

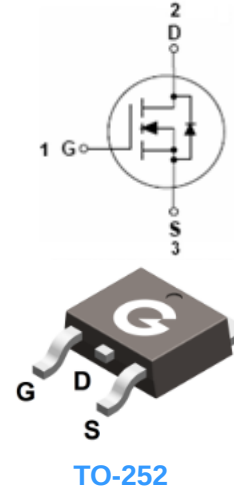
Features

- Extremely low losses due to very low FOM $R_{DS(on)} \times Q_G$
- High-speed switching
- HBM: AEC-Q101-001: H1A (JESD22-A114-B: 1A)
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

HF

Mechanical Data

- Case: TO-252
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TQBL250N06TD	TO-252	80 pcs / Tube & 2500 pcs / Tape & Reel	250N06TD

Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	60	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	29	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		20	A
Continuous Drain Current ($T_A = 25^\circ\text{C}$) *1		10.5	A
Continuous Drain Current ($T_A = 100^\circ\text{C}$) *1		7.4	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	116	A
Single Pulse Avalanche Energy *3	E_{AS}	23	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	37.5	W
Operating Junction Temperature Range	T_J	$-55 \sim +175$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +175$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	3.75	4	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	24	30	$^\circ\text{C/W}$

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 60V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 10A	-	18	25	mΩ
		V _{GS} = 4.5V, I _D = 10A	-	25	35	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.5	3	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHZ	-	3.7	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	551	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 25V	-	188	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1MHZ	-	24	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 30V	-	3	-	ns
t _r	Turn-on Rise Time	V _{GS} = 15V	-	37	-	
t _{d(OFF)}	Turn-Off Delay Time	I _D = 15A	-	14	-	
t _f	Turn-Off Fall Time	R _G = 3.3Ω	-	30	-	
Q _G	Total Gate-Charge	V _{DD} = 30V	-	11.4	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	1.7	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 10A	-	3.3	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 10A, V _{GS} = 0V, T _J = 25°C	-	0.9	1.2	V
t _{rr}	Reverse Recovery Time	V _R = 30V, I _F = 10A	-	25	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	15.5	-	nC

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 30V, L = 0.5mH, V_{GS} = 10V$

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

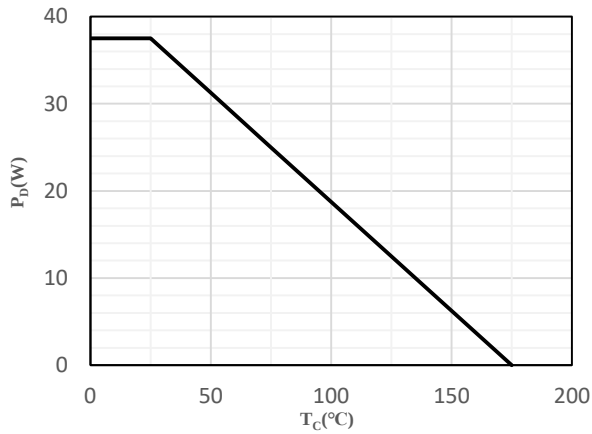


Fig 1 Power Dissipation

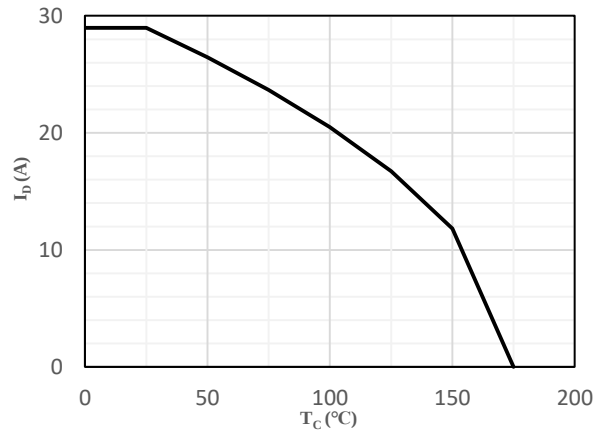


Fig 2 Drain Current

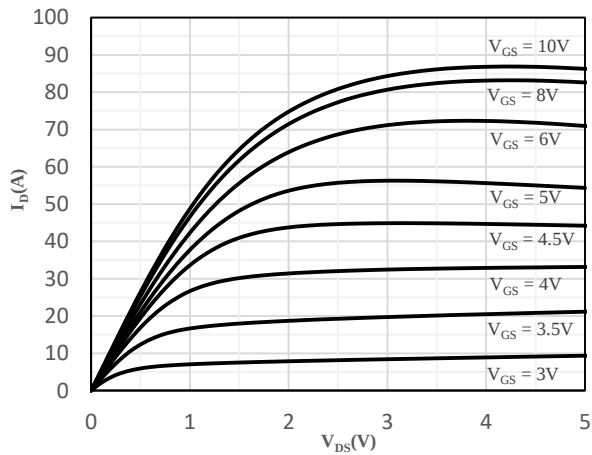


Fig 3 Typical Output Characteristics

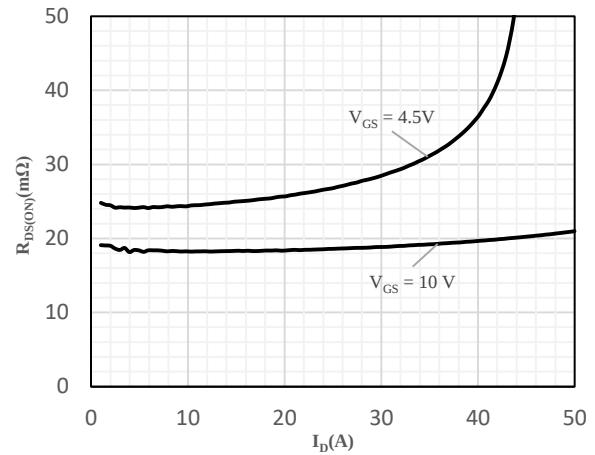


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

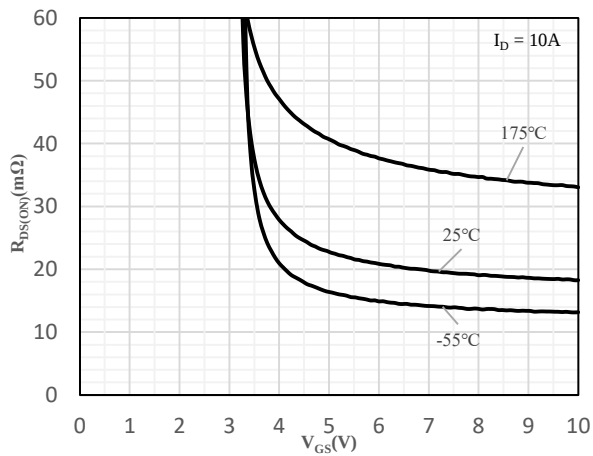


Fig 5 On-Resistance vs. Gate-Source Voltage

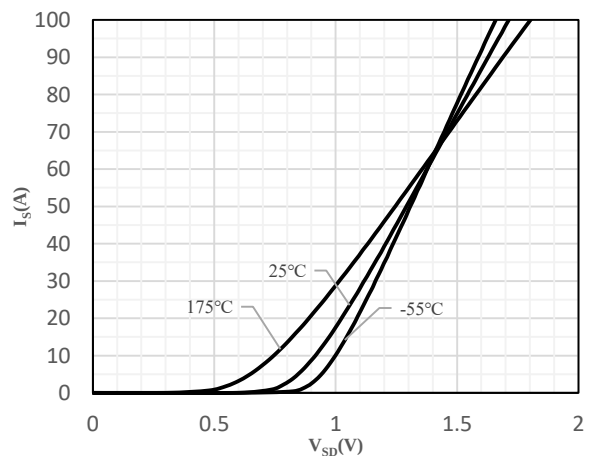


Fig 6 Body-Diode Characteristics

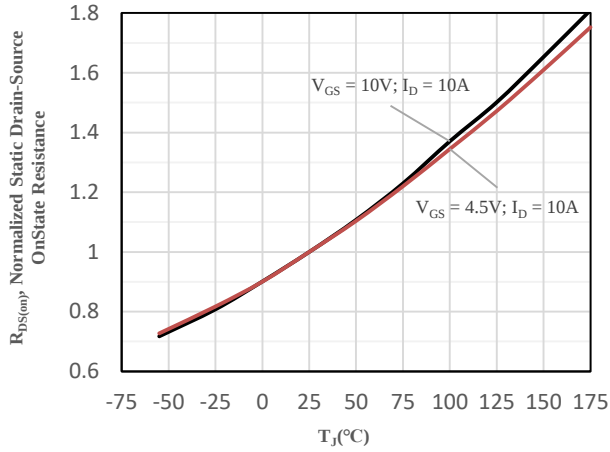


Fig 7 Normalized On-Resistance vs. Junction Temperature

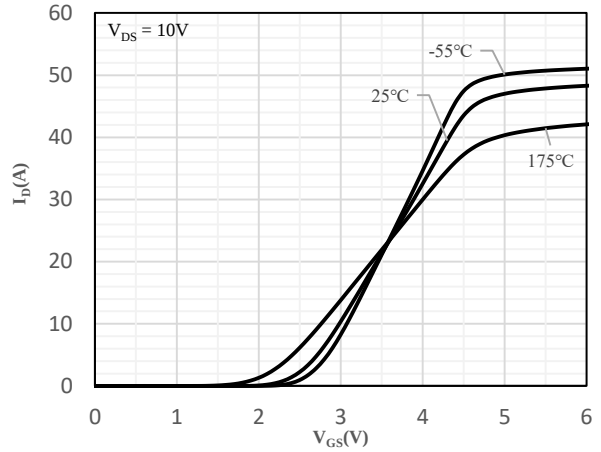


Fig 8 Transfer Characteristics

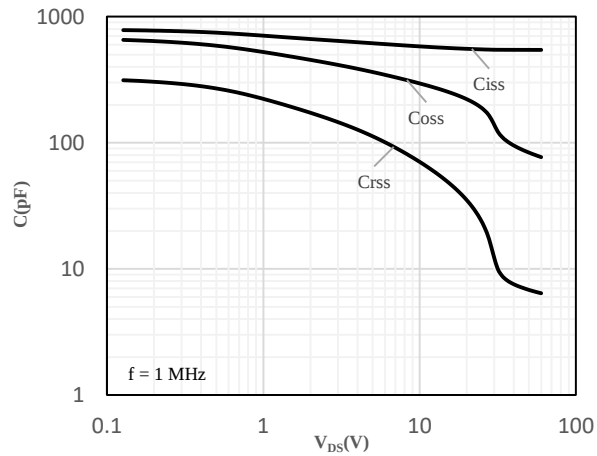


Fig 9 Capacitance Characteristics

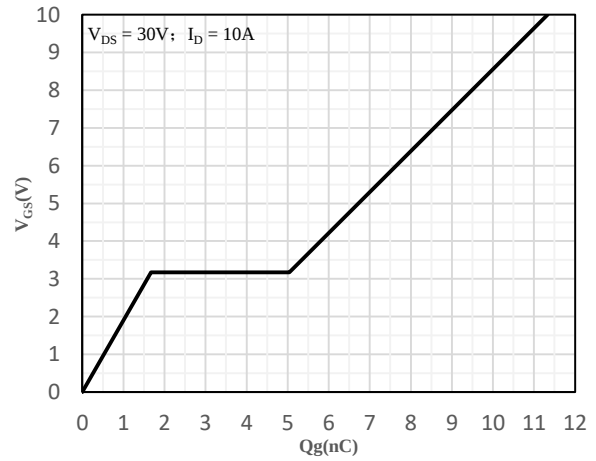


Fig 10 Gate-Charge Characteristics

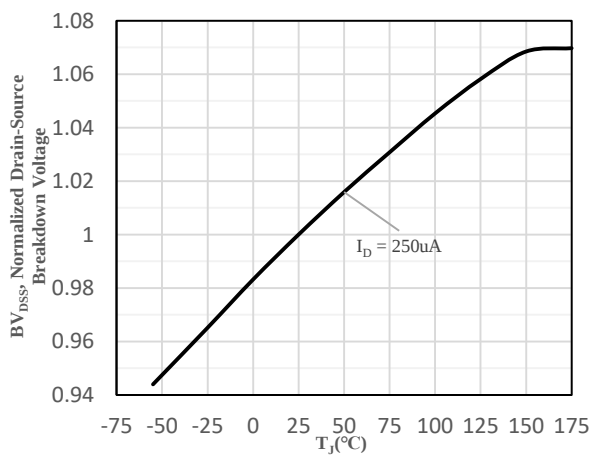


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

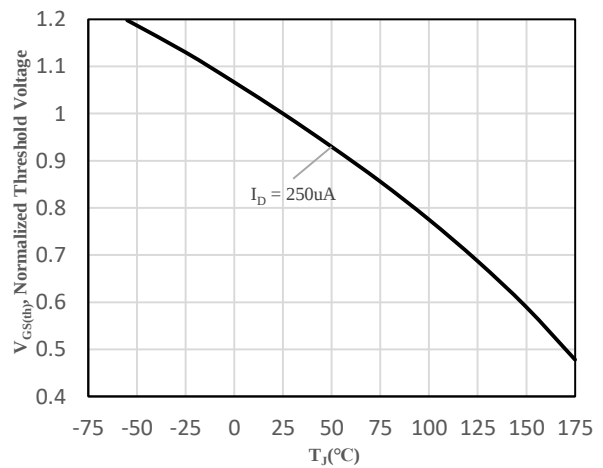


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

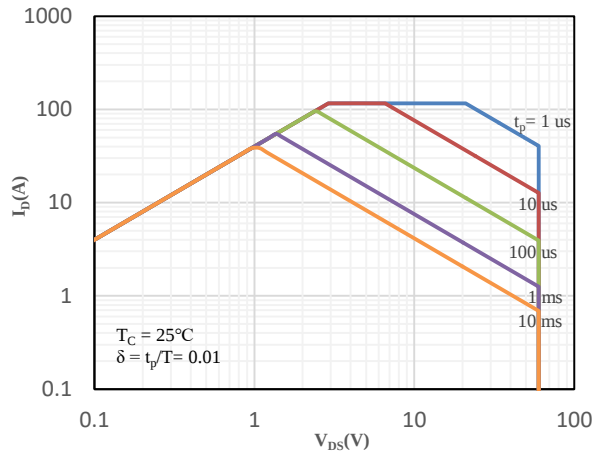


Fig 13 Safe Operation Area

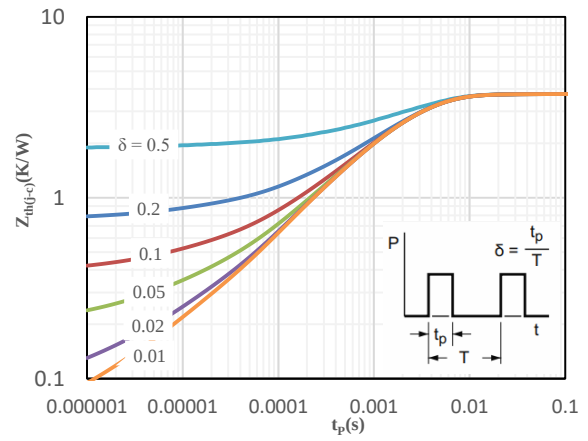
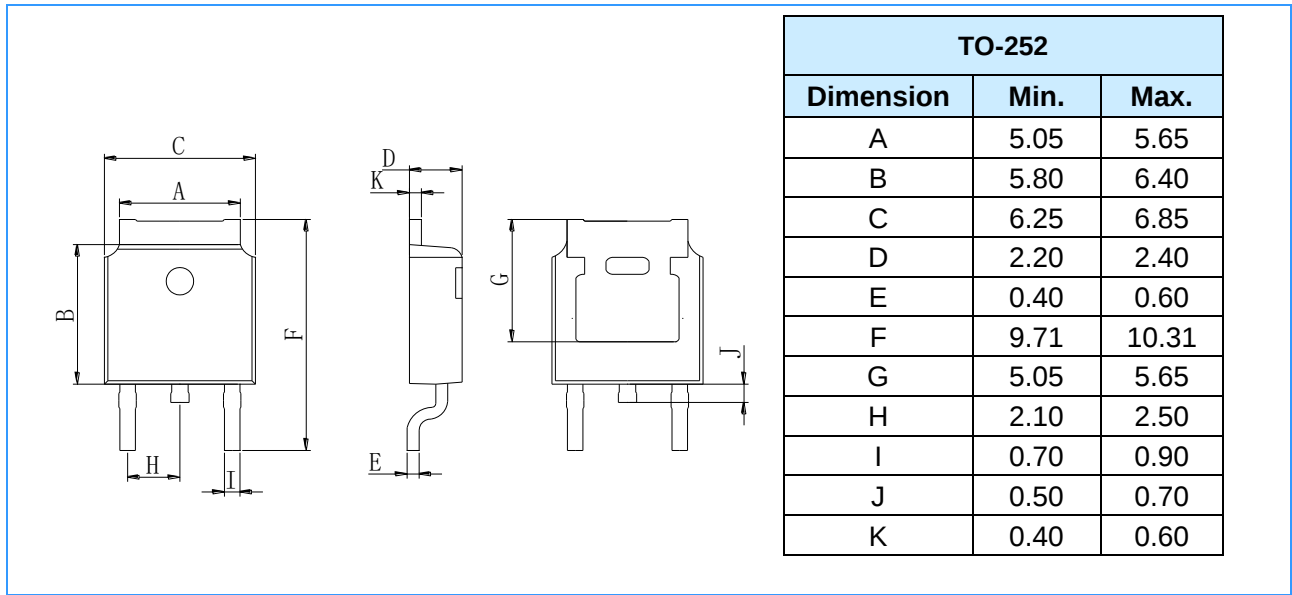


Fig 14 Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



Mounting Pad Layout (Unit: mm)

