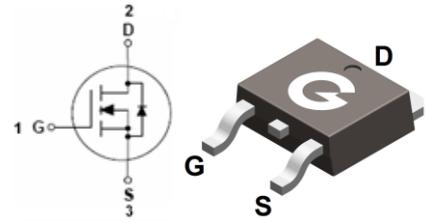


### Features

- Low  $R_{DS(ON)}$  & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

HF



TO-252

### 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
TBL120N10TD	TO-252	80 pcs / Tube & 2500 pcs / Tape & Reel	120N10TD

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DSS}$	100	V
Gate-to-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current ( $T_C = 25^\circ\text{C}$ ) <sup>*4</sup>	$I_D$	53	A
Continuous Drain Current ( $T_C = 100^\circ\text{C}$ ) <sup>*4</sup>	$I_D$	34	A
Pulsed Drain Current <sup>*3</sup> ( $t_p=10\mu\text{s}$ )	$I_{DM}$	240	A
Single Pulse Avalanche Energy <sup>*3,5</sup>	$E_{AS}$	27	mJ

### Thermal Characteristics

Parameter	Symbol	Value	Unit
Power Dissipation ( $T_C = 25^\circ\text{C}$ ) <sup>*2</sup>	$P_D$	62.5	W
Thermal Resistance Junction-to-Air <sup>*1</sup>	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case <sup>*1</sup>	$R_{\theta JC}$	2	$^\circ\text{C/W}$
Operating Junction Temperature Range	$T_J$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
$V_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$R_{DS(ON)}$	Static Drain-Source On-resistance	$V_{GS} = 10V, I_D = 20A$	-	10	12	m $\Omega$
		$V_{GS} = 4.5V, I_D = 10A$	-	15	17	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.8	2.6	V
$R_G$	Gate Resistance	$V_{DS} = V_{GS} = 0V, f = 1MHz$	-	5.7	-	$\Omega$
<b>Dynamic Characteristics</b>						
$C_{ISS}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 40V$ $f = 1.0MHz$	-	1641	-	pF
$C_{OSS}$	Output Capacitance		-	529	-	
$C_{RSS}$	Reverse Transfer Capacitance		-	12	-	
<b>Switching Characteristics</b>						
$t_{d(ON)}$	Turn-on Delay Time	$V_{DS} = 50V$ $V_{GS} = 10V$ $R_G = 3\Omega$ $I_D = 20A$	-	33	-	ns
$t_r$	Turn-on Rise Time		-	20	-	
$t_{d(OFF)}$	Turn-Off Delay Time		-	31	-	
$t_f$	Turn-Off Fall Time		-	12	-	
$Q_G$	Total Gate-Charge	$V_{DS} = 50V$ $V_{GS} = 10V$ $I_D = 20A$	-	31	-	nC
$Q_{GS}$	Gate to Source Charge		-	6	-	
$Q_{GD}$	Gate to Drain (Miller) Charge		-	7	-	
<b>Source-Drain Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$I_{SD} = 20A, V_{GS} = 0V$	-	0.91	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 20A, V_{GS} = 30V$ $di_{SD}/dt = 100A/\mu s$	-	46	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	63	-	nC

Notes:

- The data tested by surface mounted on a 35mm \* 35mm \* 1mm FR4-epoxy P.C.B
- The power dissipation  $P_D$  is based on  $T_{J(MAX)} = 150^\circ\text{C}$ , using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used
- Single pulse width limited by junction temperature  $T_{J(MAX)} = 150^\circ\text{C}$
- The maximum current rating is package limited
- The  $E_{AS}$  data shows Max. rating. The test condition is  $V_{DS} = 50V, V_{GS} = 10V, L = 0.5mH$

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

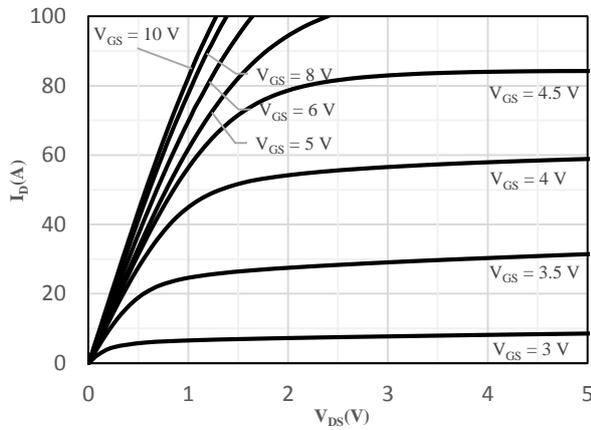


Fig 1 Typical Output Characteristics

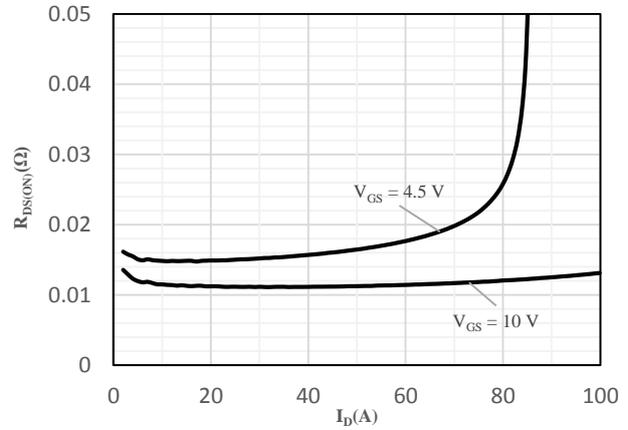


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

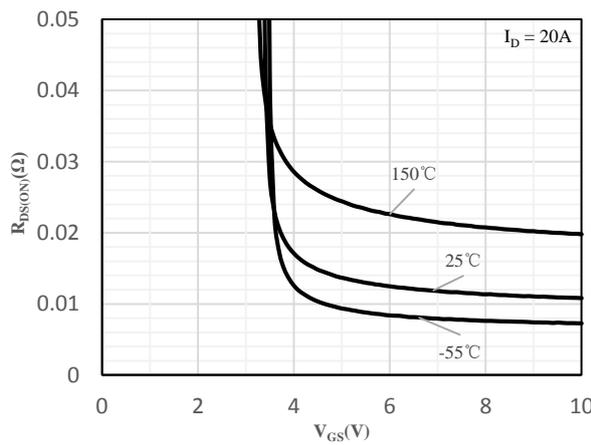


Fig 3 On-Resistance vs. Gate-Source Voltage

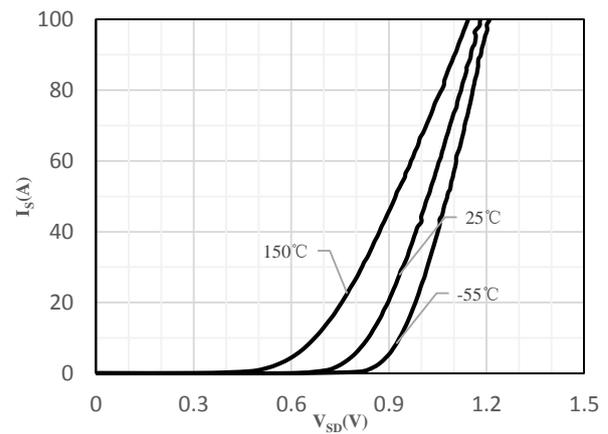


Fig 4 Body-Diode Characteristics

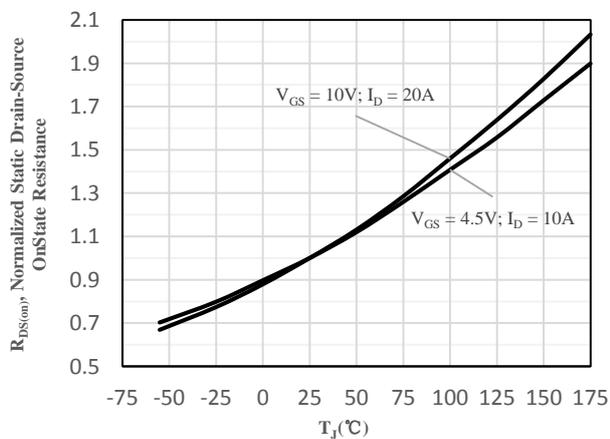


Fig 5 On-Resistance vs. Junction Temperature

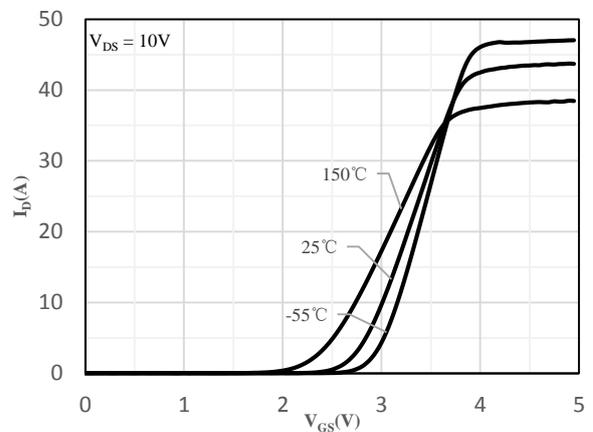


Fig 6 Transfer Characteristics

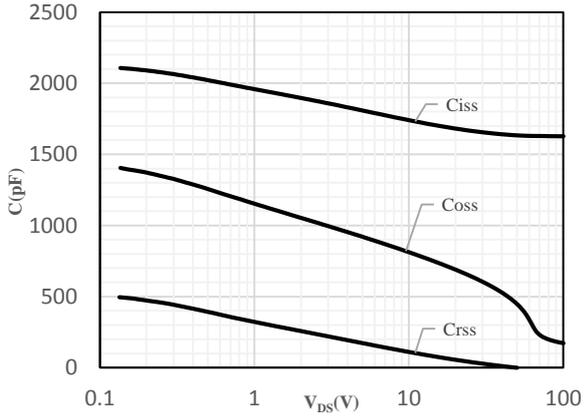


Fig 7 Capacitance Characteristics

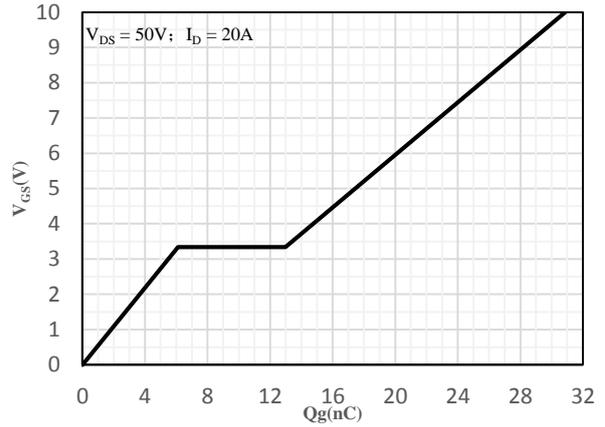


Fig 8 Gate-Charge Characteristics

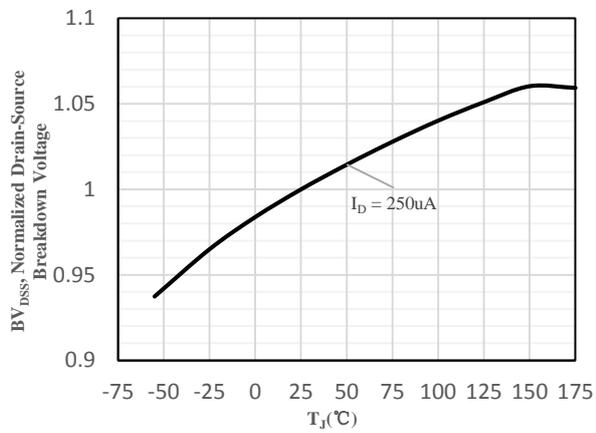


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

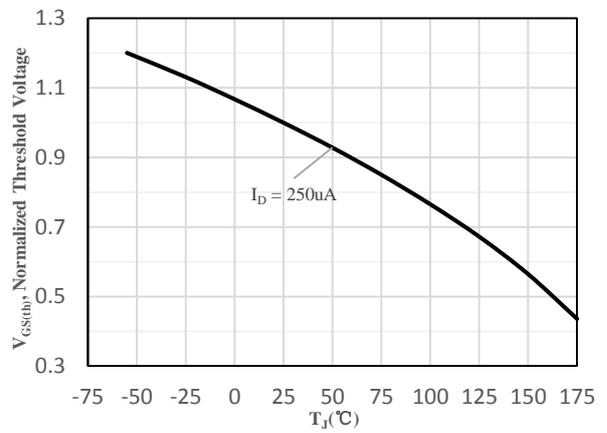


Fig 10 V<sub>GS(th)</sub> vs. Junction Temperature

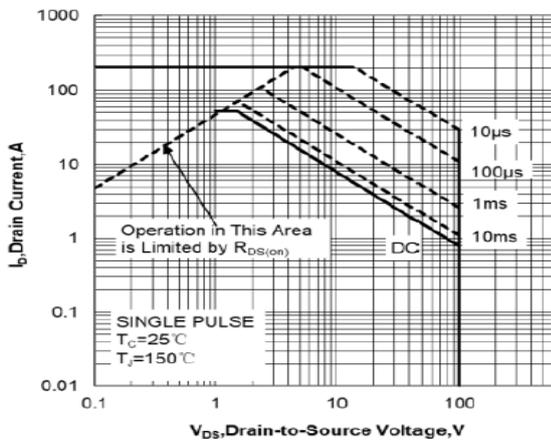
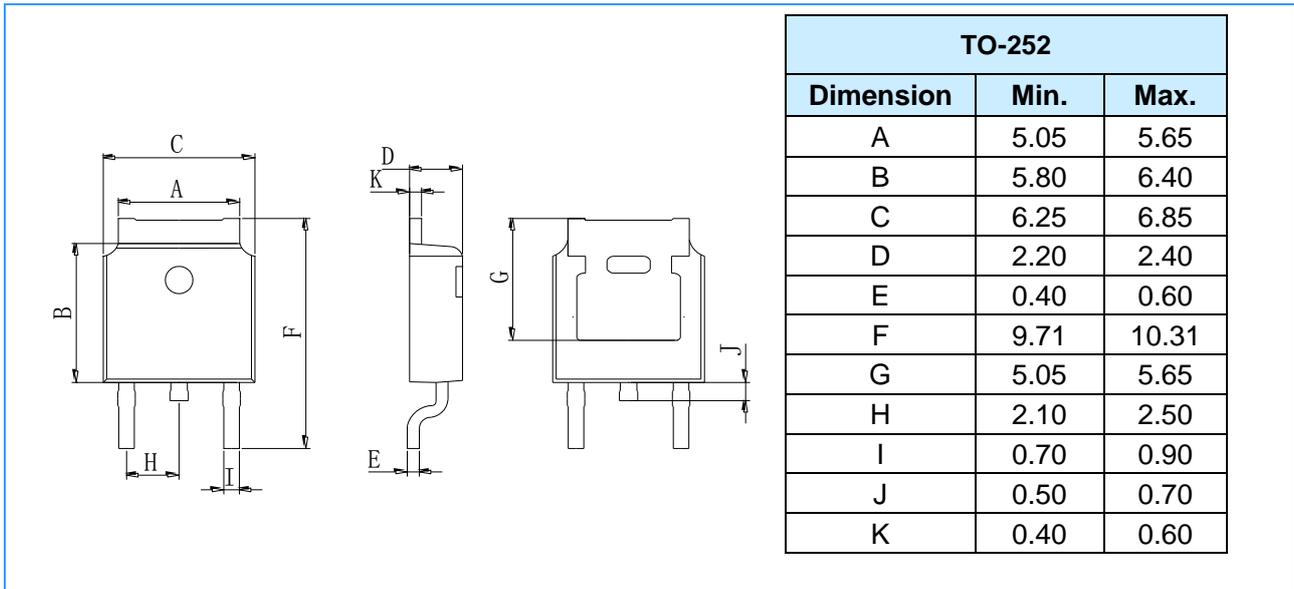
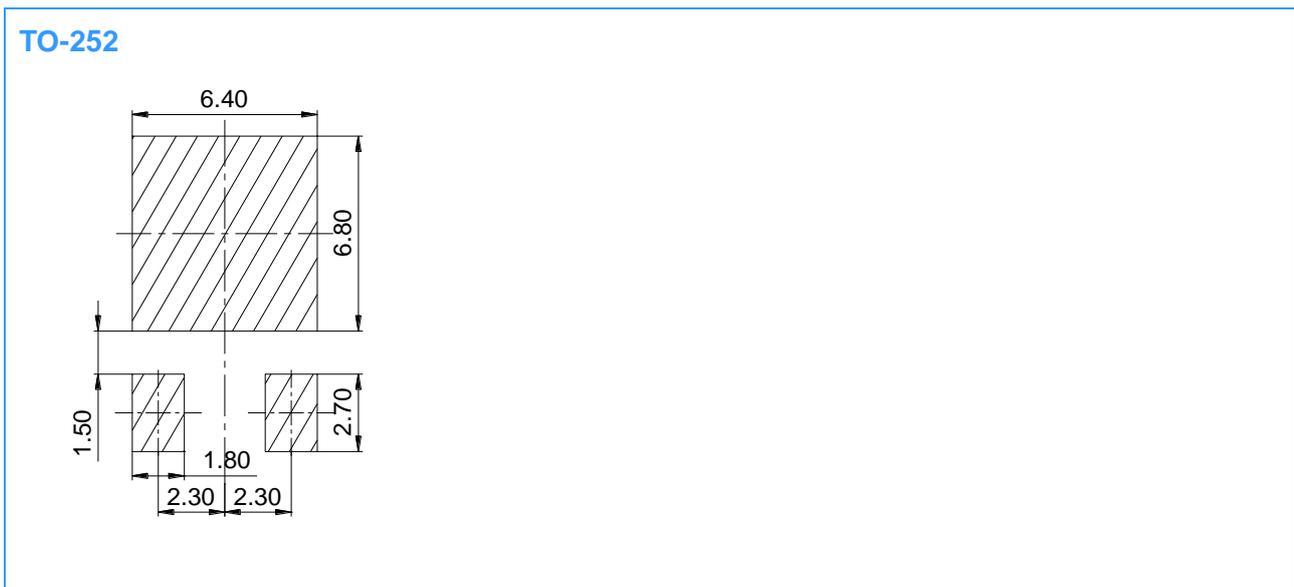


Figure 11 Maximum Safe Operating Area

### Package Outline Dimensions (Unit: mm)



### Mounting Pad Layout (Unit: mm)



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