

preliminary

CMA04104NH-TL

40V N-Channel Power MOSFET

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

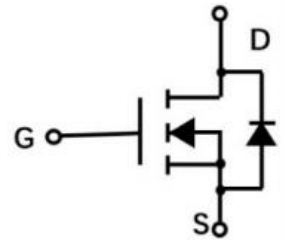
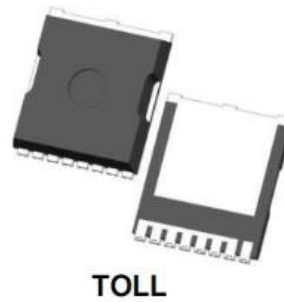
Applications

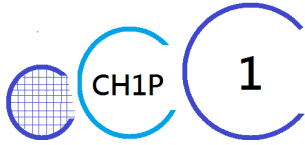
- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

Product Summary

Item	Typical Value	Unit
V_{DS}	40	V
$R_{DS(on)}$ @ $V_{GS} = 10V$ (Max)	1.5	m Ω
I_D	190	A

Pin Description





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Absolute Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Single Pulse UIS Capability, 0.5mH	E_{AS}	450	mJ
Continuous Drain Current, $T_C = 25^\circ\text{C}$	I_D	190	A
Maximum Power Dissipation, $T_C = 25^\circ\text{C}$	P_D	114	W
Junction Temperature Maximum	T_{JMAX}	150	$^\circ\text{C}$
Storage Temperature	$T_{Storage}$	-55 to 150	$^\circ\text{C}$

Absolute Ratings

Parameter	Symbol	Value	Units
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	20	$^\circ\text{C}/\text{W}$

Electrical Characteristics

Static ($T_J=25^{\circ}\text{C}$ unless otherwise specified)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	40	---	---	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	---	---	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V, T_J=25^{\circ}\text{C}$	---	---	1	uA
		$V_{DS} = 40V, V_{GS} = 0V, T_J=100^{\circ}\text{C}$	---	---	100	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	---	---	1.5	m Ω
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	---	4	V
Dynamic ($T_J=25^{\circ}\text{C}$ unless otherwise specified)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 25V, f = 300\text{KHz}$	---	9300	---	pF
Output Capacitance	C_{oss}		---	1410	---	
Reverse Transfer Capacitance	C_{rss}		---	78	---	
Total Gate Charge	Q_g	$V_{DS} = 32V, I_D = 20A, V_{GS} = 10V$	---	127	---	nC
Gate-Source Charge	Q_{gs}		---	35	---	
Gate-Drain Charge	Q_{gd}		---	26	---	
Turn-on delay time	$T_{d(on)}$	$V_{DS} = 20V, I_D = 25A, V_{GS} = 10V, R_G = 2\Omega,$	---	22.5	---	ns
Rise time	T_r		---	6.7	---	
Turn-off delay time	$T_{d(off)}$		---	80.3	---	
Fall time	T_f		---	26.9	---	
Reverse Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_F = 25A$	---	---	1.2	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_F = 25A, di_F/dt=100A/\mu s$	---	100	---	ns
Reverse Recovery Charge	Q_{rr}		---	163	---	nC

Typical Characteristics

Figure.1 Typical Output Characteristics

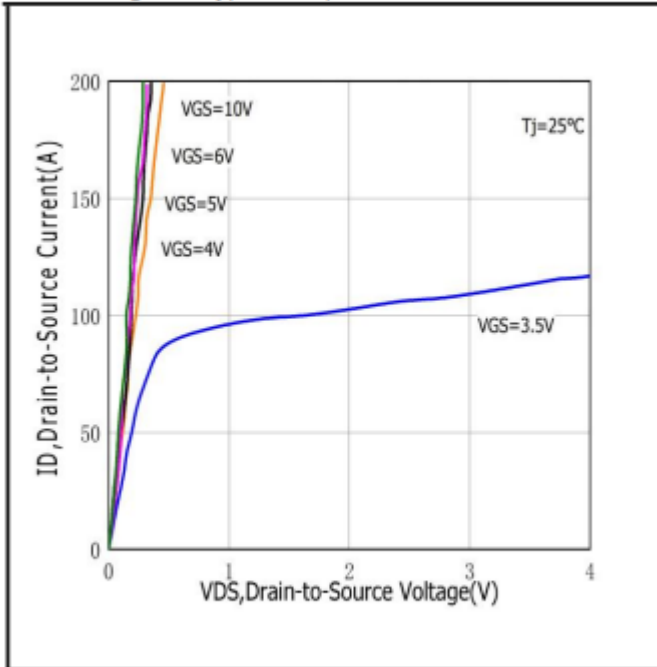


Figure.2 Typical Gate Charge vs Gate to Source Voltage

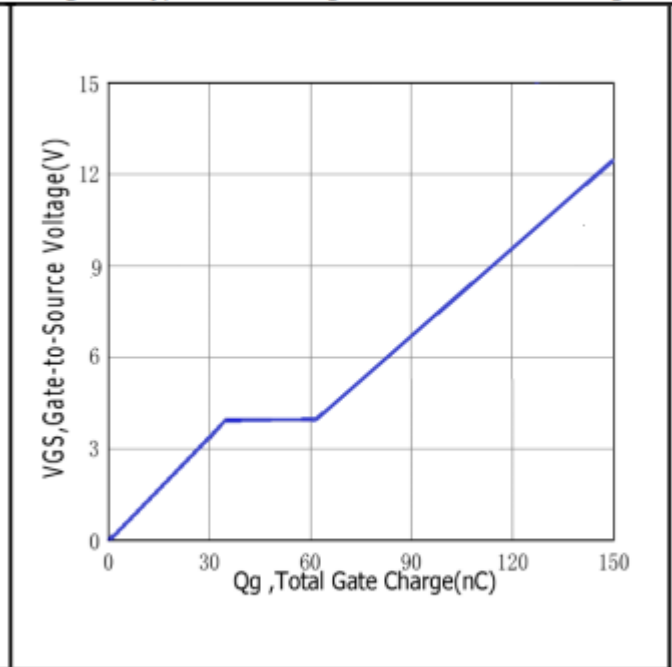


Figure.3 Typical Body Diode Transfer Characteristics

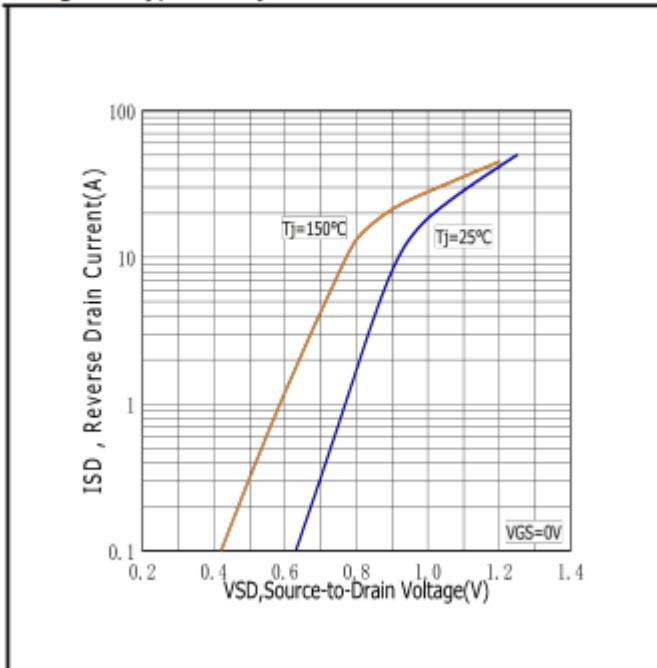


Figure.4 Typical Capacitance vs Drain to Source Voltage

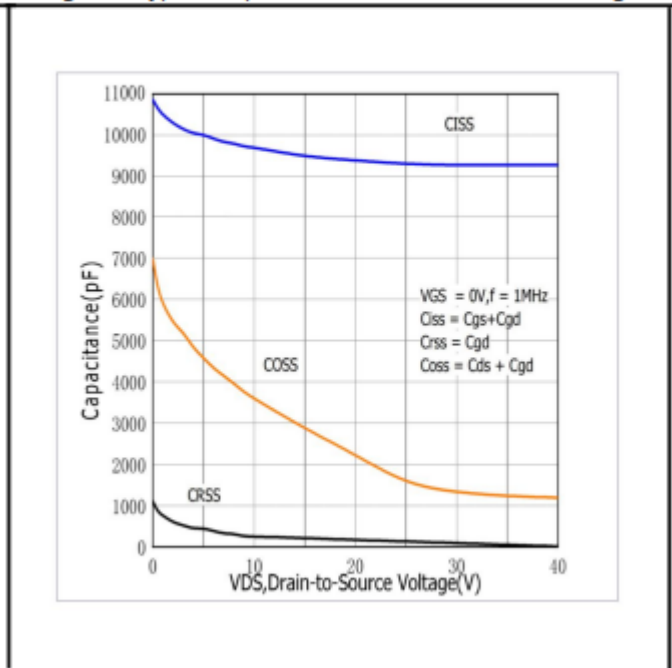


Figure.5 Typical Breakdown Voltage vs Junction Temperature

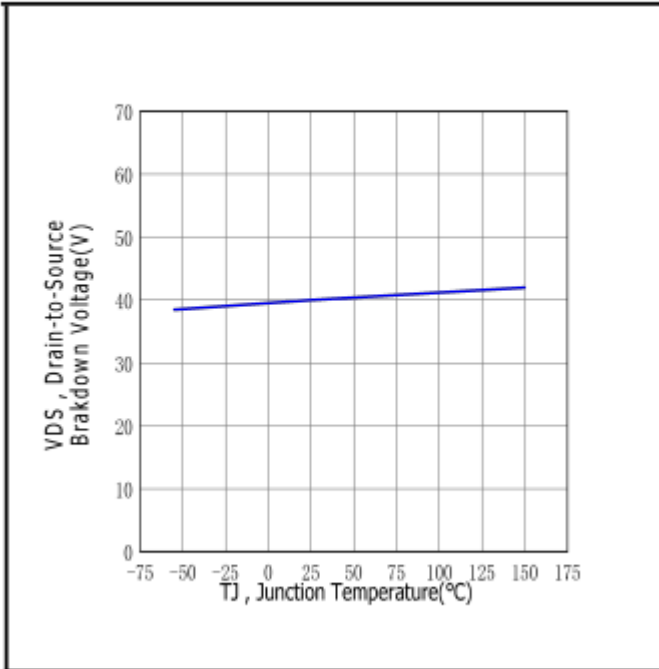


Figure.6 Typical Drain to Source on Resistance vs Junction Temperature

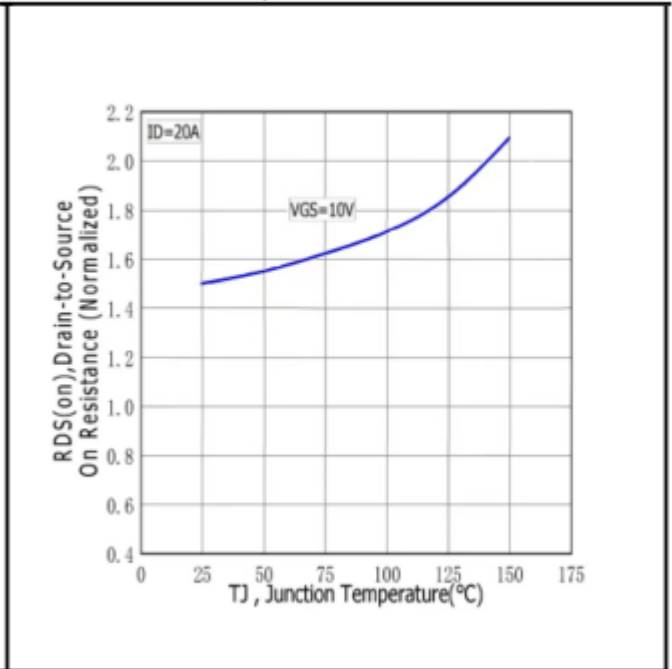


Figure.7 Maximum Forward Bias Safe Operating Area

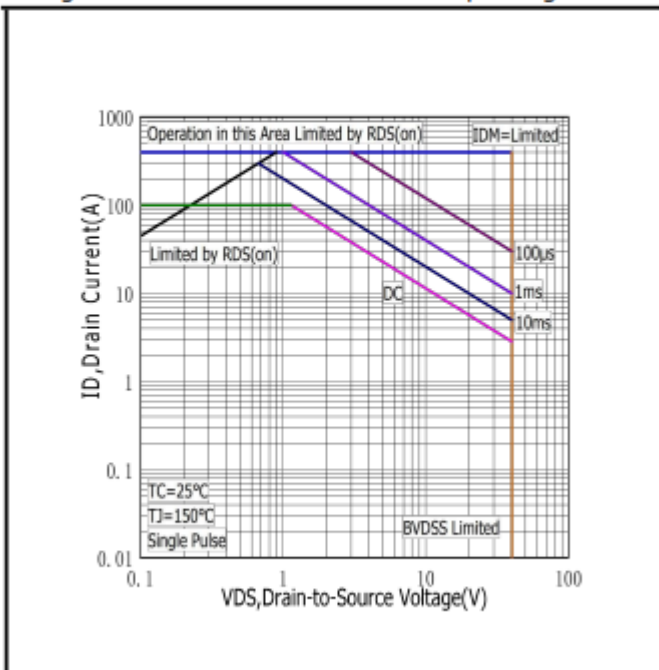


Figure.8 Typical Drain to Source ON Resistance vs Drain Current

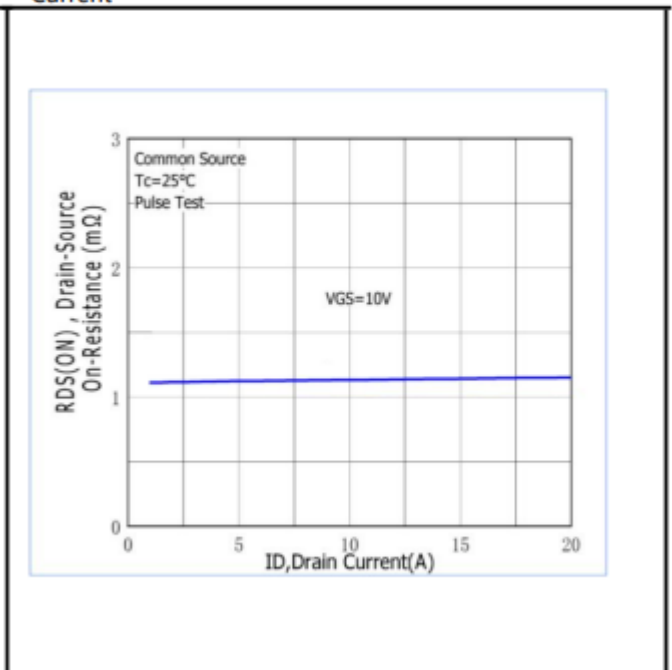


Figure.9 Maximum EAS vs Channel Temperature

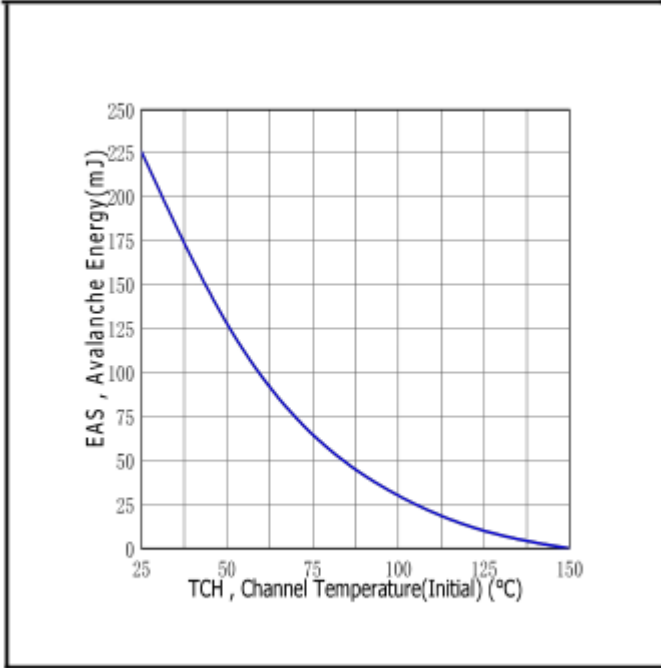


Figure.10 Typical Threshold Voltage vs Case Temperature

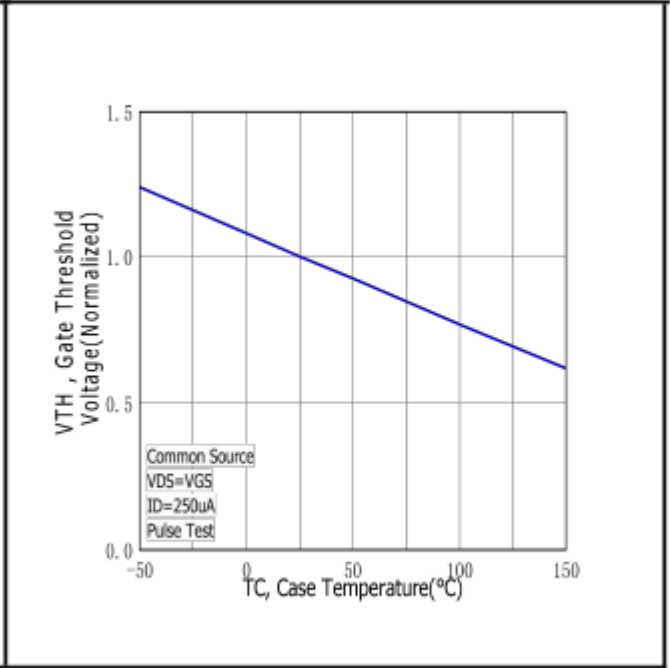


Figure.11 Typical Transfer Characteristics

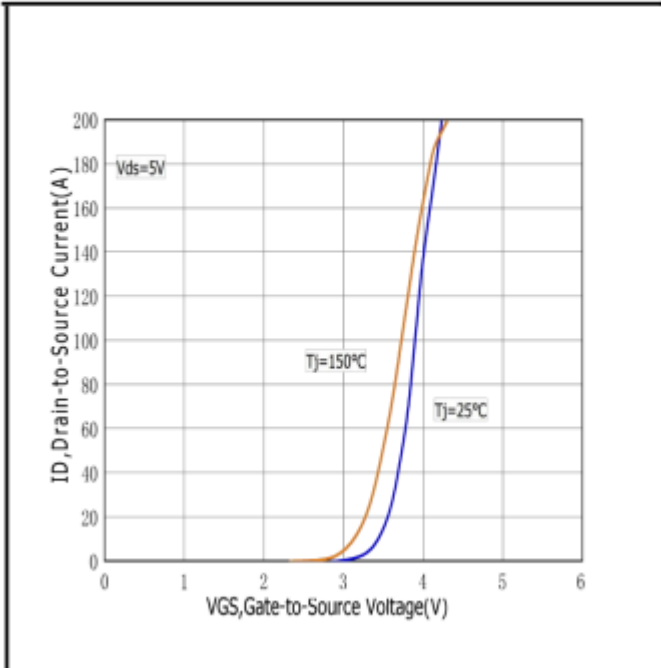


Figure.12 Maximum Power Dissipation vs Case Temperature

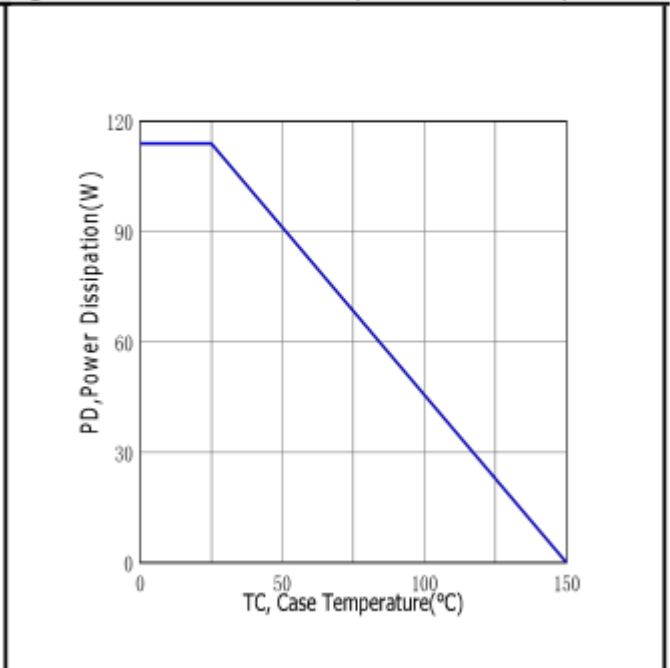
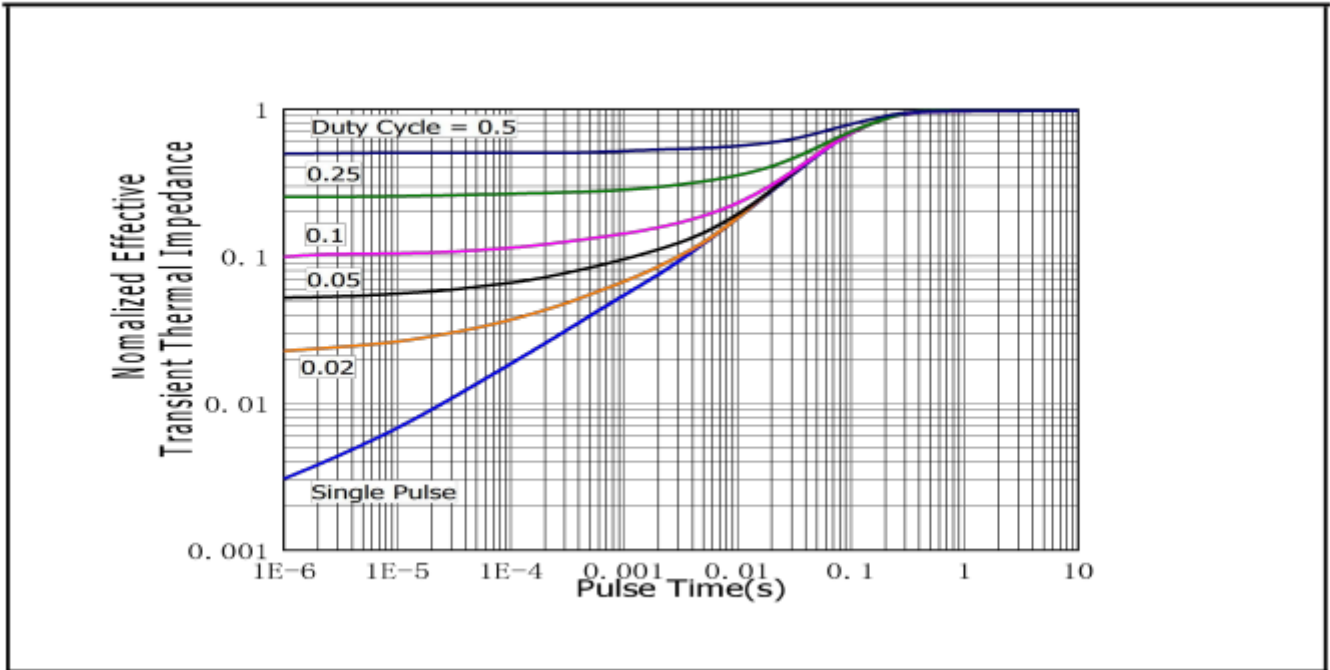
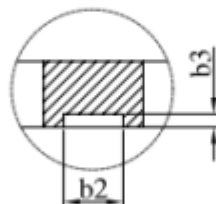
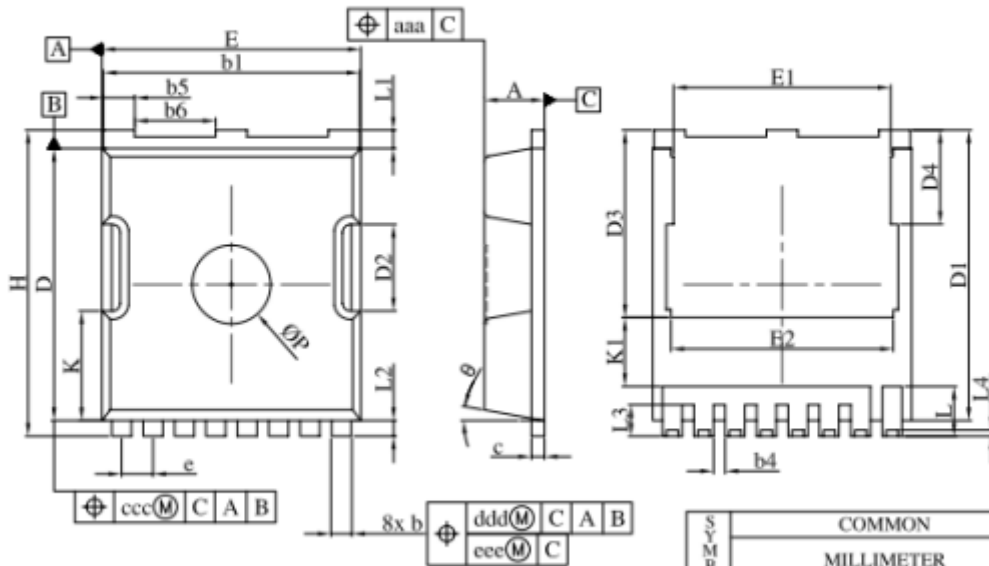


Figure.13 Maximum Effective Thermal Impedance , Junction to Case



TOLL



SYMBOL	COMMON		
	MILLIMETER		
	MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.36	0.45	0.55
b3	0.05	0.100	0.35
b4	0.30	0.40	0.50
b5	1.10	1.20	1.30
b6	3.00	3.10	3.20
c	0.40	0.50	0.60
D	10.28	10.38	10.55
D1	10.98	11.08	11.18
D2	3.20	3.30	3.40
D3	7.00	7.15	7.30
D4	3.44	3.59	3.74
e	1.10	1.20	1.30
E	9.80	9.90	10.00
E1	8.20	8.30	8.40
E2	8.35	8.50	8.65
H	11.50	11.68	11.85
K	4.08	4.18	4.28
K1	2.45	---	---
L	1.60	1.90	2.10
L1	0.50	0.70	0.90
L2	0.50	0.60	0.70
L3	1.00	1.20	1.30
L4	0.13	0.23	0.33
P	2.85	3.00	3.15
θ	10° REF		
aaa	0.20		
ccc	0.20		
ddd	0.25		
eee	0.20		