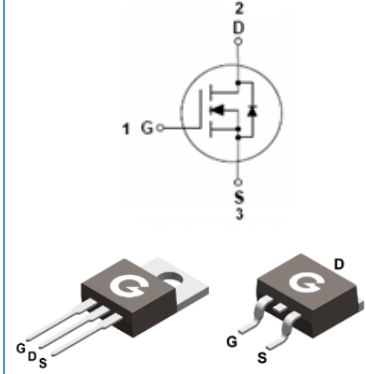


Features

- Advanced new Planar technology
- Superior thermal resistance
- Optimized for linear operation
- HBM: AEC-Q101-001: H2 (JESD22-A114-B: 2)
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF



TO-220AB

TO-263

Mechanical Data

- Case: TO-220AB, TO-263
- 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
TBL7510	TO-220AB	50 pcs / Tube	7510
TBL7510B	TO-263	50 pcs / Tube & 800 pcs / Tape & Reel	7510B

Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	60	V
Gate-to-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Package Limited)	I _D	120	A
Continuous Drain Current (T _C = 25°C, Silicon Limited)		134	
Continuous Drain Current (T _C = 100°C, Silicon Limited)		95	
Continuous Drain Current (T _A = 25°C, TO-263) ^{*1}		15	
Continuous Drain Current (T _A = 100°C, TO-263) ^{*1}		10.6	
Continuous Drain Current (T _A = 25°C, TO-220AB)		13.4	
Continuous Drain Current (T _A = 100°C, TO-220AB)		9.5	
Pulsed Drain Current (t _p = 10μs, T _C = 25°C)	I _{DM}	480	A
Single Pulse Avalanche Energy ^{*3}	E _{AS}	1000	mJ
Power Dissipation (T _C = 25°C)	P _D	300	W
Operating Junction Temperature Range	T _J	-55 ~ +175	°C
Storage Temperature Range	T _{STG}	-55 ~ +175	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	0.48	0.5	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air (TO-263) *1	$R_{\theta JA}$	-	-	40	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air (TO-220AB)		-	36	50	$^{\circ}\text{C/W}$

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 = 60A	-	6.8	8	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2	2.7	4	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	1.4	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	2732	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 30V	-	896	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	415	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 30V	-	25	-	ns
t _r	Turn-on Rise Time	V _{GS} = 15V	-	83	-	
t _{d(OFF)}	Turn-Off Delay Time	I _D = 30A	-	116	-	
t _f	Turn-Off Fall Time	R _G = 3.3Ω	-	45	-	
Q _G	Total Gate-Charge	V _{DD} = 30V	-	114	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	13	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 55A	-	59	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 60A, V _{GS} = 0V	-	0.9	1.2	V
t _{rr}	Reverse Recovery Time	I _S = 30A, V _{GS} = 0V	-	96	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	270	-	nC

Notes:

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

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

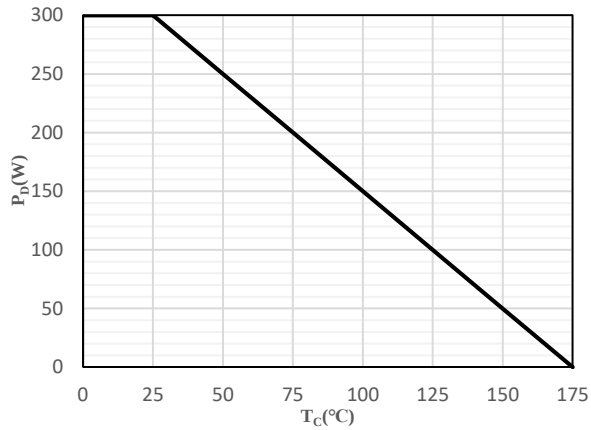


Fig 1 Power Dissipation

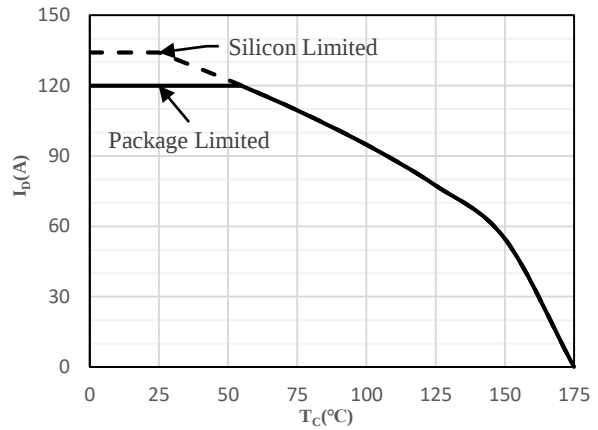


Fig 2 Drain Current

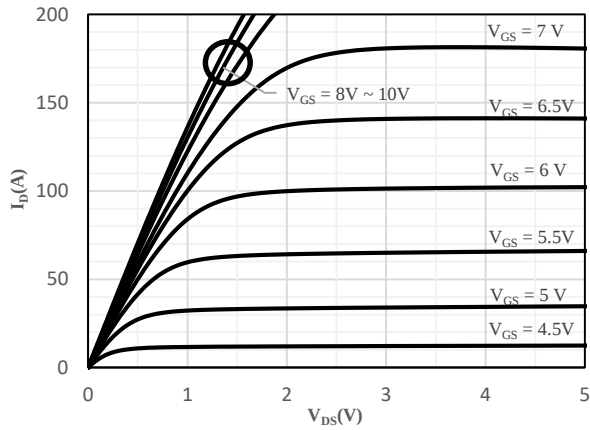


Fig 3 Typical Output Characteristics

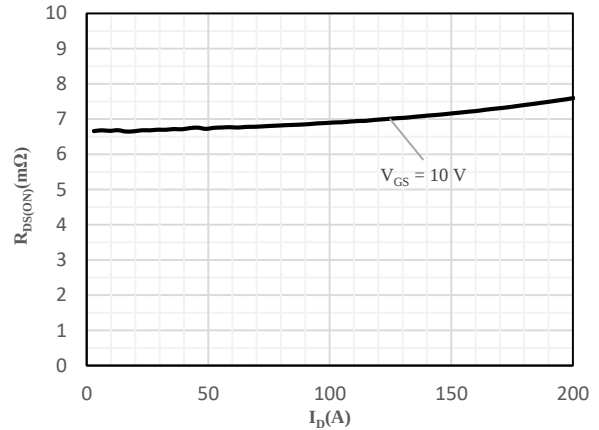


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

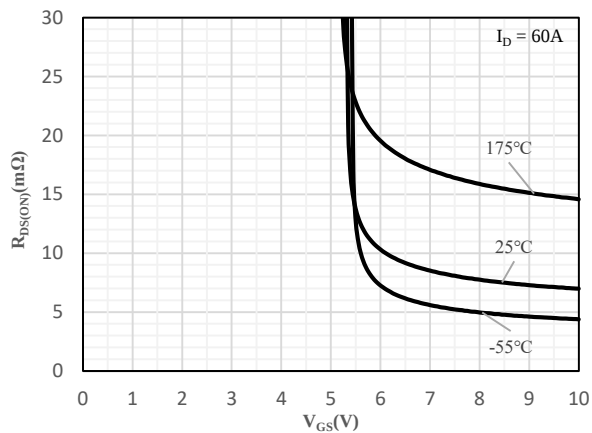


Fig 5 On-Resistance vs. Gate-Source Voltage

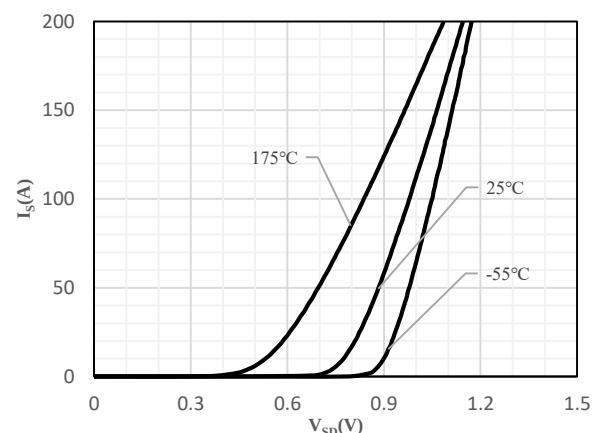


Fig 6 Body-Diode Characteristics

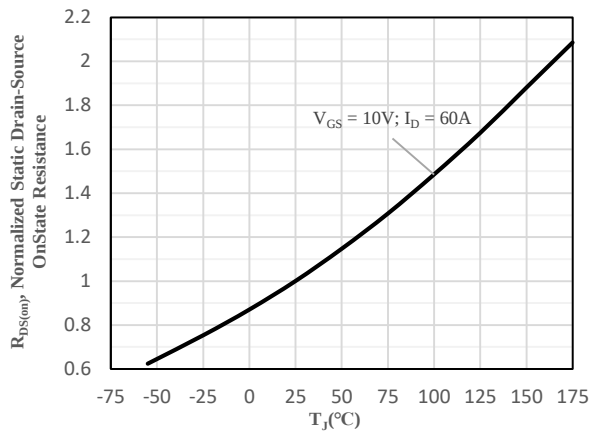


Fig 7 Normalized On-Resistance vs. Junction Temperature

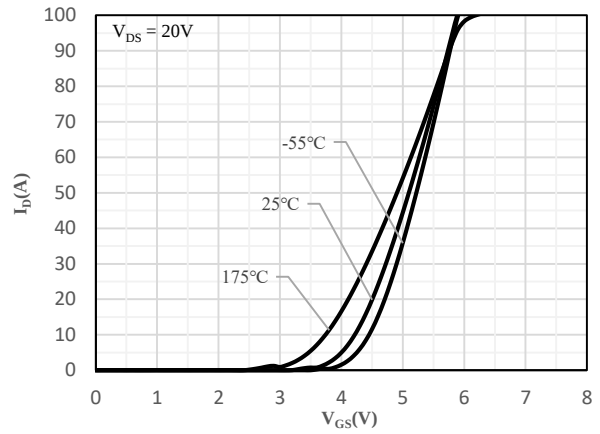


Fig 8 Transfer Characteristics

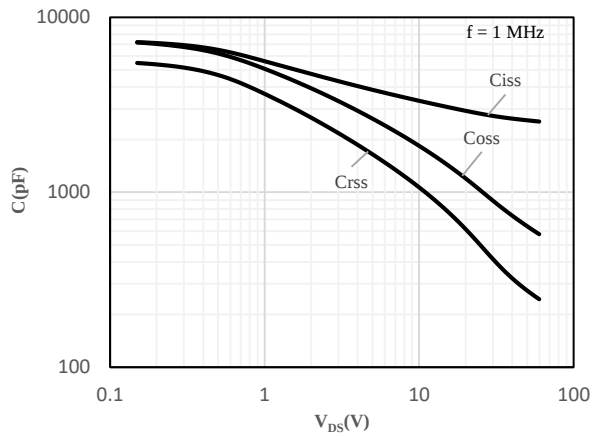


Fig 9 Capacitance Characteristics

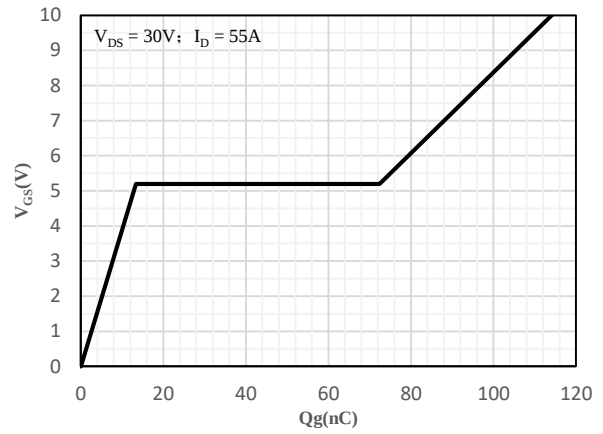


Fig 10 Gate-Charge Characteristics

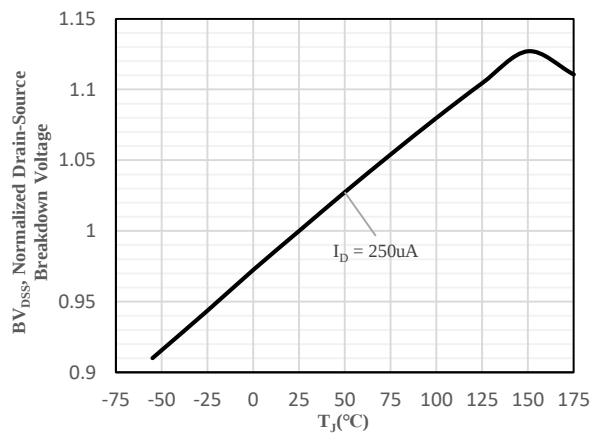


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

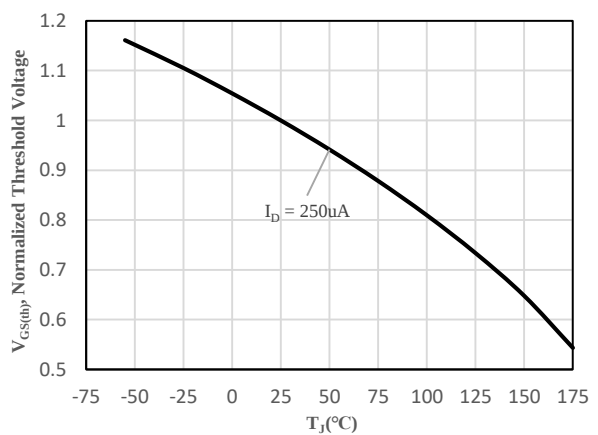


Fig 12 Normalized Gate Threshold Voltage vs. Junction Temperature

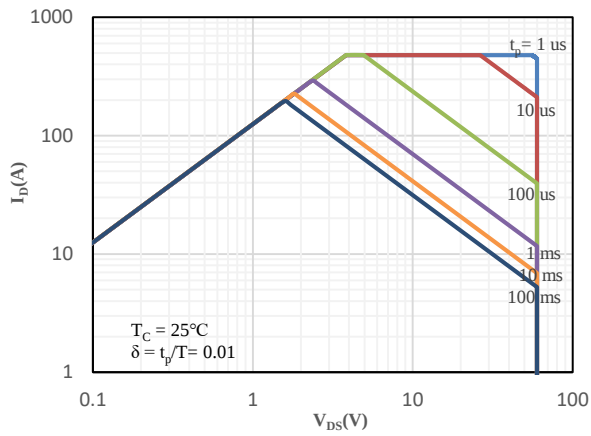


Fig 13 Safe Operation Area

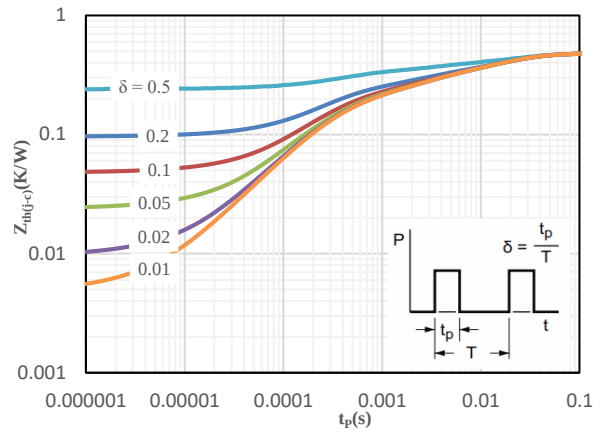


Fig 14 Maximum transient thermal impedance

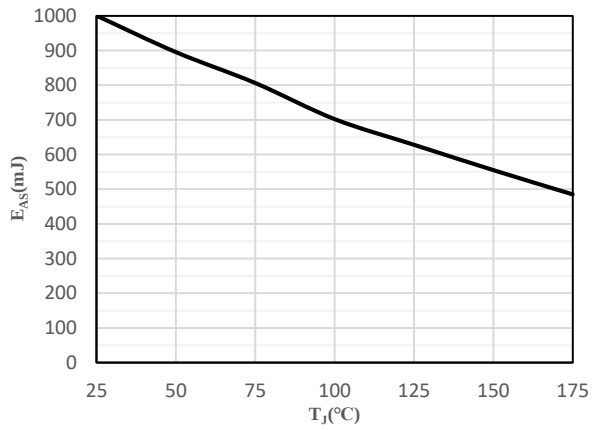


Fig 15 Single Pulse Avalanche Energy vs. Junction Temperature

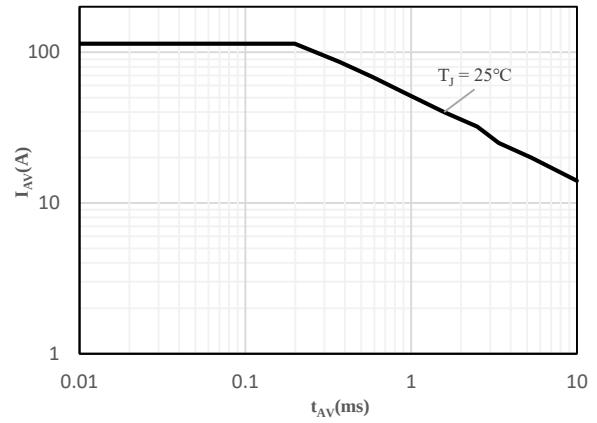


Fig 16 Single-shot Avalanche rating

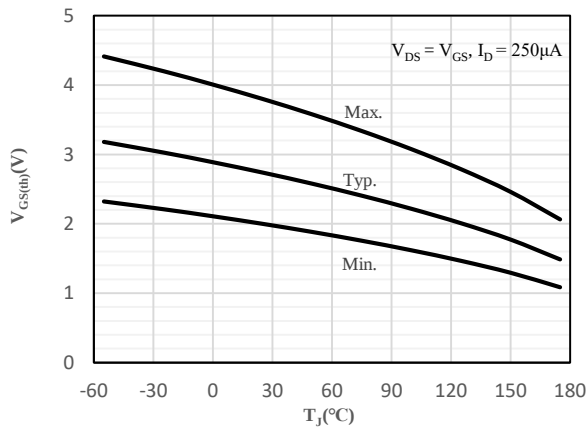
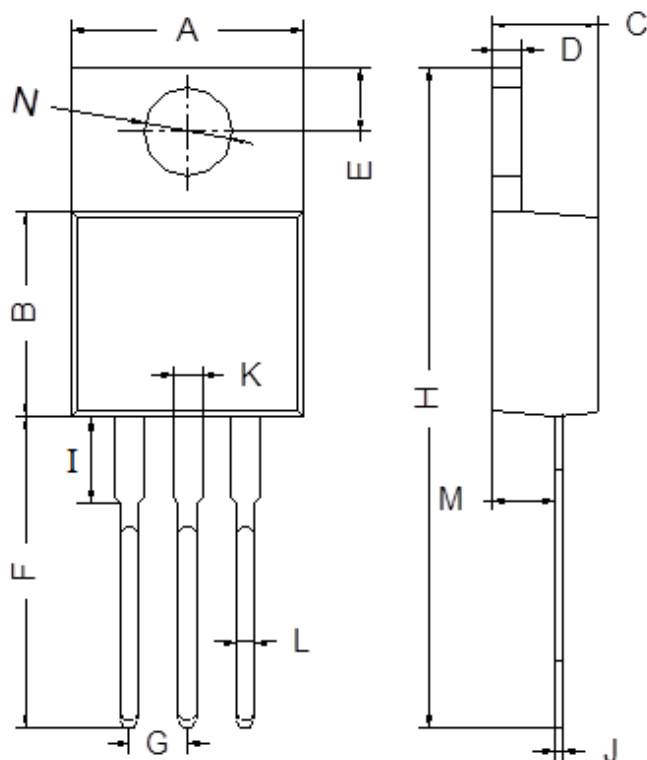
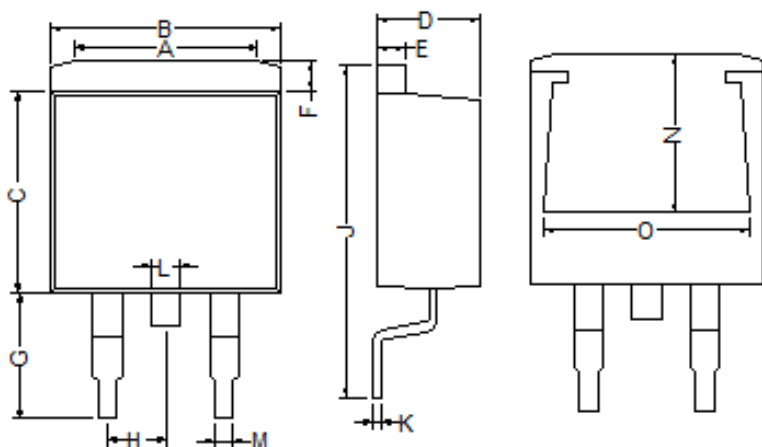


Fig 17 Gate Threshold Voltage vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



TO-220AB		
Dimension	Min.	Max.
A	9.80	10.30
B	8.70	9.10
C	4.37	4.77
D	1.07	1.47
E	2.64	2.84
F	13.14	13.74
G	2.44	2.64
H	28.03	28.83
I	3.50	4.00
J	0.28	0.48
K	1.22	1.32
L	0.71	0.91
M	2.40	2.60
N	3.76	3.96



TO-263		
Dimension	Min.	Max.
A	6.00	8.00
B	9.90	10.30
C	8.50	9.10
D	4.37	4.77
E	1.07	1.47
F	1.07	1.47
G	5.05	5.74
H	2.44	2.66
J	15.15	15.80
K	0.28	0.48
L	1.17	1.37
M	0.71	0.91
N	6.55	7.68
O	7.70	8.10

Mounting Pad Layout (Unit: mm)

TO-263

