

P-Channel Enhancement Mode Power MOSFET

Description

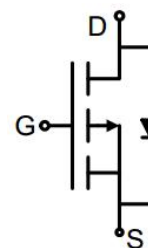
The GT036P06T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

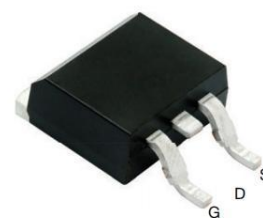
- V_{DS} -60V
- I_D (at $V_{GS} = -10V$) -180A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 4.5m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 6m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-263

Ordering Information

Device	Package	Marking	Packaging
GT036P06T	TO-263	GT045P06	800pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Continuous Drain Current	I_D	$T_C = 25^\circ\text{C}$ -180	A
		$T_C = 100^\circ\text{C}$ -114	
Pulsed Drain Current (note1)	I_{DM}	-720	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	325	W
Single pulse avalanche energy (note2)	E_{AS}	900	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	0.38	$^\circ\text{C/W}$

Specifications T _J = 25°C, 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	-60	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -60V, 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	-1.9	-3.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -20A	--	3.7	4.5	mΩ
		V _{GS} = -4.5V, I _D = -15A	--	5.0	6.0	
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D = -20A	--	52	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -30V, f = 0.7MHz	--	12800	--	pF
Output Capacitance	C _{oss}		--	1700	--	
Reverse Transfer Capacitance	C _{rss}		--	130	--	
Total Gate Charge	Q _g	V _{DD} = -30V, I _D = -20A, V _{GS} = -10V	--	198	--	nC
Gate-Source Charge	Q _{gs}		--	26	--	
Gate-Drain Charge	Q _{gd}		--	42	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -30V, I _D = -20A, R _G = 3Ω	--	92	--	ns
Turn-on Rise Time	t _r		--	59	--	
Turn-off Delay Time	t _{d(off)}		--	217	--	
Turn-off Fall Time	t _f		--	66	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	-180	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = -20A, V _{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = -20A, V _{GS} = 0V di/dt=-100A/us	--	132	--	nC
Reverse Recovery Time	T _{rr}		--	59	--	ns

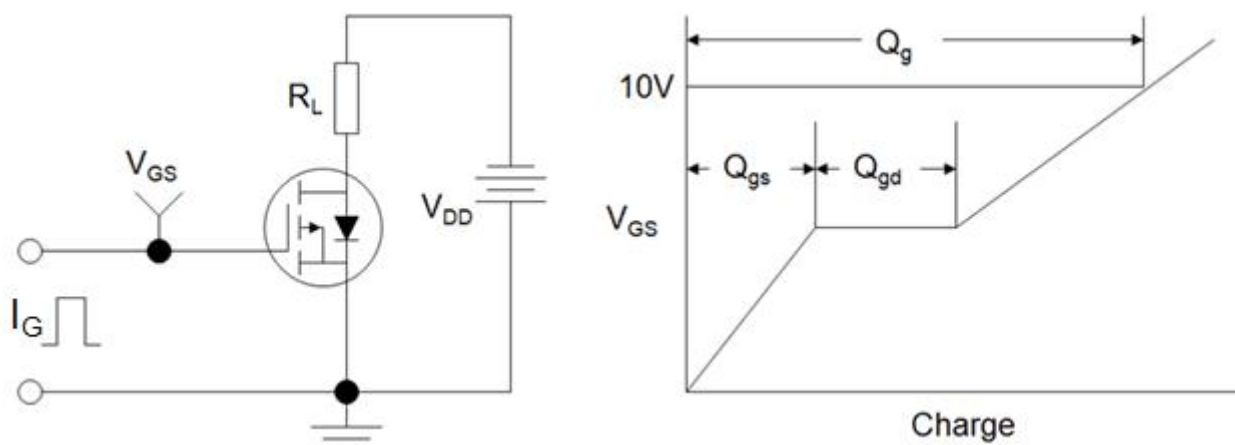
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^\circ\text{C}$, $V_{DD} = 50V$, $V_{GS} = 10V$, $L = 0.5mH$, $R_g = 25\Omega$

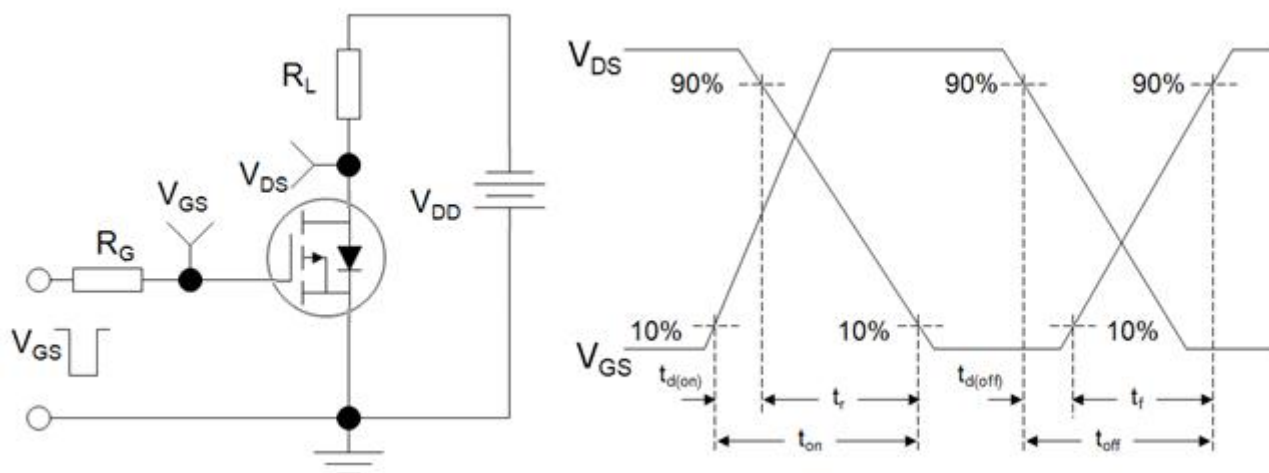
The table shows the minimum avalanche energy, which is 2500mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

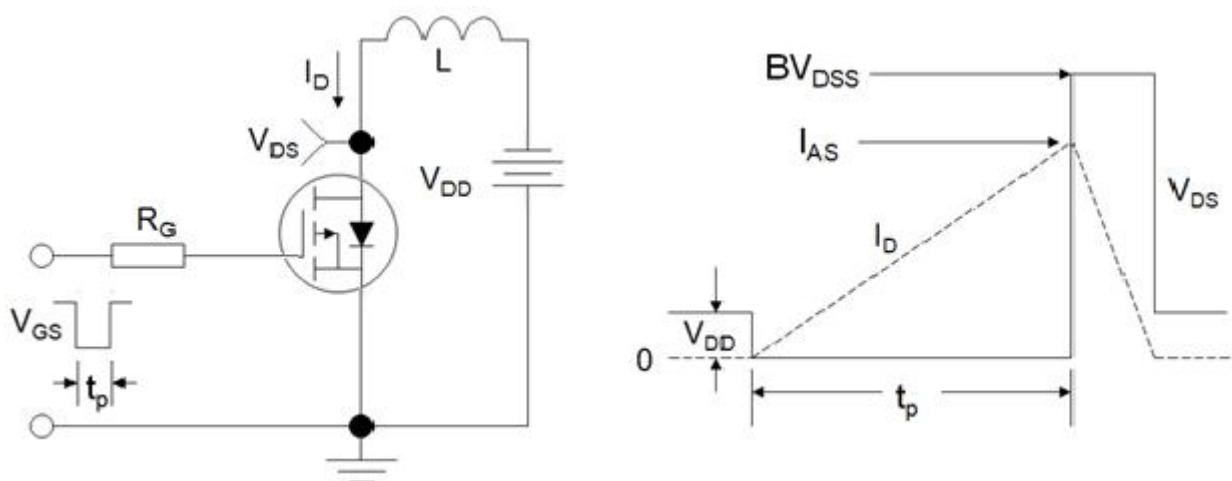
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

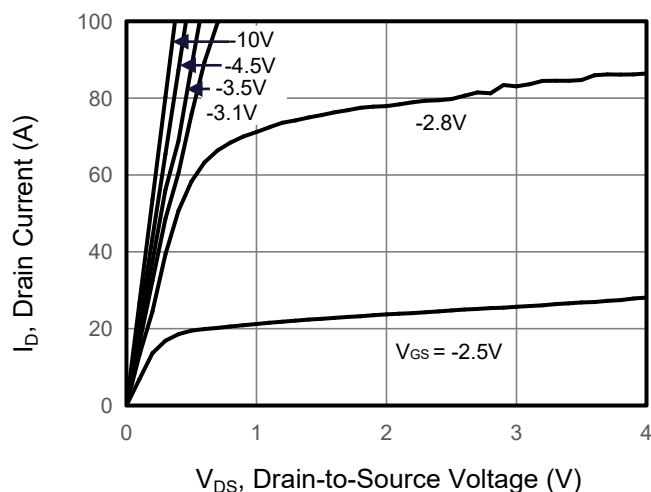


Figure 2. Transfer Characteristics

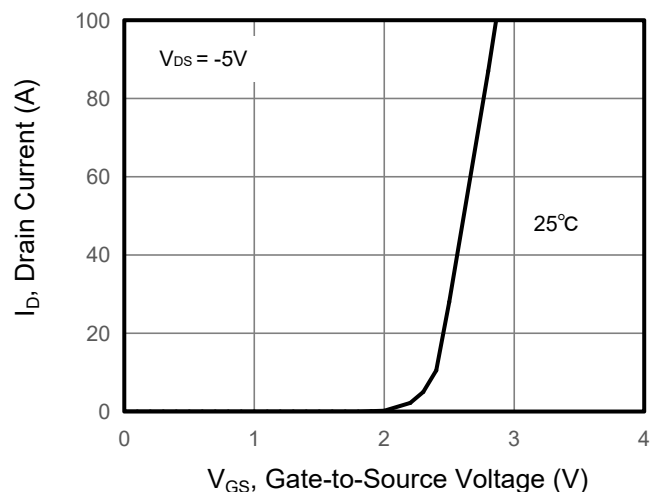


Figure 3. Drain Source On Resistance

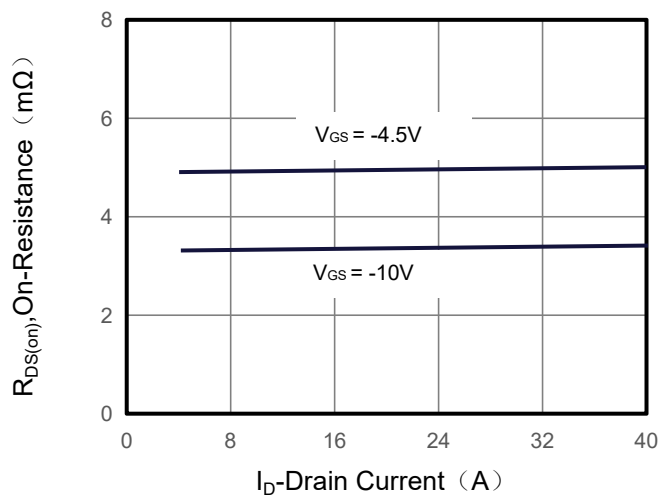
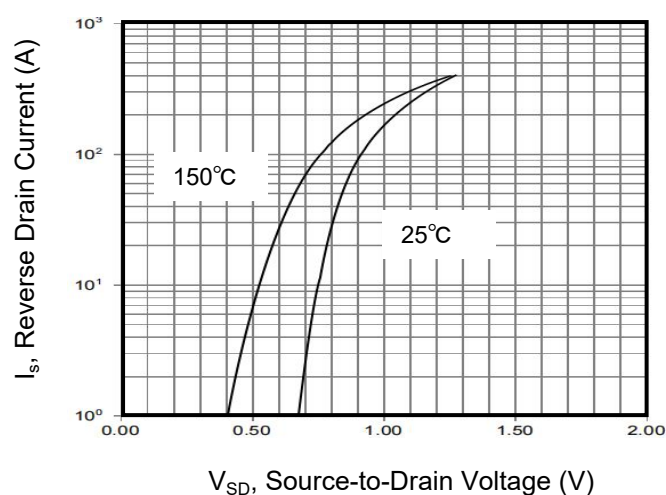
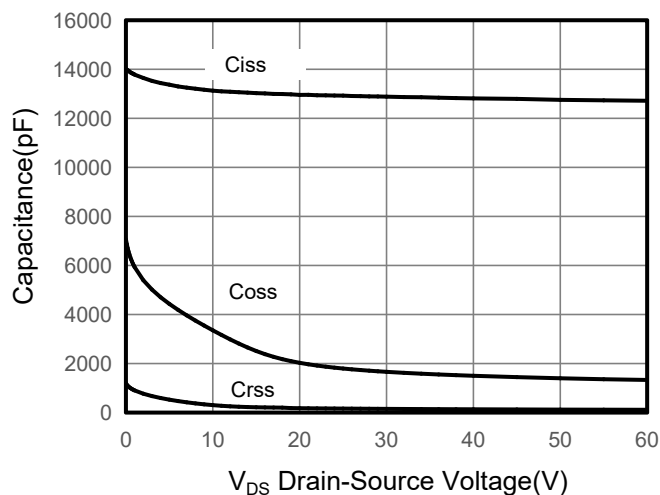
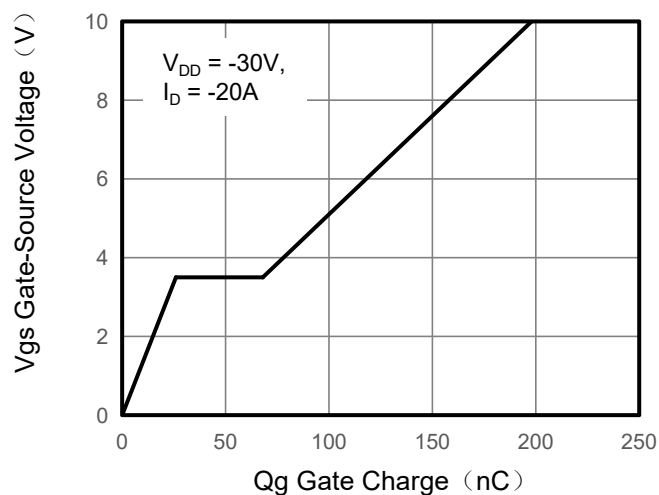


Figure 4. Gate Charge



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

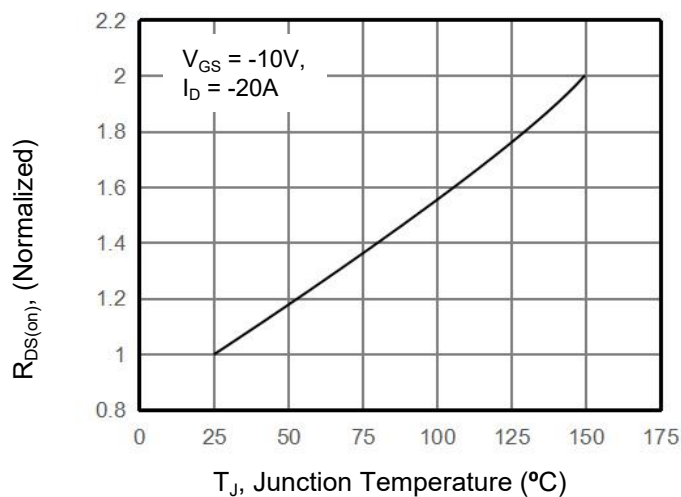


Figure 8. Safe Operation Area

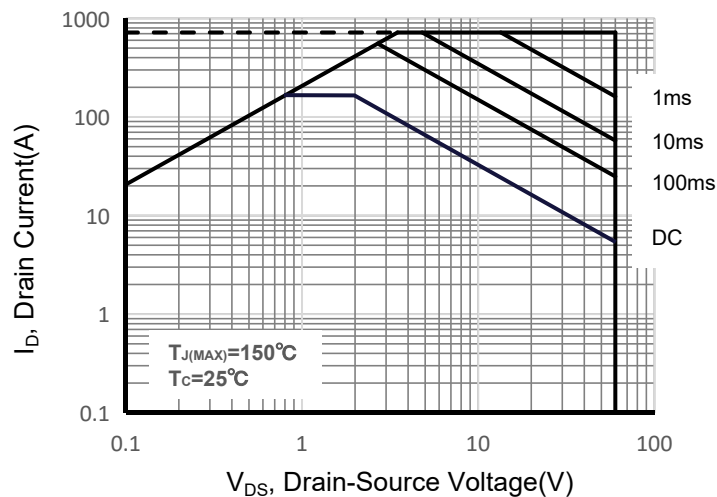


Figure 9. Maximum Continuous Drain Current vs Case Temperature

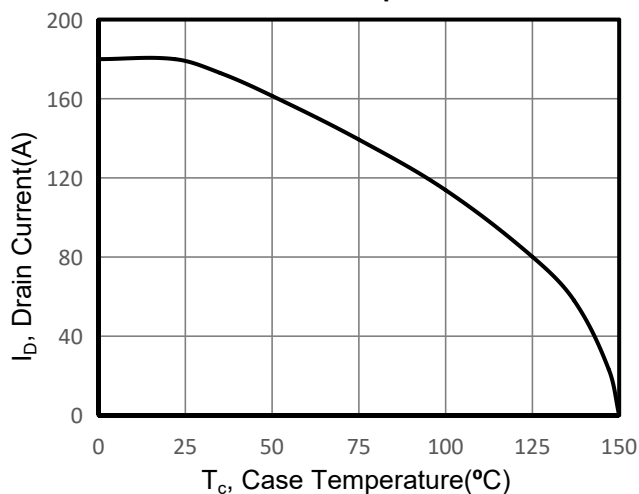
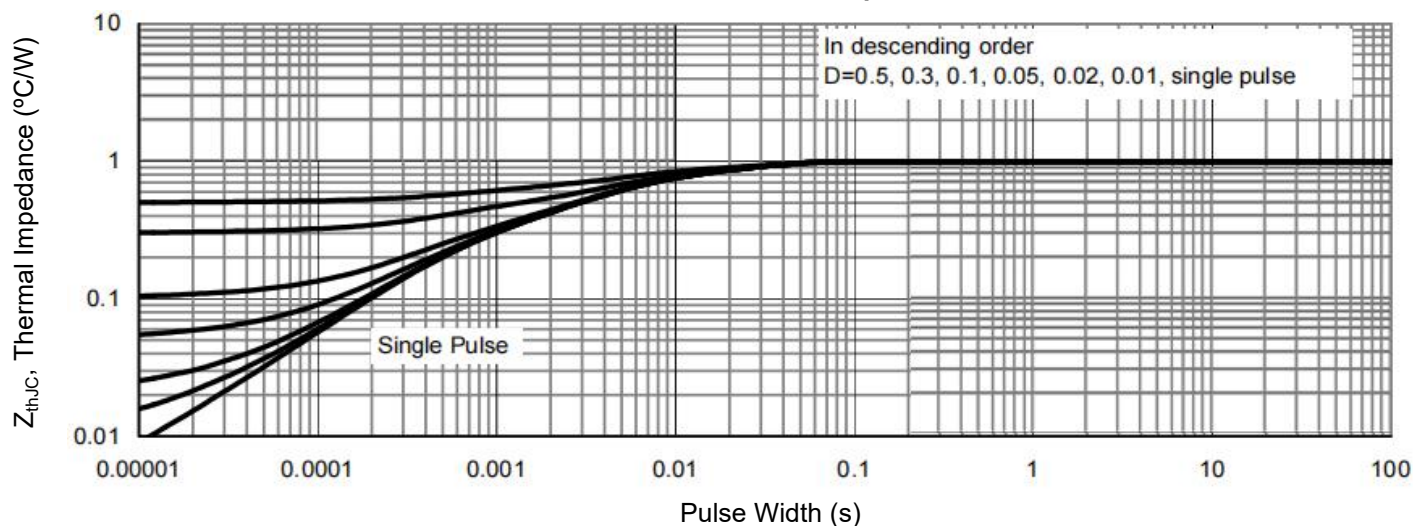
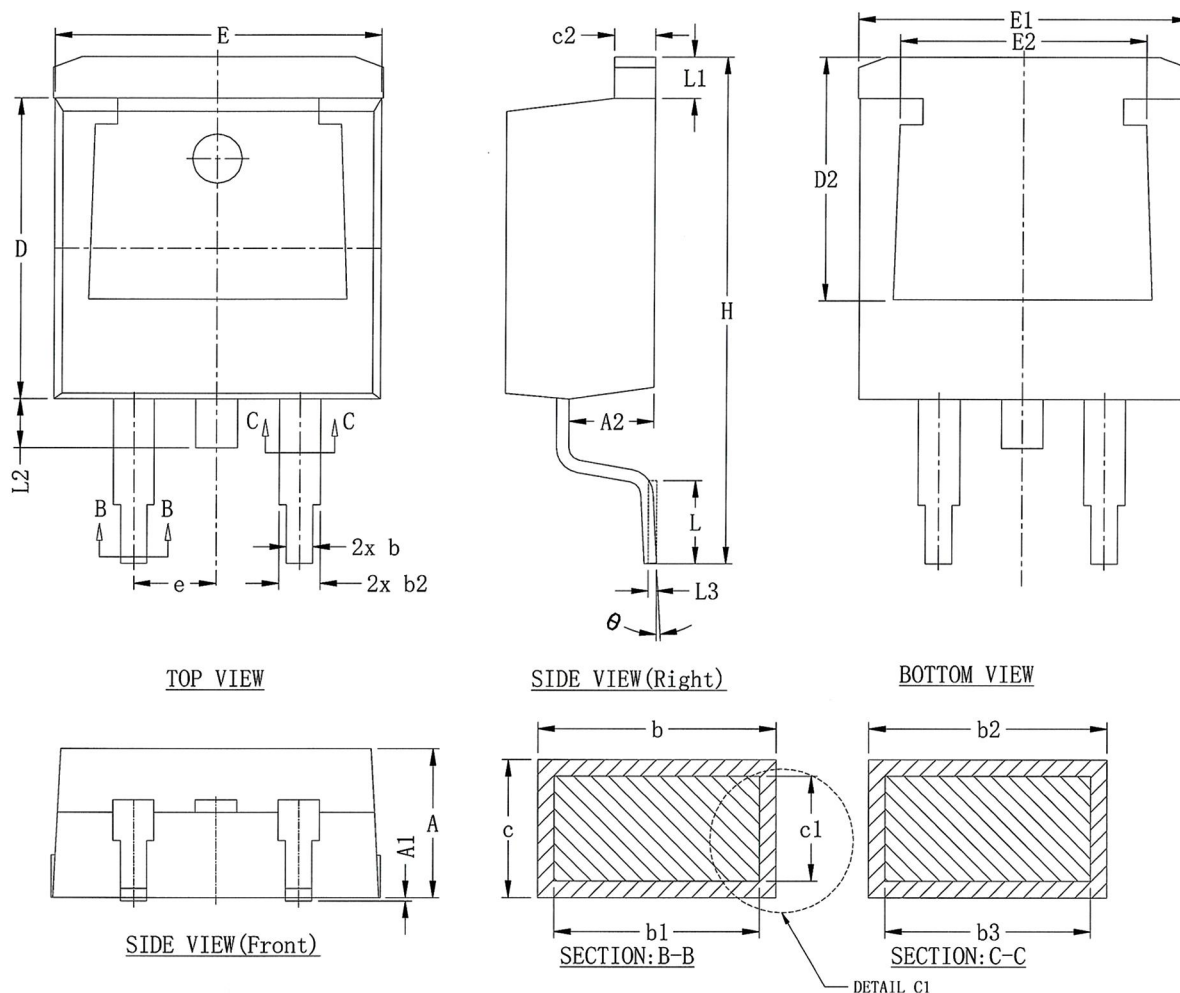


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-263 Package Information



DIM SYMBOL	MIN.	NOM.	MAX.	DIM SYMBOL	MIN.	NOM.	MAX.
A	4.450	4.550	4.650	D2	7.215	7.415	7.615
A1	0.000	—	0.150	E	9.900	10.000	10.100
A2	2.500	2.600	2.700	E1	9.900	10.100	10.300
b	0.753	0.853	0.953	E2	7.341	7.541	7.741
b1	0.713	0.813	0.913	e	2.540 BSC.		
b2	1.210	1.310	1.410	H	15.300	15.500	15.700
b3	1.170	1.270	1.370	L	2.340	2.540	2.740
c	0.330	0.421	0.521	L1	1.066	1.266	1.466
c1	0.281	0.381	0.481	L2	1.400	1.500	1.600
c2	1.210	1.310	1.410	L3	0.254 BSC.		
D	9.100	9.200	9.300	θ	0°	---	5°