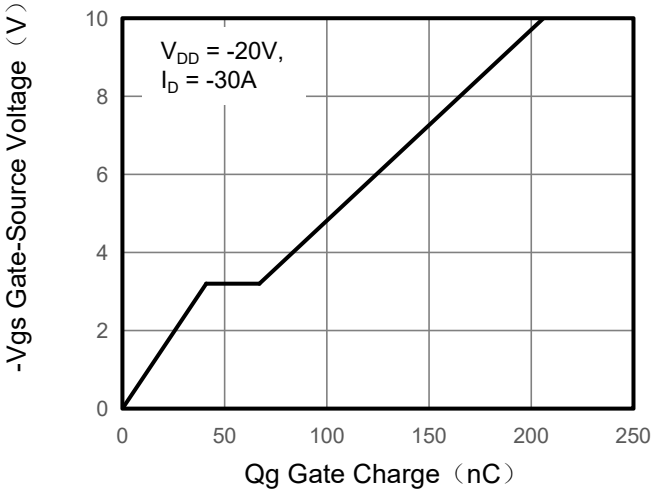


Figure 5. Capacitance

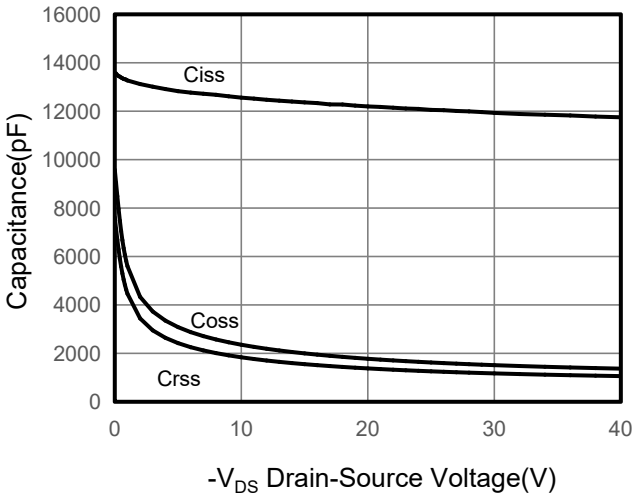
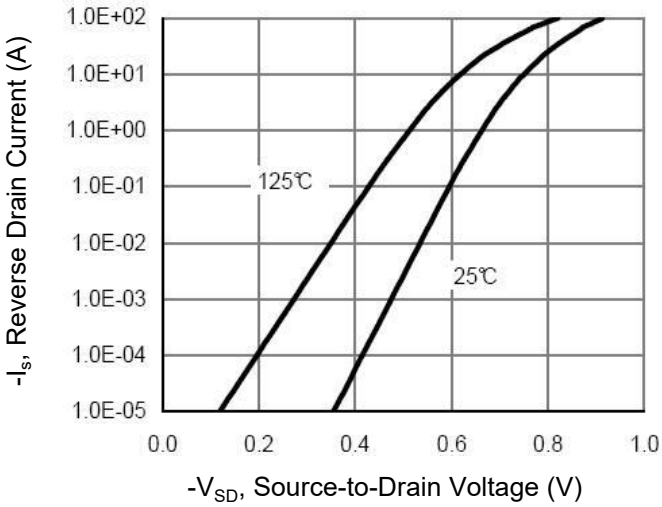


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

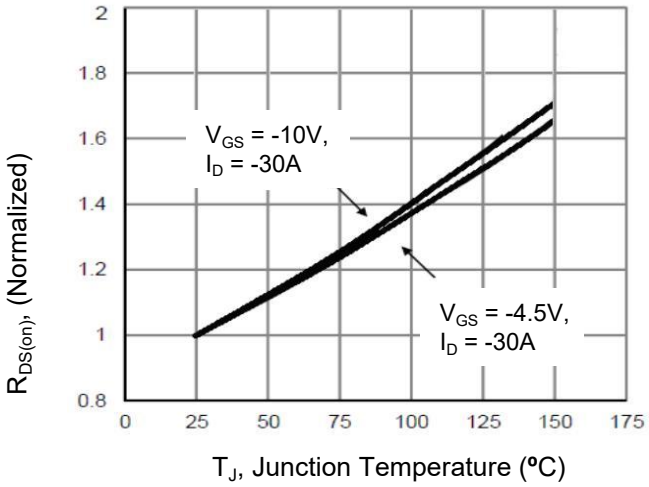


Figure 8. Safe Operation Area

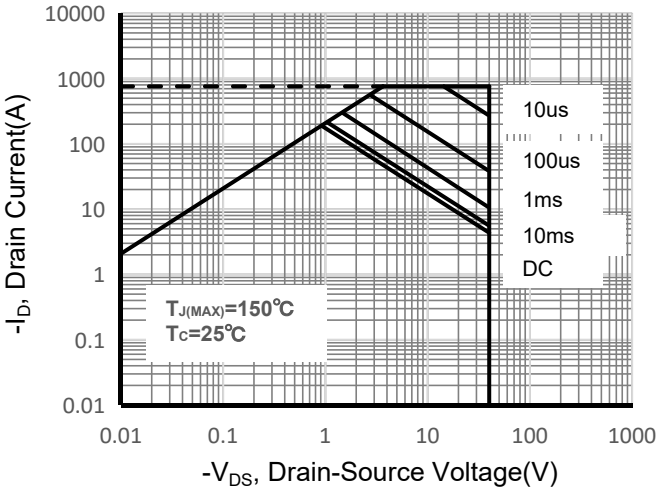


Figure 9. Maximum Continuous Drain Current vs Case Temperature

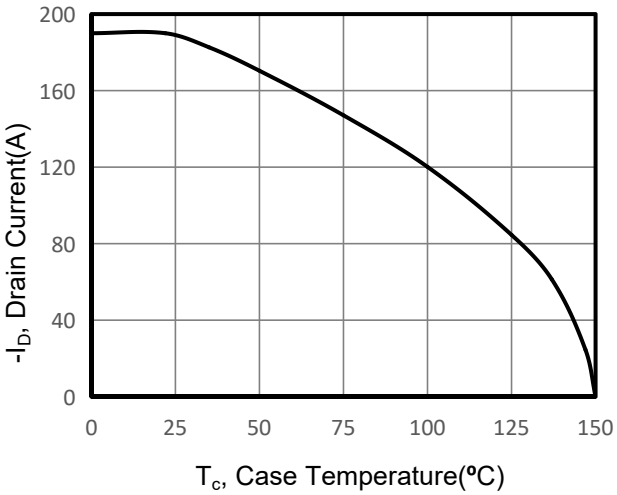
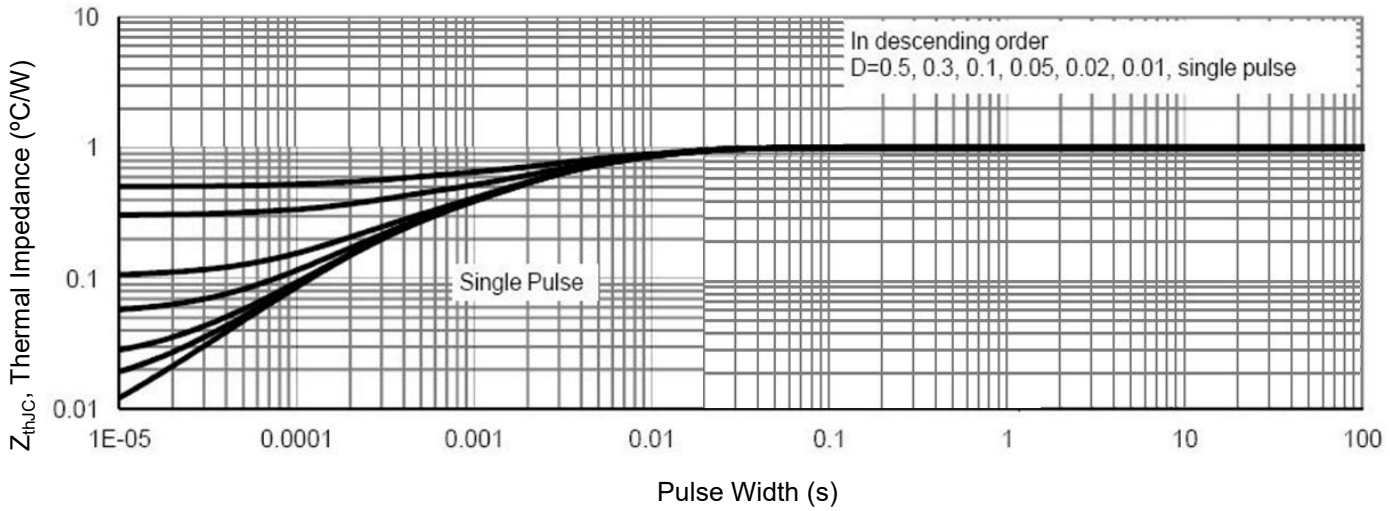
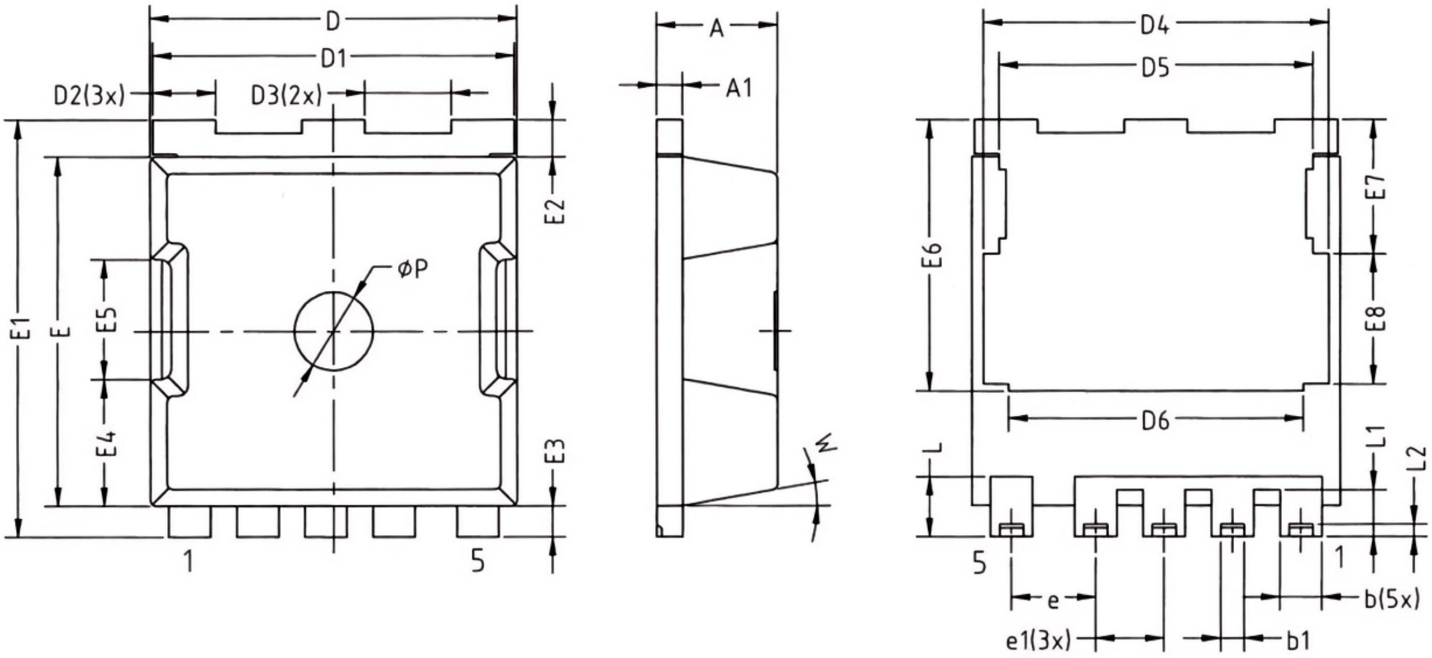


Figure 10. Normalized Maximum Transient Thermal Impedance



sTOLL Package Information



COMMON DIMENSIONS

SYMBOL	mm			SYMBOL	mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	2.20	2.30	2.40	E2	0.60	0.70	0.80
A1	0.40	0.50	0.60	E3	0.50	0.60	0.70
b	0.70	0.80	0.90	E4	2.43 (REF)		
b1	0.42	0.45	0.50	E5	2.30 (REF)		
D	6.80	7.00	7.20	E6	5.20 (REF)		
D1	6.80	6.90	7.00	E7	2.57 (REF)		
D2	1.10	1.20	1.30	E8	2.50 (REF)		
D3	1.55	1.65	1.75	e	1.60 (BSC)		
D4	6.56 (REF)			e1	1.30 (BSC)		
D5	5.96 (REF)			L	1.05	1.15	1.25
D6	5.60 (REF)			L1	0.80	0.90	1.00
E	6.50	6.70	6.90	L2	0.13	0.235	0.33
E1	7.80	8.00	8.20	P	1.40	1.50	1.60
E2	0.60	0.70	0.80	W	8.50°	-	11.50°