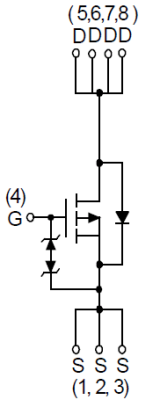
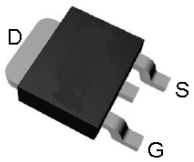
P-Channel Enhancement Mode MOSFET TDM3435

DESCRIPTION

The TDM3435 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.



P-Channel MOSFET



Top View of TO-252-3

GENERAL FEATURES

- -30V/-68A
- RDS(ON) < 15mΩ @ VGS=-4.5V
  RDS(ON) < 9mΩ @ VGS=-10V
- Reliable and Rugged
- HBM ESD capability level of 8KV typical
- Lead free product is available
- TO252 Package

Application

- PWM applications
- Load switch
- Power management

ABSOLUTE MAXIMUM RATINGS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±25	V
Diode Continuous Forward Current	I_S(Tc=25℃)	-30	A
Pulsed Drain Current Tested (note1)	I_{DM}(Tc=25℃)	-180	A
Continuous Drain Current	I_D (Tc=25℃)	-68	A
	I_D (Tc=100℃)	-43	A
Maximum Power Dissipation	P_D(Tc=25℃)	62.5	W
	P_D(Tc=100℃)	25	W
Continuous Drain Current(V_{GS}=-10V) (note1)	I_D (T_A=25℃)	-21.5	A
	I_D (T_A=70℃)	-17.2	A
Maximum Power Dissipation	P_D(T_A=25℃)	6.25	W
	P_D(T_A=70℃)	4	W
Thermal Resistance-Junction to Ambient (note1)	$R_{\theta JA}$(t≤10s)	20	℃/W
	$R_{\theta JA}$(Steady State)	55	℃/W
Thermal Resistance-Junction to Case (note2)	$R_{\theta JC}$	2	℃/W
Maximum Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃
Avalanche Current, Single pulse	I_{AS}(L=0.5mH)	24	A
Avalanche Energy, Single pulse	E_{AS}(L=0.5mH)	144	mJ

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

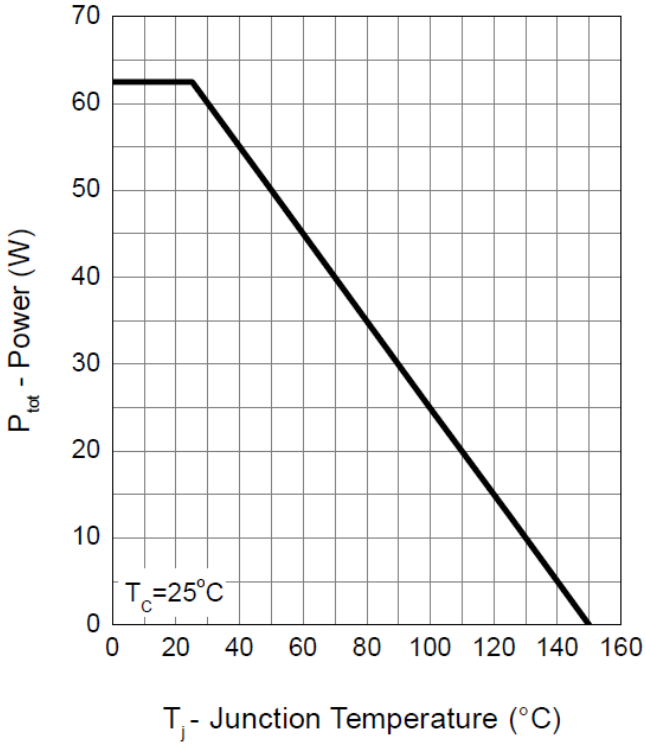
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24, V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±10	μA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=-250μA	-1.3	-1.8	-2.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V,I_{DS}=-10A	-	11	15	mΩ
		V_{GS}=-10V, I_{DS}=-20A	-	7	9	mΩ
DYNAMIC CHARACTERISTICS (Note4)						
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V,F=1MHz	-	8	-	Ω
Input Capacitance	C_{iss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	2110	-	PF
Output Capacitance	C_{oss}		-	460	-	PF
Reverse Transfer Capacitance	C_{rss}		-	360	-	PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, R_L=15Ω, V_{GEN}=-10V,	-	12	-	nS
Turn-on Rise Time	t_r	R_G=6Ω I_{DS}=-1A	-	12	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	110	-	nS
Turn-Off Fall Time	t_f		-	68	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_{DS}=-20A,V_{GS}=-10V	-	47	-	nC
Gate-Source Charge	Q_{gs}		-	3	-	nC
Gate-Drain Charge	Q_{gd}		-	15	-	nC
Body Diode Reverse Recovery Time	T_{rr}	I_{DS}=-20A, dI/dt=100A/μs	-	16	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	5	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_{SD}=-1A	-	-0.7	-1	V

NOTES:

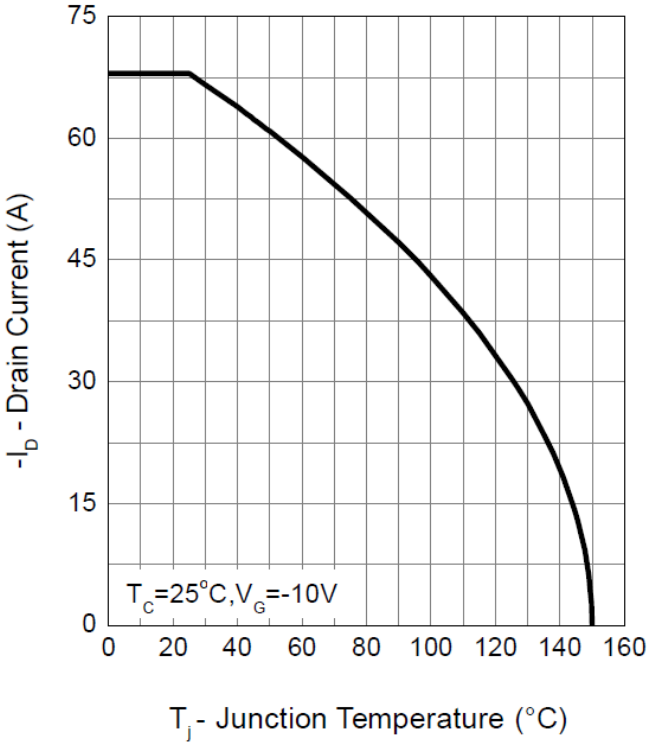
1. Surface Mounted on 1in^2 pad area, t≤ 10sec. $R_{\theta JA}$ steady state t = 999s.
2. The power dissipation P_D is based on $T_{J(MAX)}$ = 150°C, and it is useful for reducing junction-to-case thermal resistance ($R_{\theta JC}$) when additional heat sink is used.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

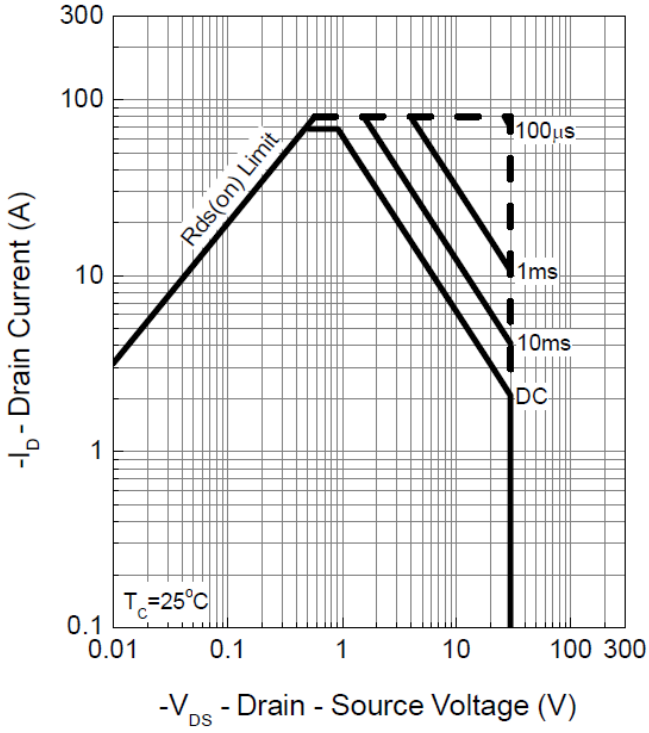
Power Dissipation



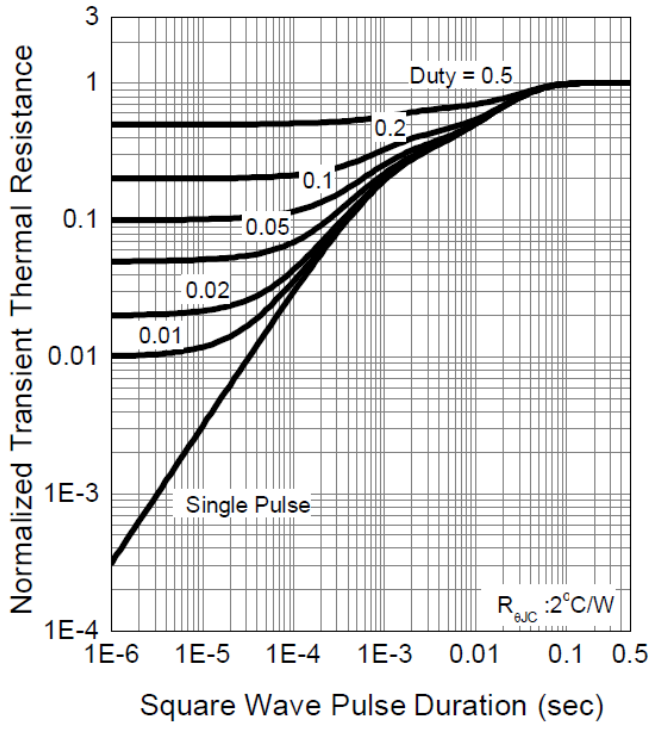
Drain Current



Safe Operation Area

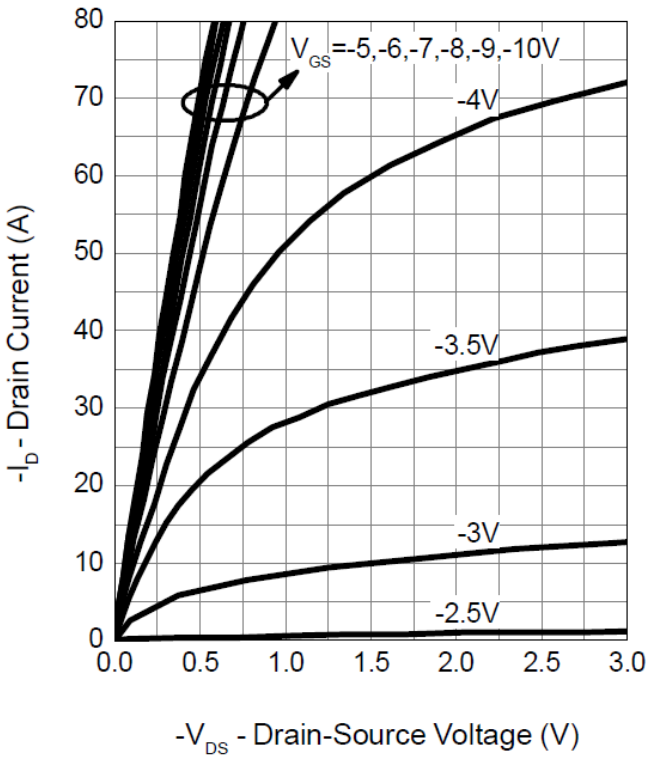


Thermal Transient Impedance

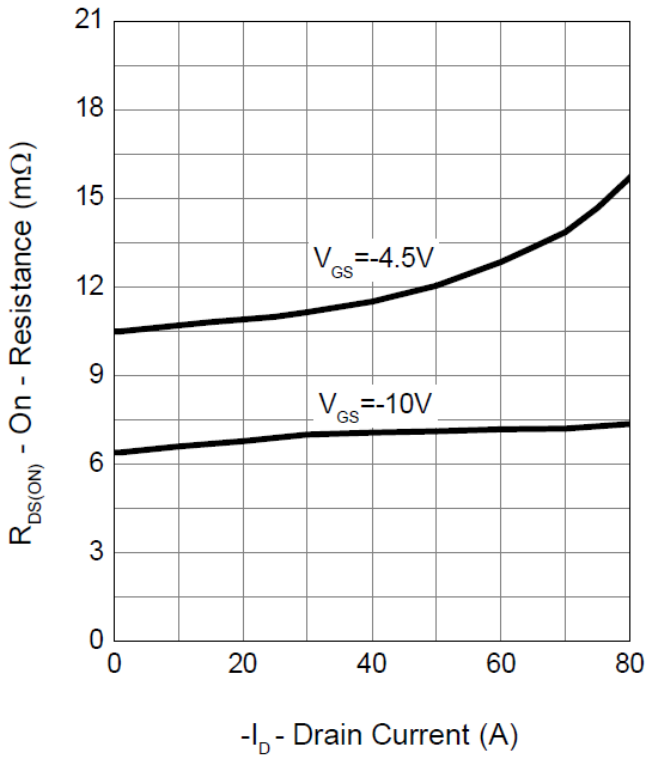


Typical Operating Characteristics(Cont.)

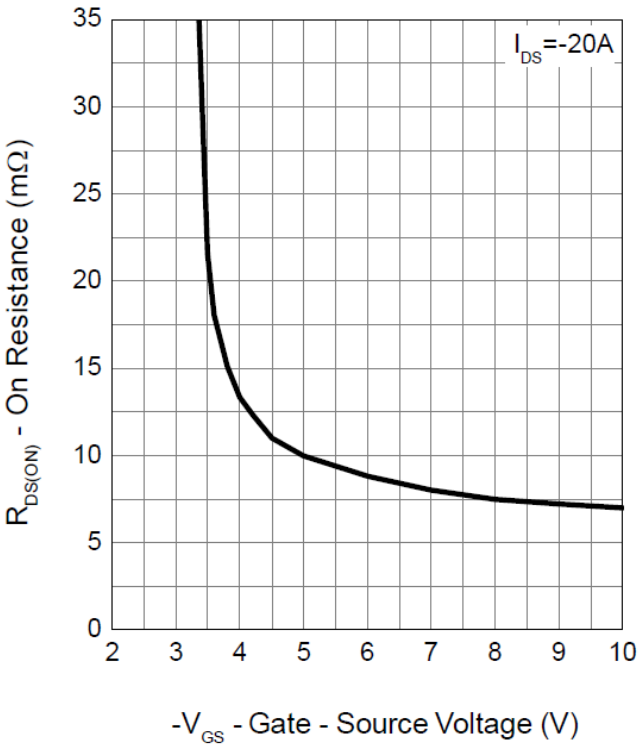
Output Characteristics



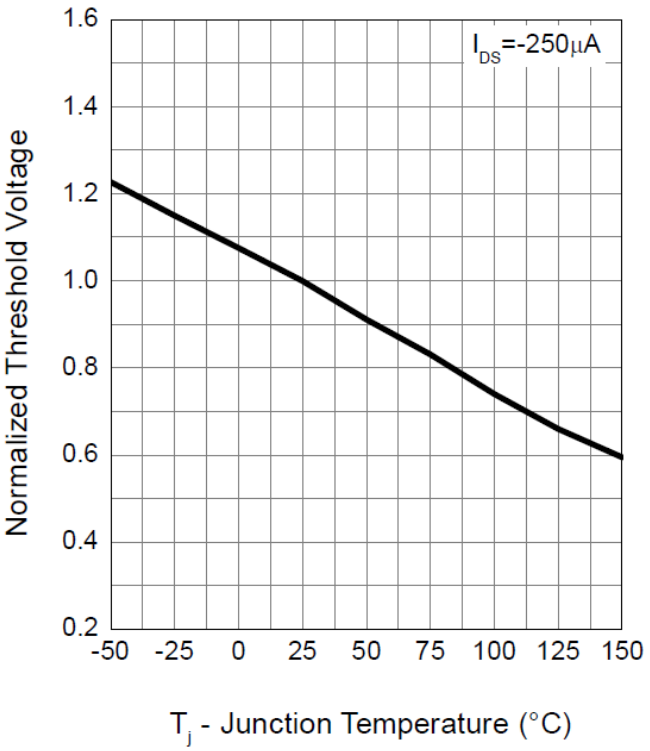
Drain-Source On Resistance



Gate-Source On Resistance

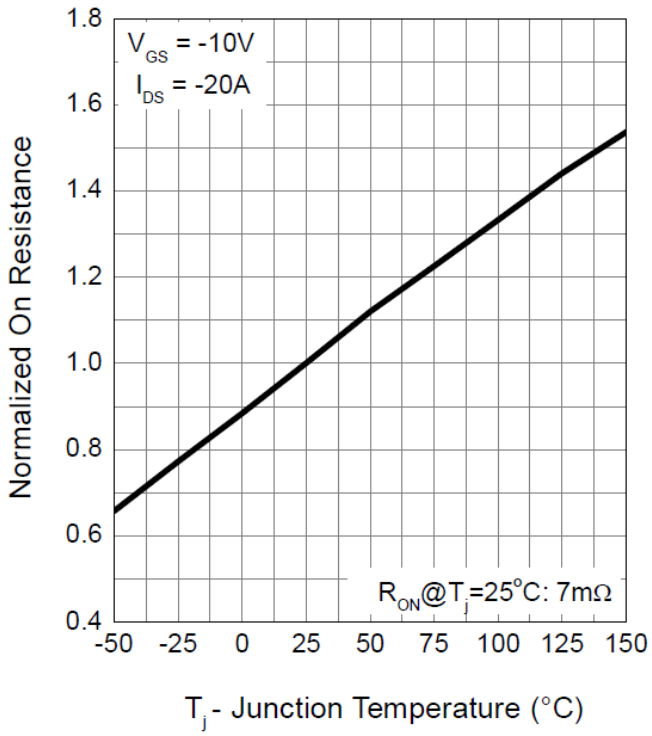


Gate Threshold Voltage

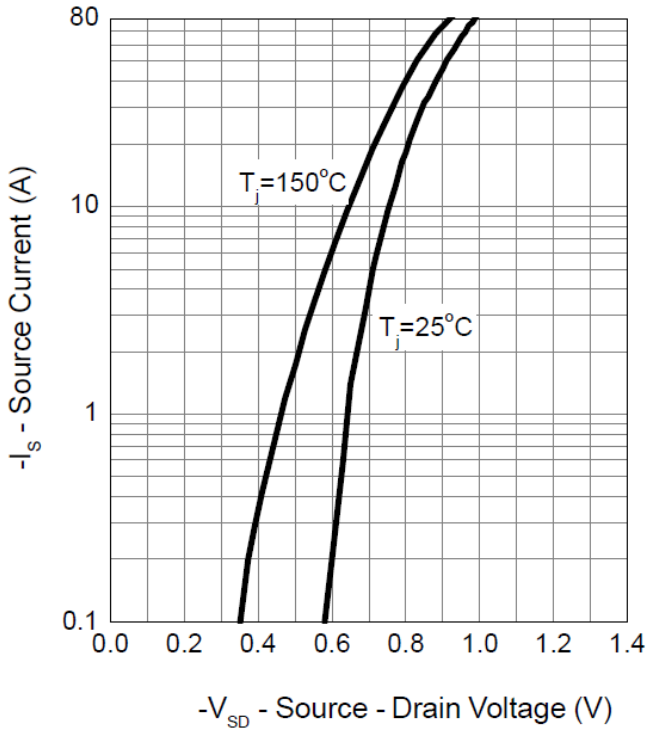


Typical Operating Characteristics (Cont.)

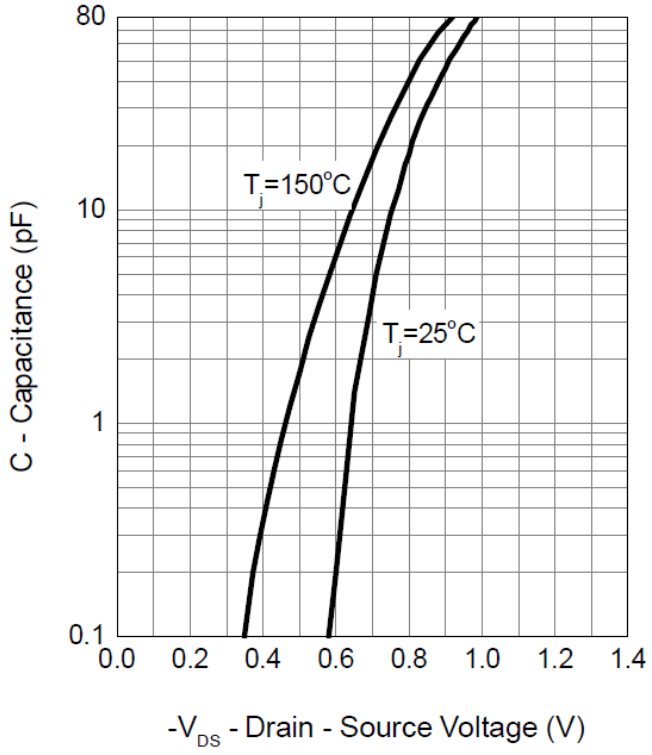
Drain-Source On Resistance



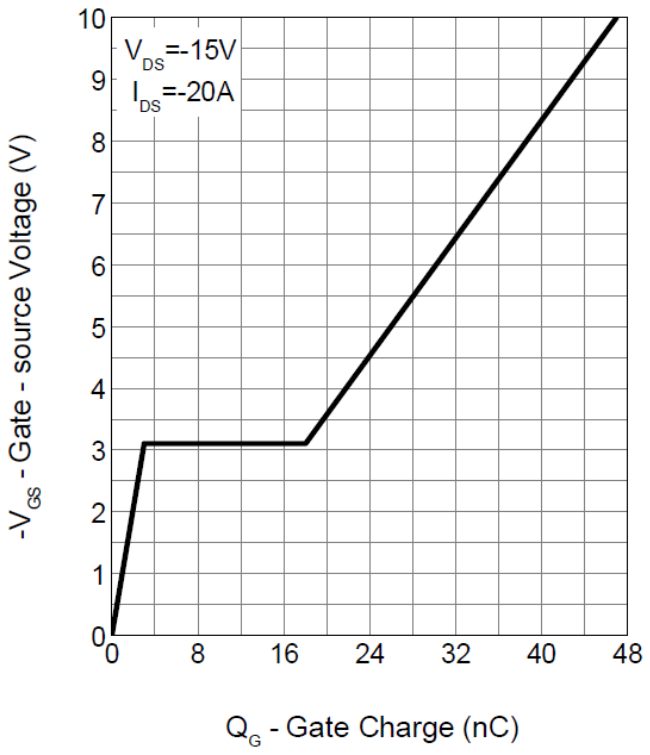
Source-Drain Diode Forward



Capacitance



Gate Charge



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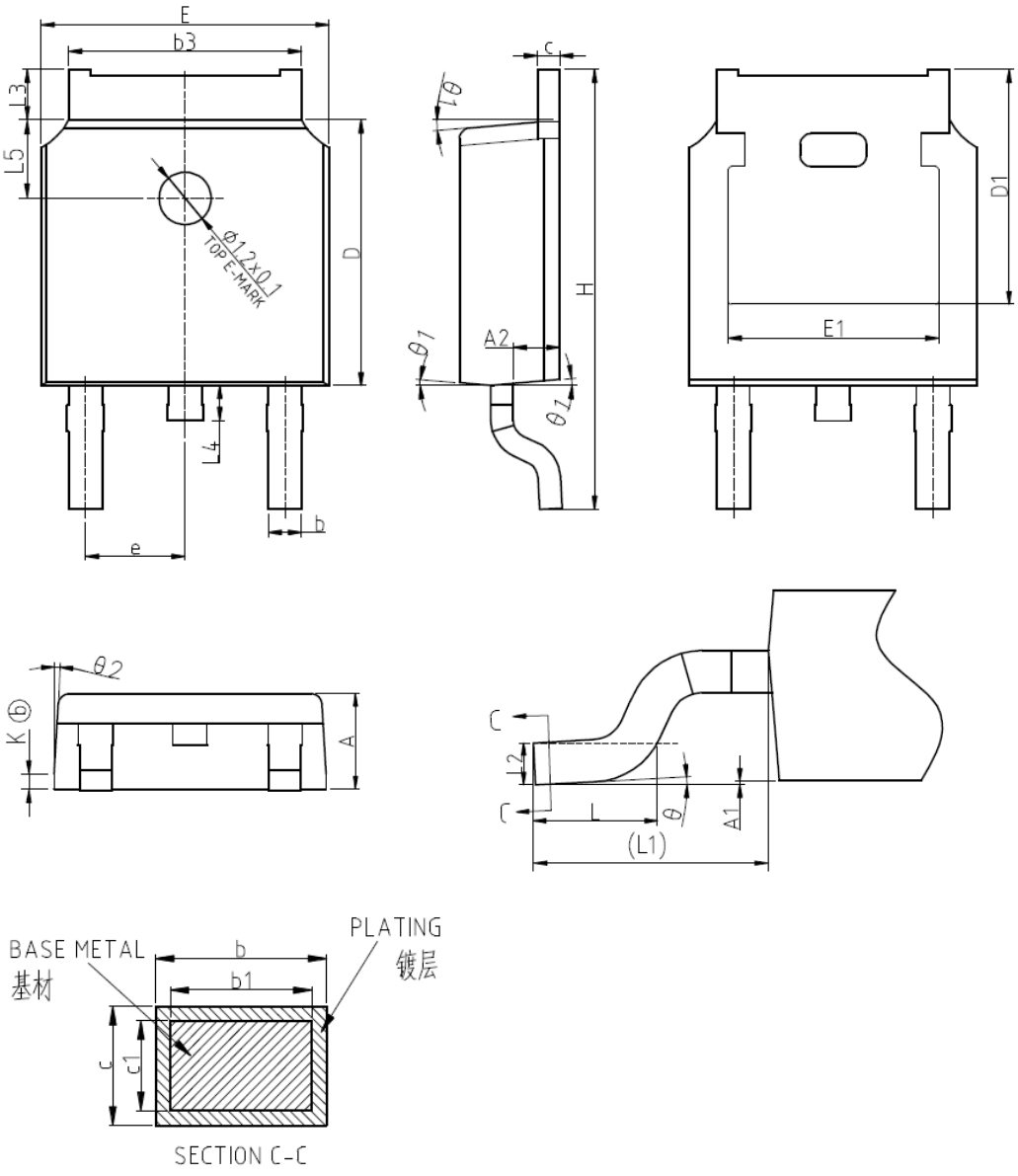
Package Information

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