P-Channel Trench MOSFET

Description

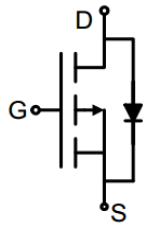
The G65P06 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} -60V
- I_D (at V_{GS} = -10V) -65A
- $R_{DS(ON)}$ (at V_{GS} = -10V) < 18mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram

Device	Package	Marking	Packaging
G65P06K	TO-252	G65P06	2500pcs/Reel
G65P06T	TO-220	G65P06	50pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Continuous Drain Current	I_D	-65	A
Pulsed Drain Current (note1)	I_{DM}	-260	A
Gate-Source Voltage	V_{GS}	±20	V
Power Dissipation	P_D	130	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 175	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case (note2)	R_{thJc}	1.15	ºC/W

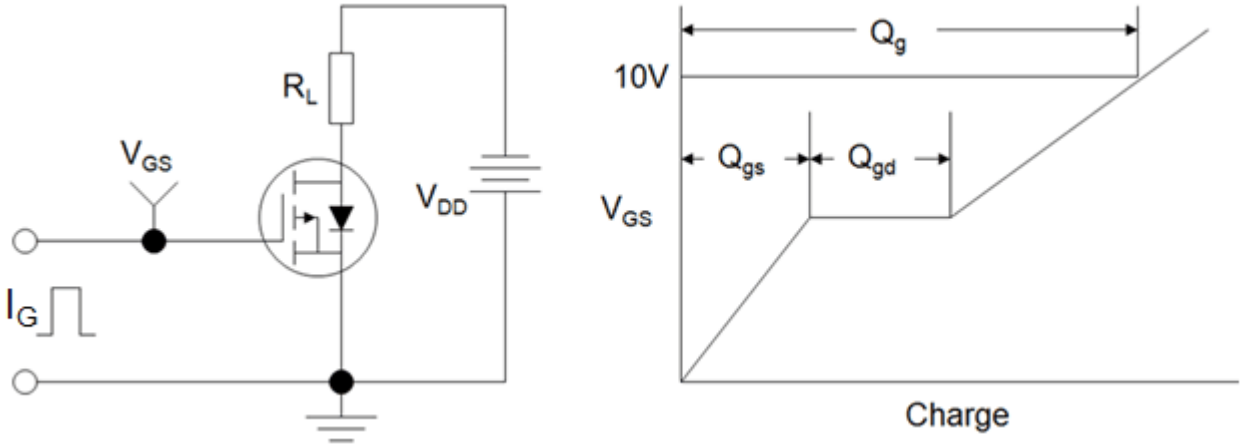
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-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	-2	-2.6	-3.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D =-20A	--	13	18	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D =-20A	--	25	--	S
Dynamic Parameters (note4)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -25V, f = 1.0MHz	--	5814	--	pF
Output Capacitance	C_{oss}		--	483	--	
Reverse Transfer Capacitance	C_{rss}		--	234	--	
Total Gate Charge	Q_g	V_{DS} = -30V, I_D = -20A, V_{GS} = -10V	--	75	--	nC
Gate-Source Charge	Q_{gs}		--	16	--	
Gate-Drain Charge	Q_{gd}		--	19	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = -30V, R_L = 1.5Ω, V_{GS} = -10V, R_G = 3Ω	--	18	--	nS
Turn-on Rise Time	t_r		--	20	--	
Turn-off Delay Time	$t_{d(off)}$		--	55	--	
Turn-off Fall Time	t_f		--	35	--	
Drain-Source Body Diode Characteristics						
Body Diode Voltage (note3)	V_{SD}	I_S =-20A, V_{GS} = 0V	--	--	-1.2	V
Single pulse avalanche energy (note5)	E_{AS}		--	722	--	mJ
Reverse Recovery Time	t_{rr}	I_S =-20A, V_{GS} = 0V dI/dt = -100A/μs	--	0.13	--	μS
Reverse Recovery Charge	Q_{rr}		--	0.77	--	uC

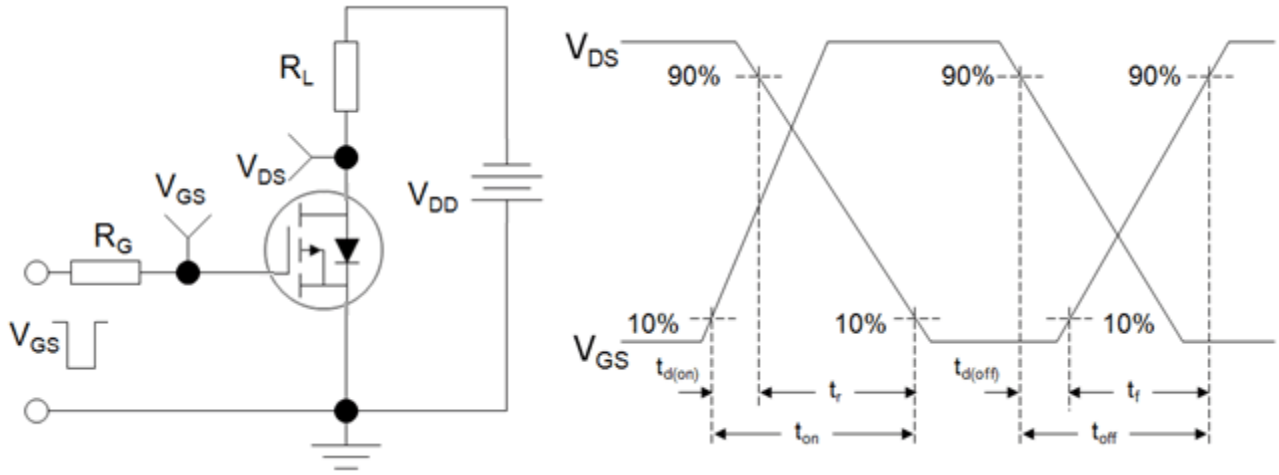
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: Tj=25℃,V_{DD}=-30V,V_G=-10V,L=0.5mH,Rg=25Ω

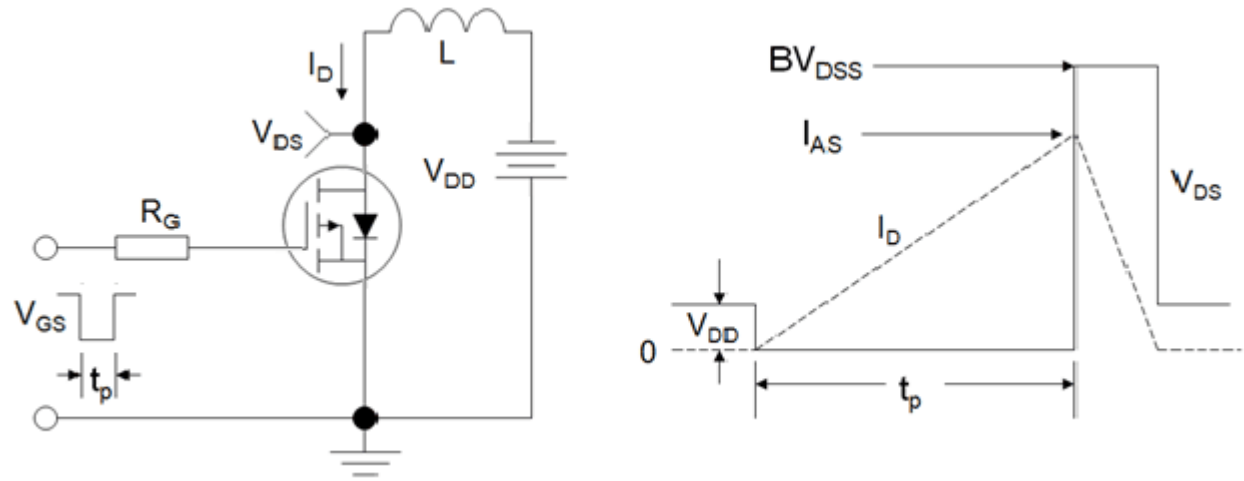
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

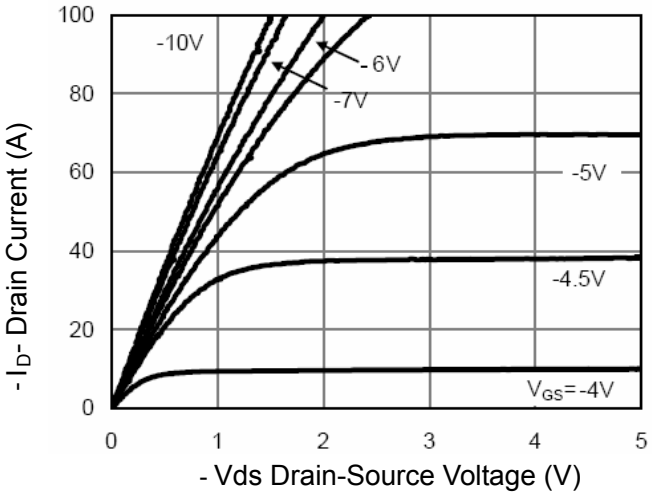


Figure 1 Output Characteristics

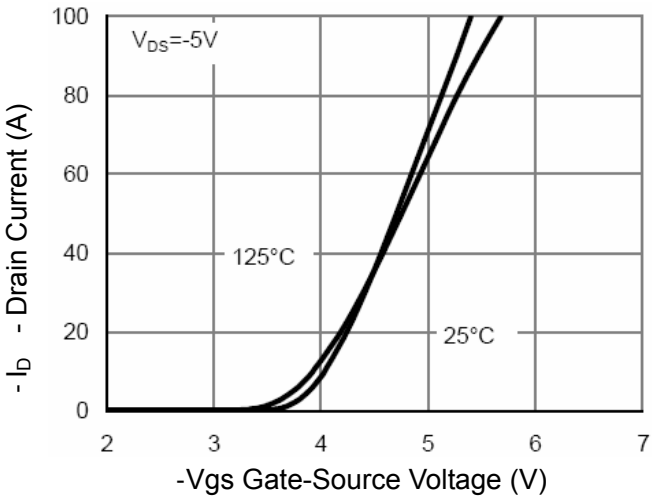


Figure 2 Transfer Characteristics

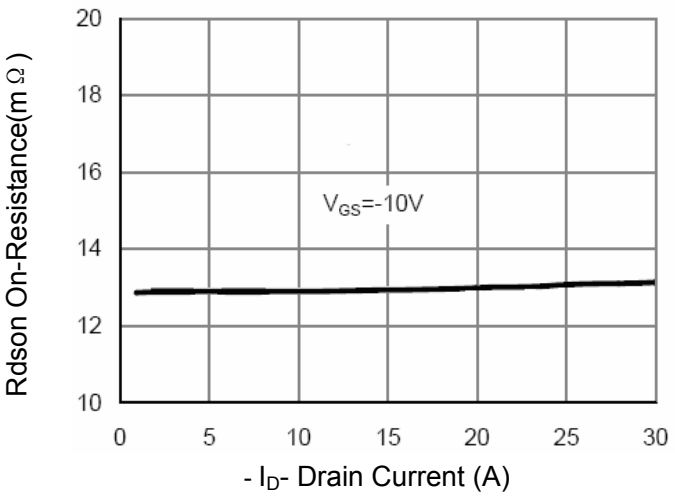


Figure 3 Rdson- Drain Current

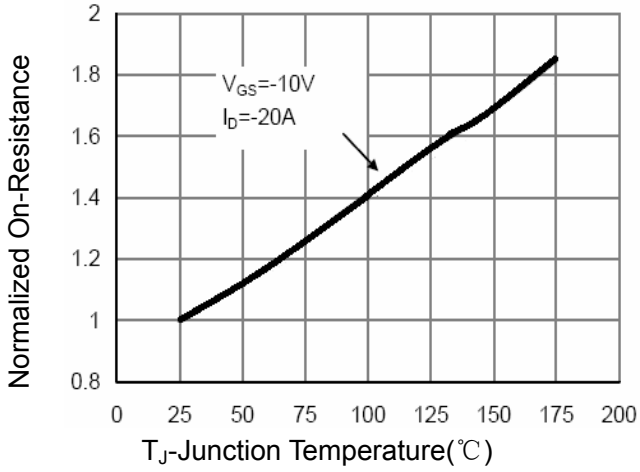


Figure 4 Rdson-Junction Temperature

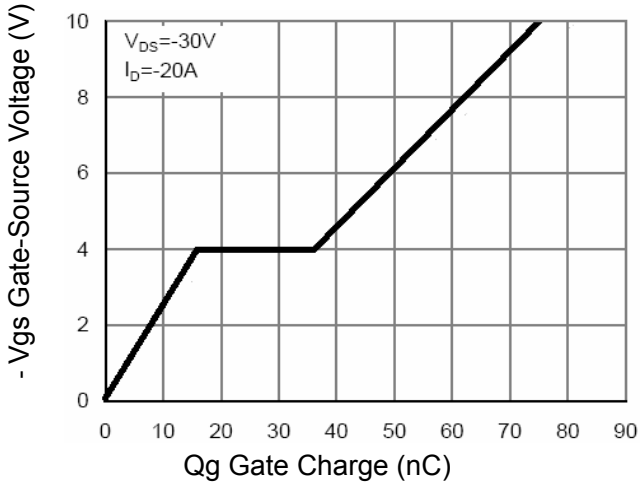


Figure 5 Gate Charge

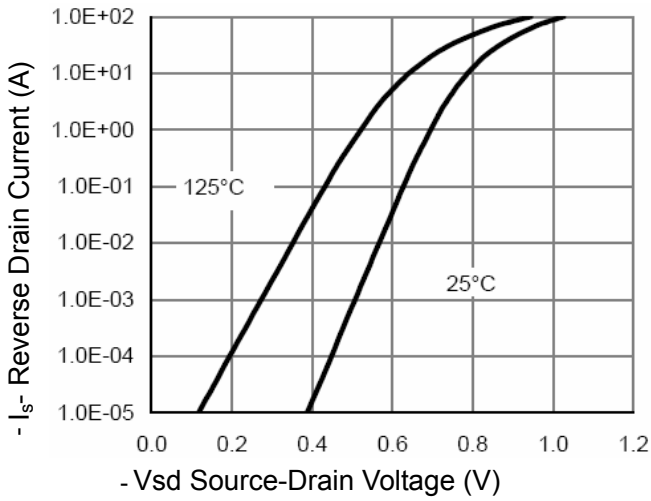


Figure 6 Source- Drain Diode Forward

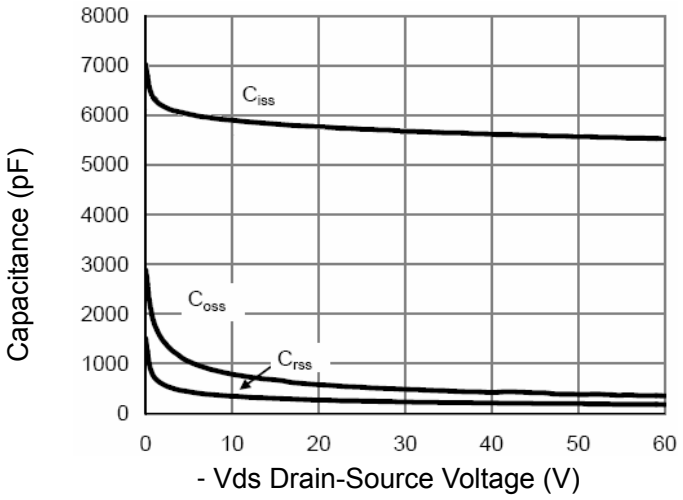


Figure 7 Capacitance vs Vds

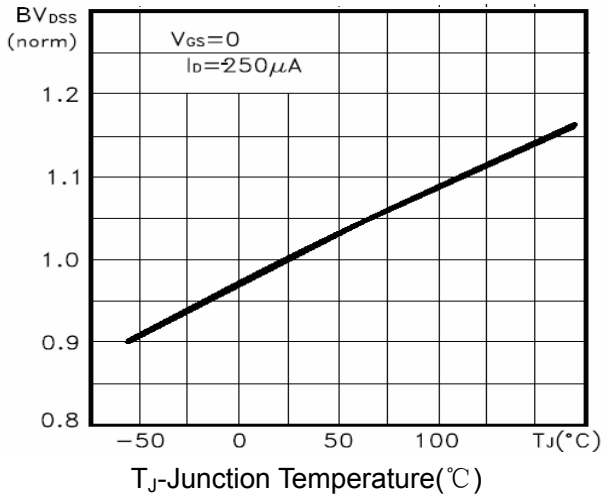


Figure 9 BV_{DSS} vs Junction Temperature

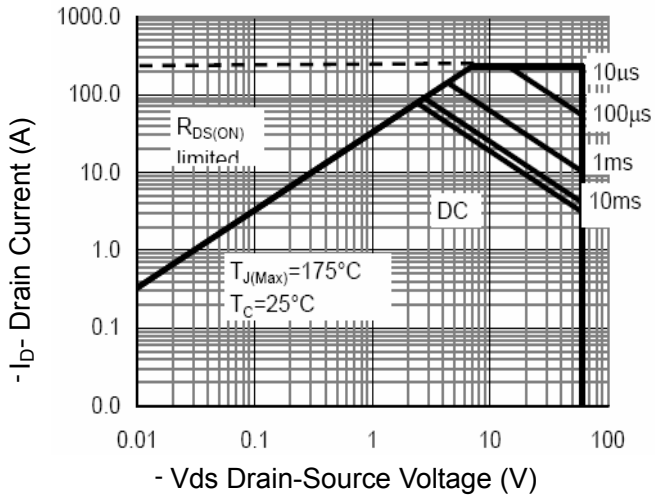


Figure 8 Safe Operation Area

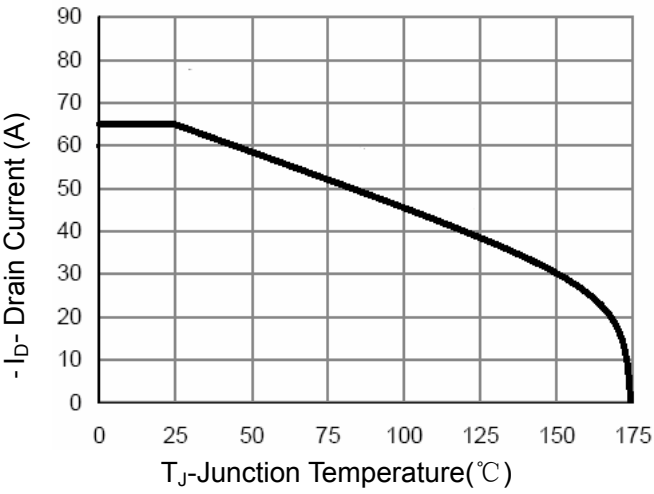


Figure 10 ID Current Derating vs Junction Temperature

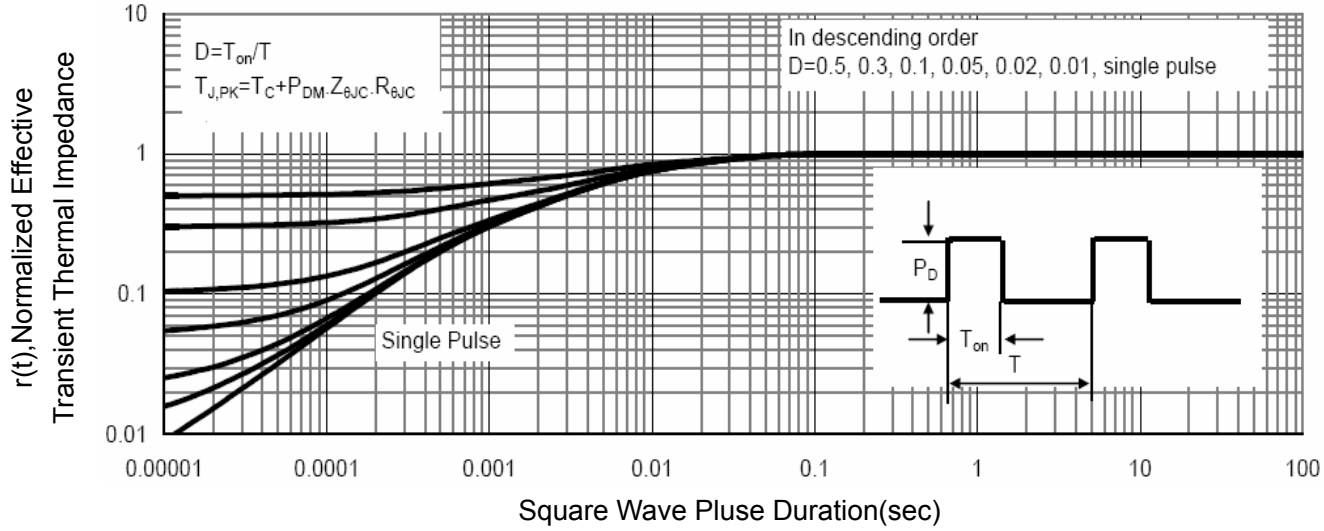
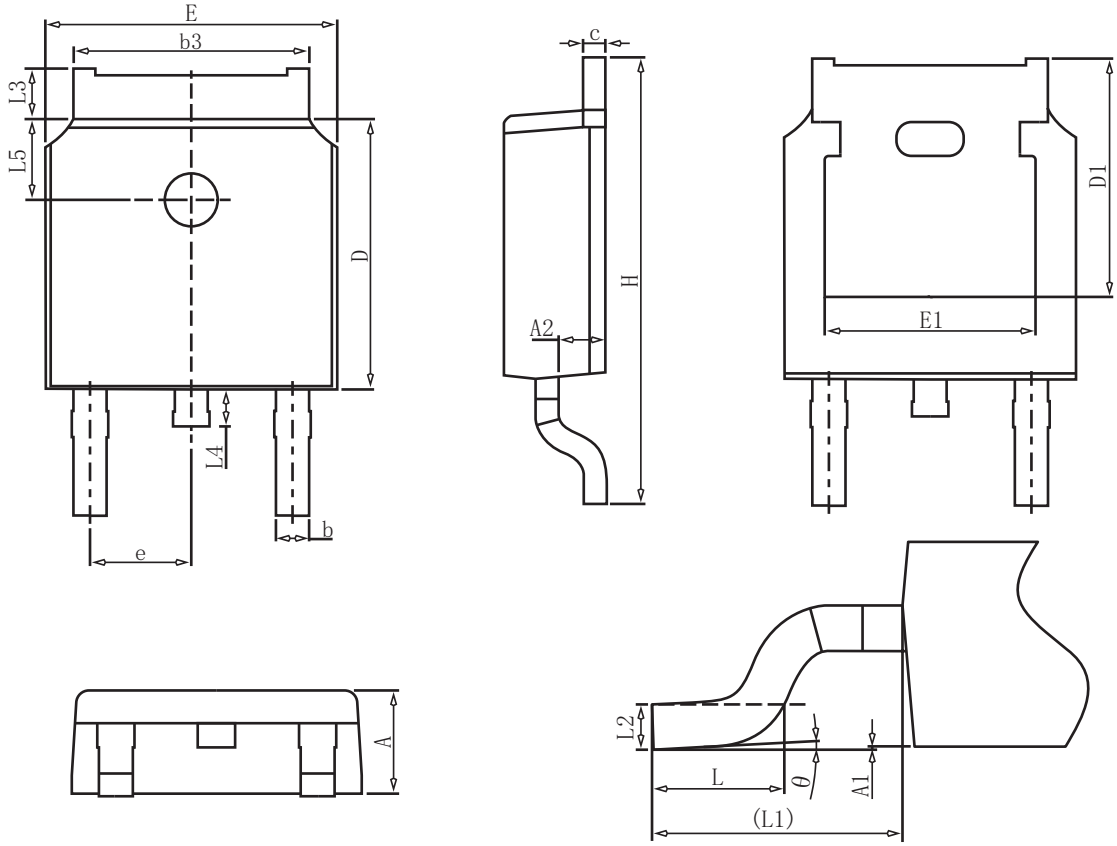


Figure 11 Normalized Maximum Transient Thermal Impedance

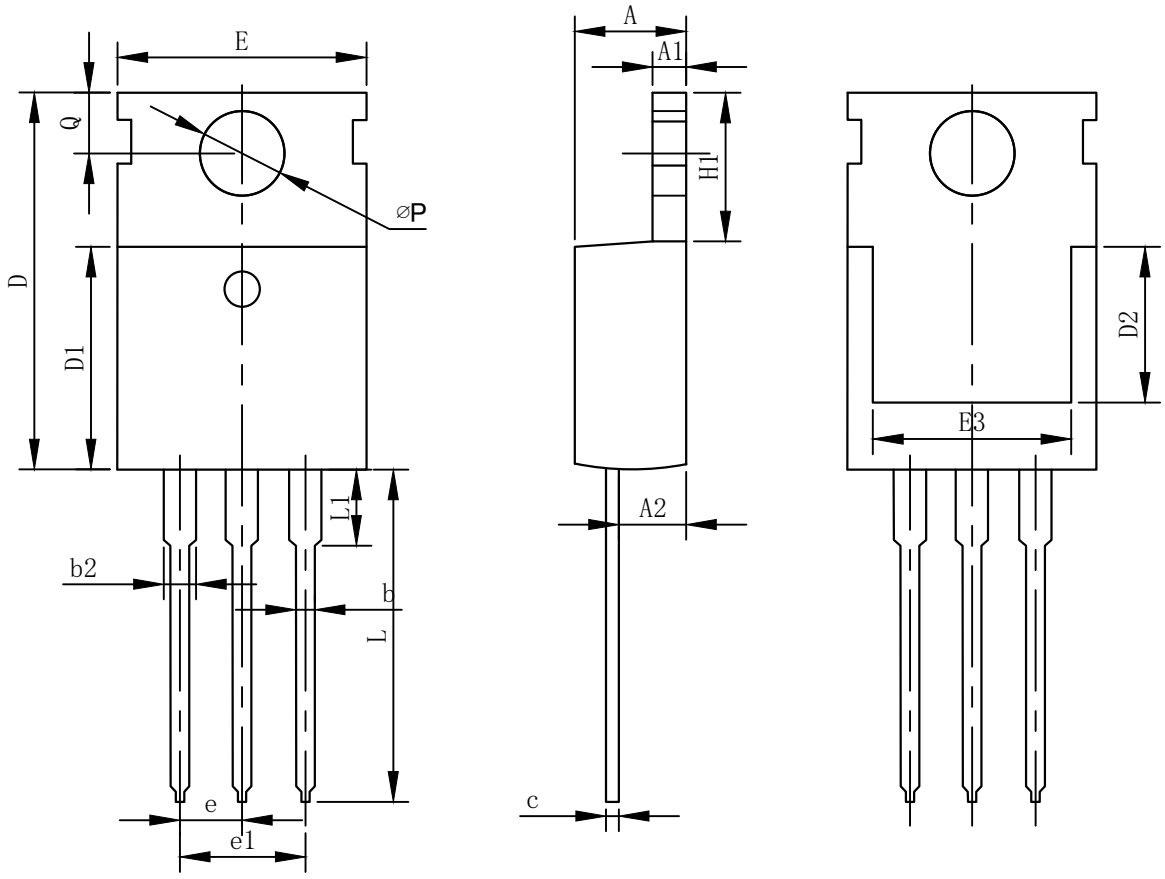
TO-252 Package information



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	–	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	–	–
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	–	1.28
L4	0.50	–	1.00
L5	1.65	1.80	1.95
θ	0°	–	8°

TO-220 Package information



COMMONDIMENSIONS

SYMBO	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.70	1.27	1.47
c	0.45	0.50	0.60
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54BSC		
e1	5.08BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ØP	3.40	3.60	3.80
Q	2.60	2.80	3.00