

N-Channel Enhancement Mode MOSFET

TDM3428B

**DESCRIPTION**

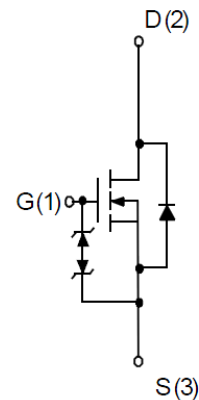
The TDM3428B uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

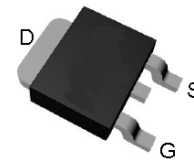
- RDS(ON) < 17.5mΩ @ VGS=4.5V  
RDS(ON) < 10.8mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

**Application**

- PWM applications
- Load switch
- Power management



N-Channel MOSFET



Top View of TO-252-3

ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Diode Continuous Forward Current	I <sub>S</sub> (T <sub>C</sub> =25°C)	5	A
Continuous Drain Current (Note 1)	I <sub>D</sub> (T <sub>C</sub> =25°C)	45	A
	I <sub>D</sub> (T <sub>C</sub> =100°C)	30	A
Pulse Drain Current Tested	I <sub>DM</sub> (T <sub>A</sub> =25°C)	36	A
Maximum Power Dissipation	P <sub>D</sub> (T <sub>C</sub> =25°C)	40	W
	P <sub>D</sub> (T <sub>C</sub> =100°C)	16	W
Maximum Power Dissipation	P <sub>D</sub> (T <sub>A</sub> =25°C)	3.5	W
	P <sub>D</sub> (T <sub>A</sub> =70°C)	2.2	W
Thermal Resistance,Junction-to-Case	R <sub>θJC</sub>	2.8	°C/W
Thermal Resistance,Junction-to-Ambient(t<10s)	R <sub>θJA</sub>	50	°C/W
Maximum Operating Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 To 150	°C

NOTES:

1. Max continuous current is limited by bonding wire.

**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

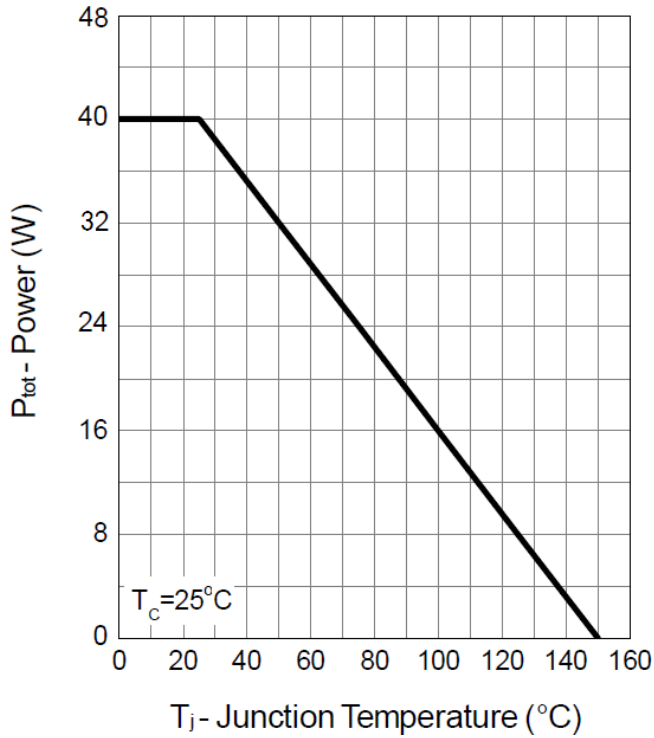
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS</b> (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.4	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$	-	9.7	10.8	$m\Omega$
		$V_{GS}=4.5V, I_D=8A$	-	13.5	17.5	$m\Omega$
<b>DYNAMIC CHARACTERISTICS</b> (Note 3)						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, F=1.0MHz$	-	450	600	PF
Output Capacitance	$C_{oss}$		-	318	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	22	-	PF
<b>SWITCHING CHARACTERISTICS</b> (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=15\Omega, V_{GEN}=10V, R_G=6\Omega, I_D=1A$	-	8.5	16	nS
Turn-on Rise Time	$t_r$		-	10	18	nS
Turn-Off Delay Time	$t_{d(off)}$		-	14	26	nS
Turn-Off Fall Time	$t_f$		-	10.6	19	nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=10A, V_{GS}=10V$	-	8	12	nC
Gate-Source Charge	$Q_{gs}$		-	1.6	-	nC
Gate-Drain Charge	$Q_{gd}$		-	1.2	-	nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_{DS}=10A, di/dt=100A/\mu s$	-	20.5	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	7.2	-	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 2)	$V_{SD}$	$V_{GS}=0V, I_S=5A$	-	0.8	1.1	V

**NOTES:**

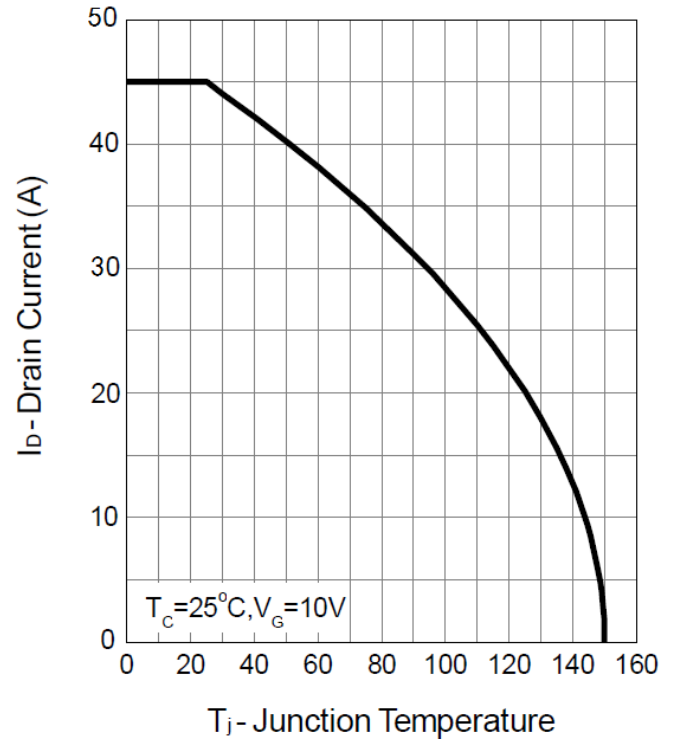
- Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing

Typical Operating Characteristics

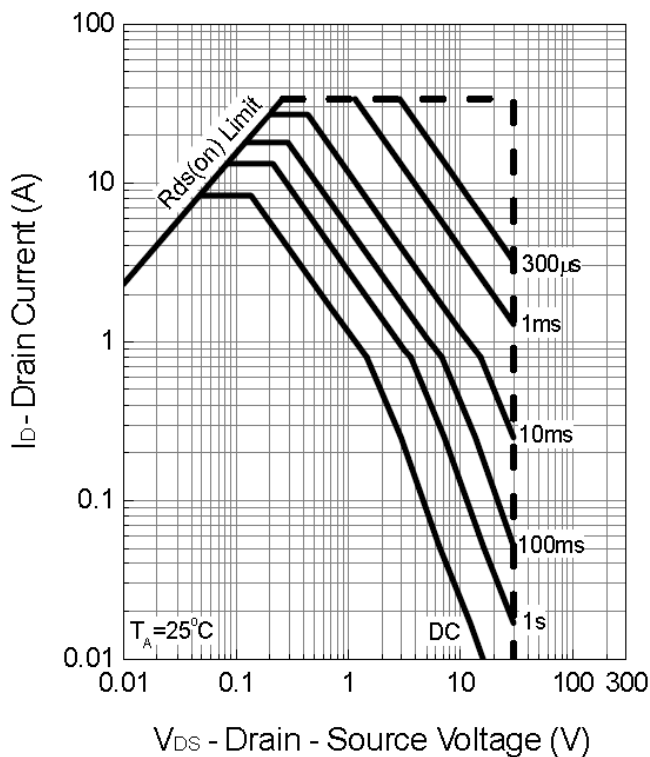
Power Dissipation



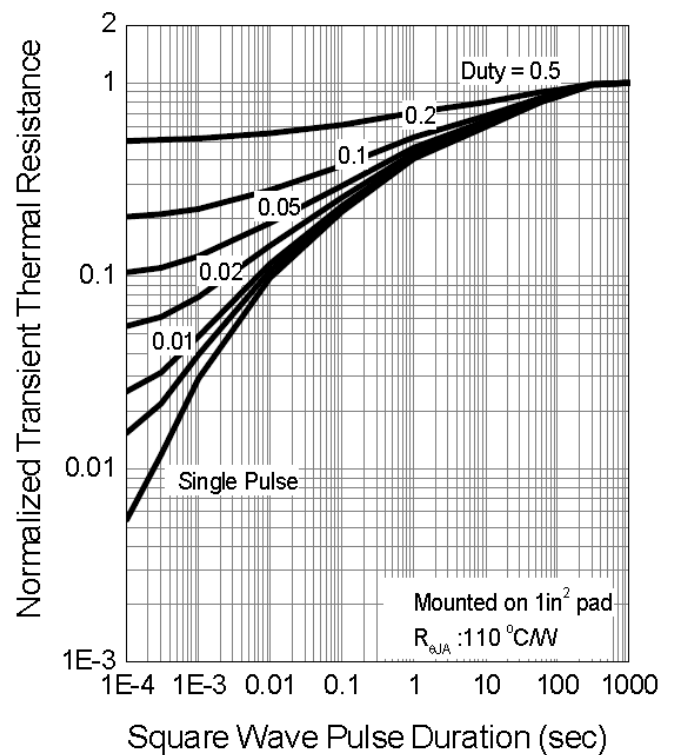
Drain Current



Safe Operation Area

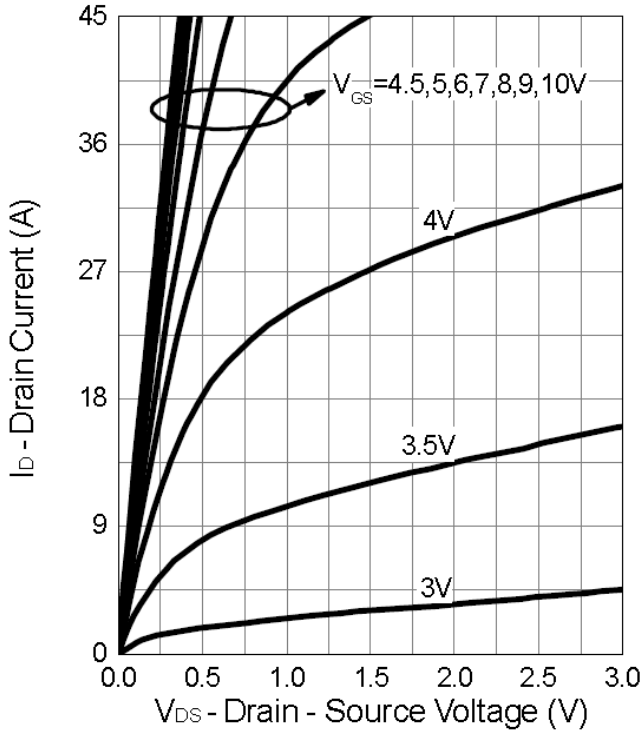


Thermal Transient Impedance

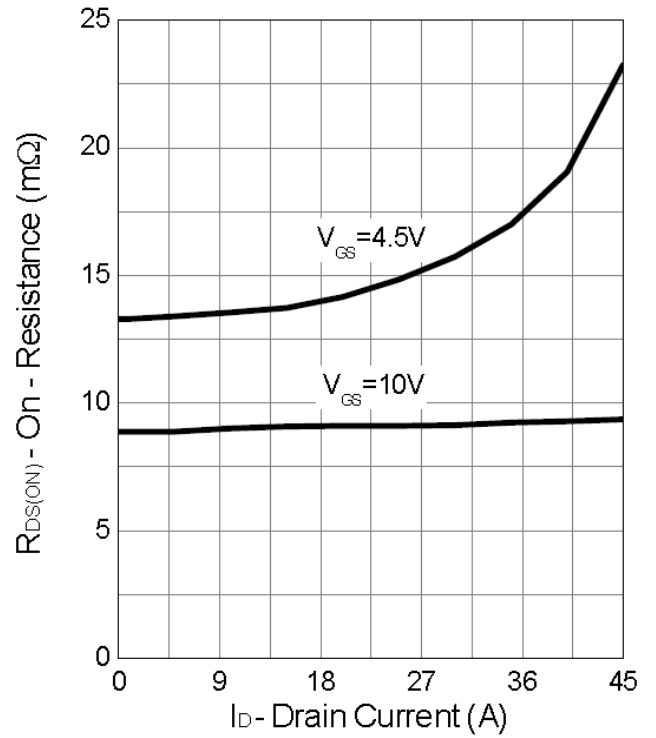


Typical Operating Characteristics(Cont.)

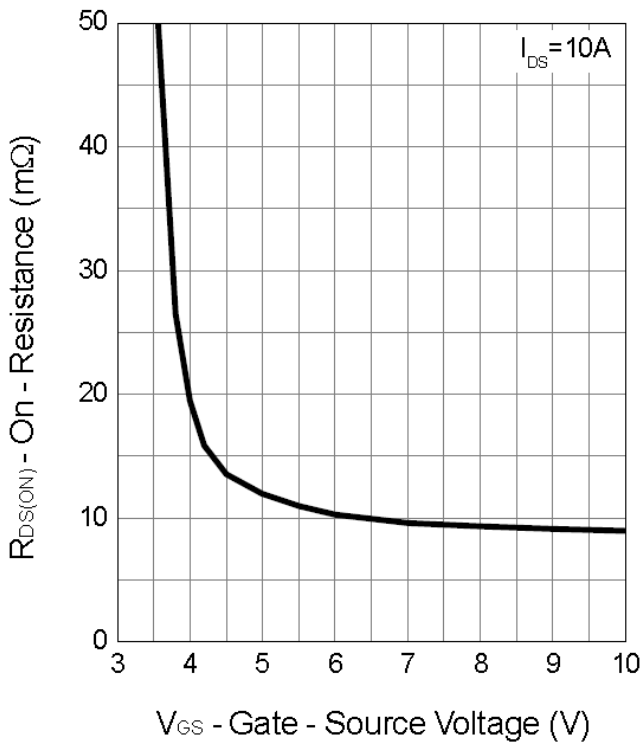
Output Characteristics



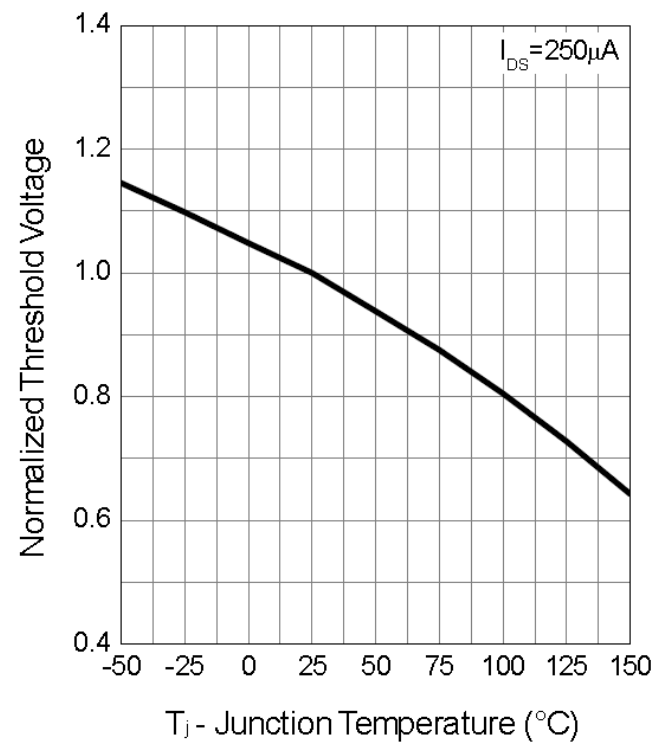
Drain-Source On Resistance



Gate-Source On Resistance

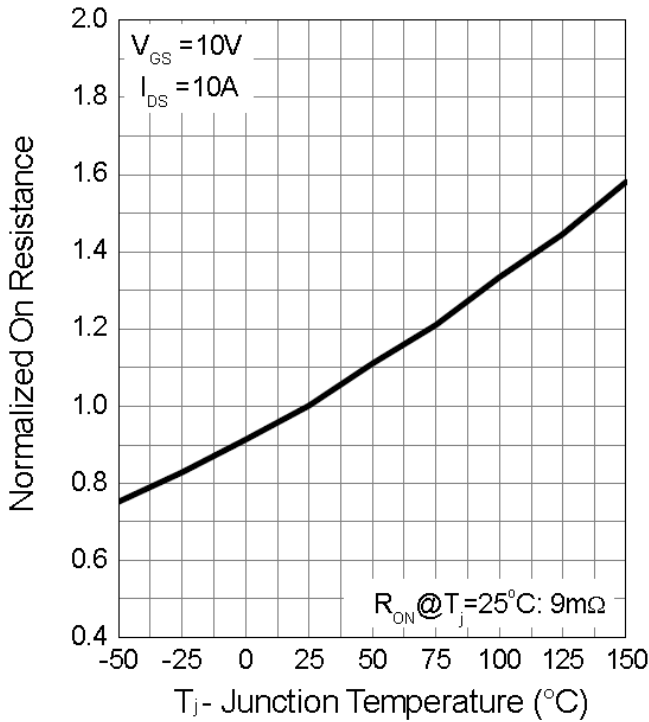


Gate Threshold Voltage

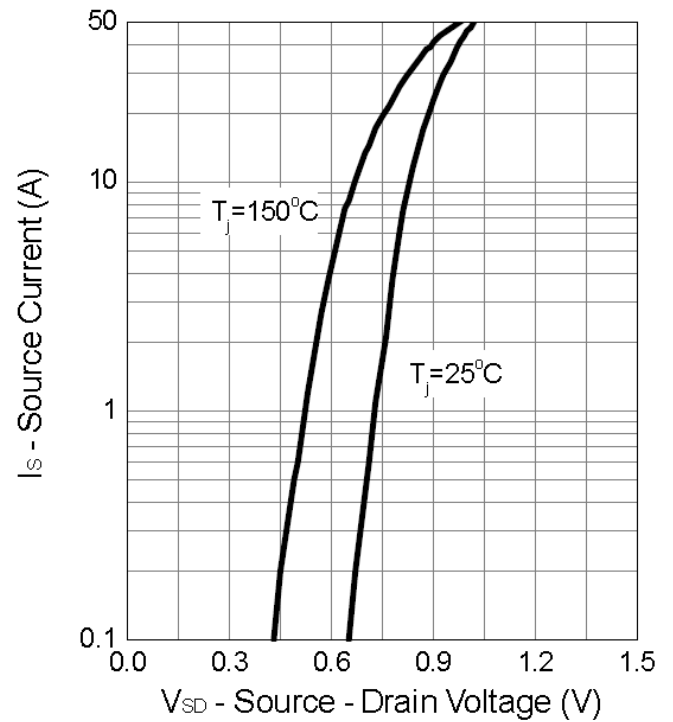


Typical Operating Characteristics (Cont.)

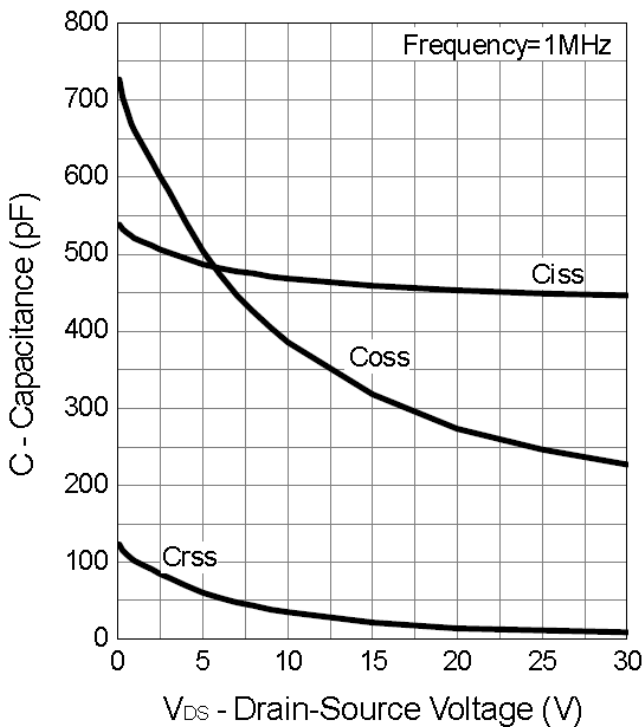
Drain-Source On Resistance



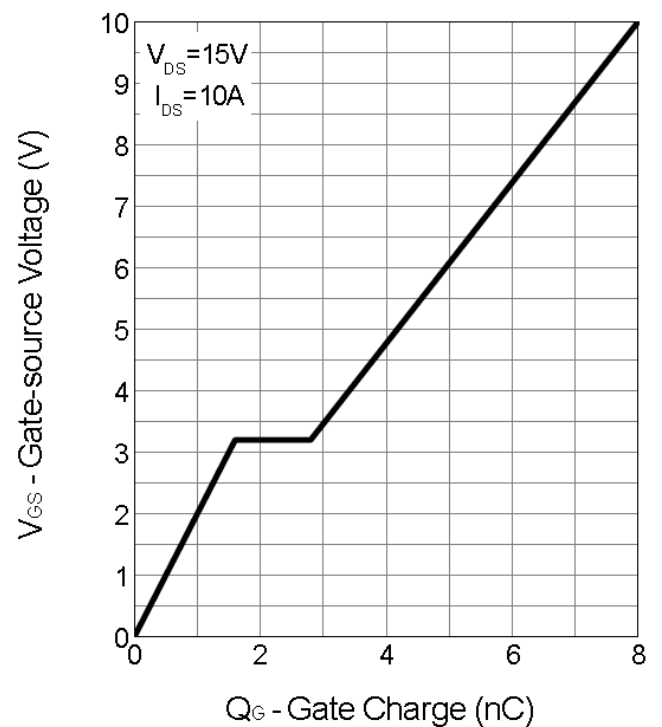
Source-Drain Diode Forward



Capacitance

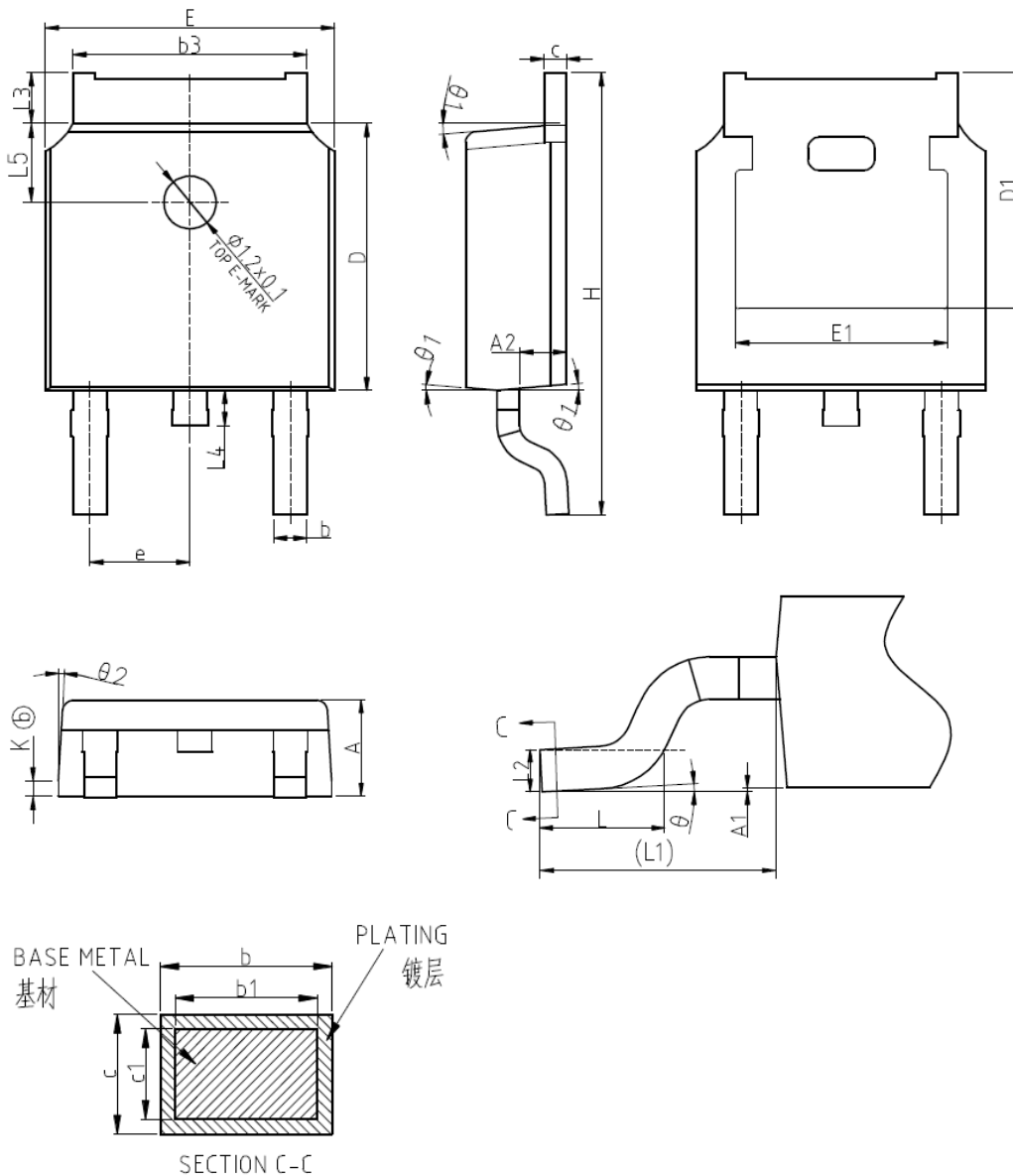


Gate Charge



Package Information

TO252-3 Package



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
b1	0.66	0.76	0.88
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
c1	0.41	0.51	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	4.83	5.03
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	-	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°
θ1	5°	7°	9°
θ2	5°	7°	9°
K	0.40REF		

Design Notes