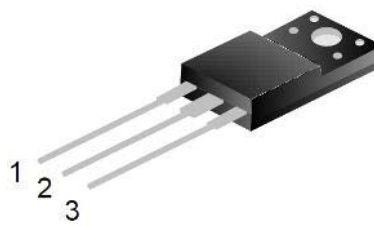


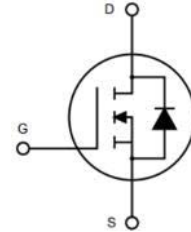
## 800V N-Channel MOSFET

### Main Product Characteristics:

$V_{(BR)DSS}$	800V
$R_{DS(ON)}$	0.42Ω(max.)
$I_D$	12A



TO-220F



Schematic Diagram

### Features and Benefits

- Grand Turbo MOSFET process technology.
- Optimized the cell structure.
- Low on-resistance and low gate charge.
- Featuring low switching and drive losses.
- Fast switching and reverse body recovery.
- High ruggedness and robustness.



### Description

The GT series products utilizes Trust's outstanding standard turbo process and packaging techniques to achieve ultral low on-resistance and low gate charge and to provide the industry's best-in-class performance.

These features make this series products extremely efficient, temperature characteristics and reliable for use in power management, synchronous rectification, battery protection, load switch and a wide variety of other applications.

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

Parameter	Symbol	Parameter.	Unit
Drain-Source Voltage	$V_{DS}$	800	V
Gate-to-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current, @ Steady-State	$I_D @ T_C = 25^\circ\text{C}$	12	A
Continuous Drain Current, @ Steady-State	$I_D @ T_C = 100^\circ\text{C}$	7.6	A
Pulsed Drain Current	$I_{DM}$	48	A
Power Dissipation	$P_D @ T_C = 25^\circ\text{C}$	36	W
		0.29	W/°C
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	510	mJ
Body diode reverse voltage slope <sup>2</sup>	dv/dt	50	V/ns
MOS dv/dt ruggedness <sup>3</sup>	dv/dt	100	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	3.5	°C/W
Operating Junction and Storage Temperature Range	$T_J/T_{STG}$	-55 to + 150	°C



## 800V N-Channel MOSFET

### Electrical Characteristics (T<sub>C</sub>=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	800	-	-	V
Drain-to-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =800V, V <sub>GS</sub> =0V	-	-	1	uA
Gate-to-Source Forward Leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =30V	-	-	100	nA
		V <sub>DS</sub> =0V, V <sub>GS</sub> = -30V	-	-	-100	
Static Drain-to-Source On- Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =6.0A	-	0.36	0.42	Ω
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.4	-	4.6	V
Gate Resistance	R <sub>g</sub>	f=1MHz	-	6.4	-	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V V <sub>DS</sub> =100V, f=1MHz	-	1130	-	pF
Output Capacitance	C <sub>oss</sub>		-	36	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	1.9	-	
Total Gate Charge <sup>4,5</sup>	Q <sub>g</sub>	I <sub>D</sub> =12A, V <sub>DD</sub> =640V, V <sub>GS</sub> =10V	-	30	-	nC
Gate-to-Source Charge <sup>4,5</sup>	Q <sub>gs</sub>		-	9.5	-	
Gate-to-Drain("Miller") Charge <sup>4,5</sup>	Q <sub>gd</sub>		-	12	-	
Turn-on Delay Time <sup>4,5</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> =400V, V <sub>GS</sub> =10V, R <sub>G</sub> =25Ω, I <sub>D</sub> =12A	-	24	-	nS
Rise Time <sup>4,5</sup>	t <sub>r</sub>		-	57	-	
Turn-Off Delay Time <sup>4,5</sup>	t <sub>d(off)</sub>		-	80	-	
Fall Time <sup>4,5</sup>	t <sub>f</sub>		-	36	-	
<b>Source-Drain Ratings and Characteristics</b>						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current (Body Diode)	I <sub>S</sub>	T <sub>C</sub> =25°C, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	12	A
Source Pulse Current	I <sub>SM</sub>		-	-	48	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =12A, V <sub>GS</sub> =0V	-	1.1	1.4	V
Reverse Recovery Time <sup>2</sup>	t <sub>rr</sub>	I <sub>F</sub> =12A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us	-	391	-	nS
Reverse Recovery Charge <sup>2</sup>	Q <sub>rr</sub>		-	4.5	-	μC

**Notes:**

- L=79mH, I<sub>AS</sub>=3.4A, V<sub>DD</sub>=100V, R<sub>G</sub>=25Ω, starting temperature T<sub>J</sub>=25°C.
- V<sub>DS</sub>=0~400V, I<sub>SD</sub><=I<sub>S</sub>, T<sub>J</sub>=25°C.
- V<sub>DS</sub>=0~480V.
- Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- Essentially Independent of Operating Tempera.



## 800V N-Channel MOSFET

### Typical Electrical and Thermal Characteristic Curves

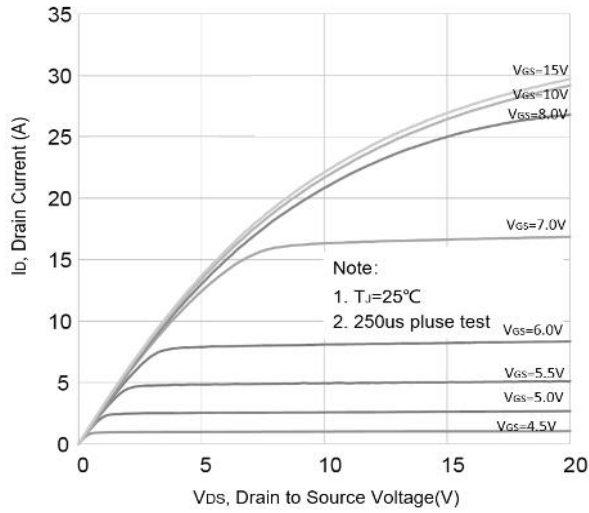


Figure1. Typical Output Characteristics

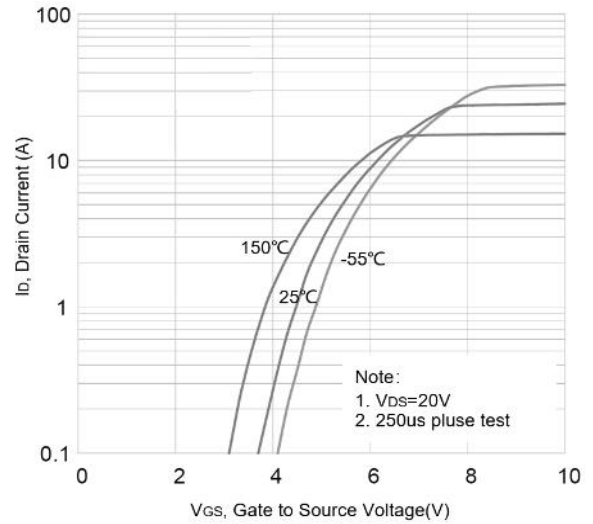


Figure2. Transfer Characteristics

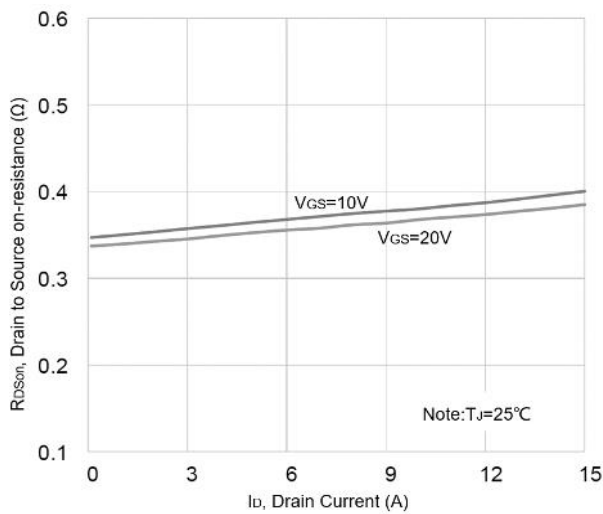


Figure3. Rds(on) vs. Drain Current

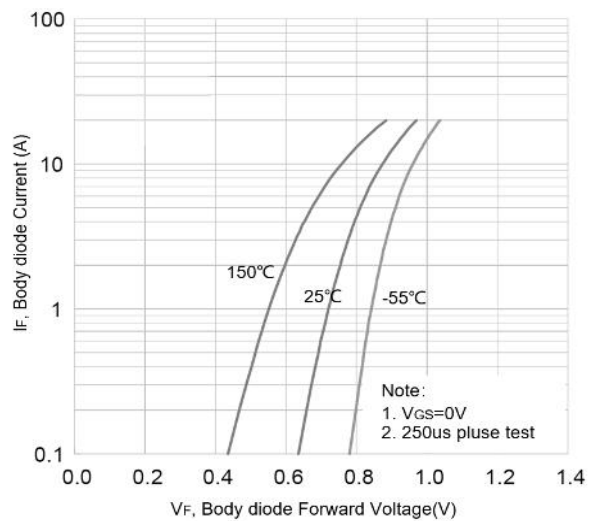


Figure4. Body Diode Characteristic

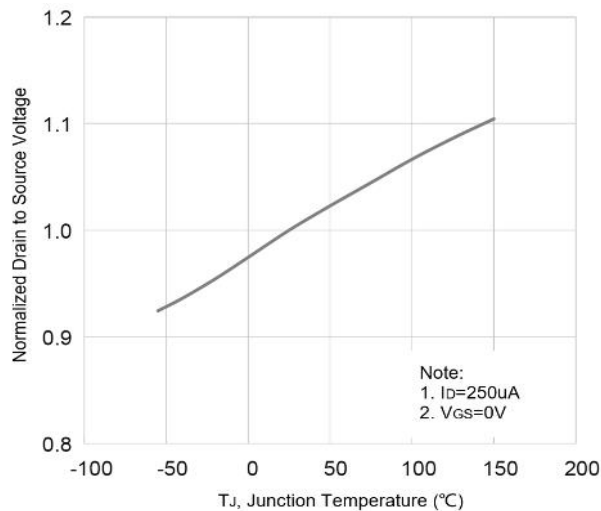


Figure5. Normalized BVdss vs. Tj

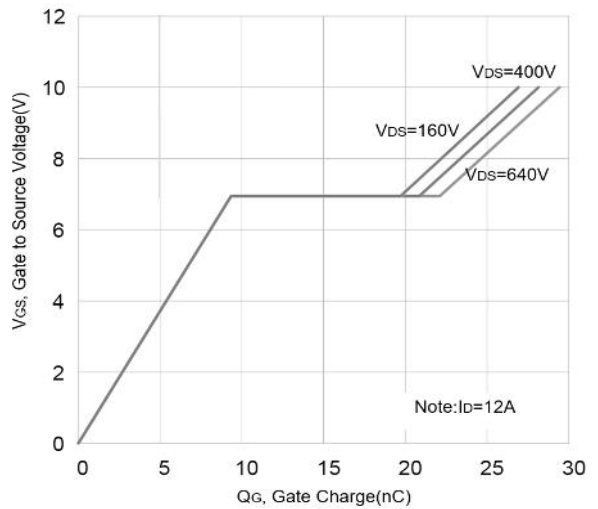
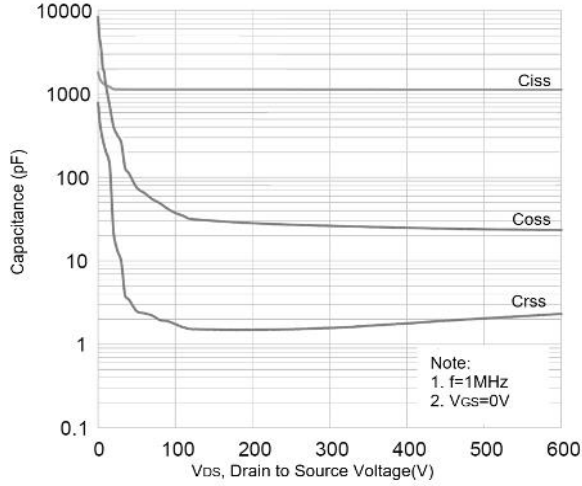


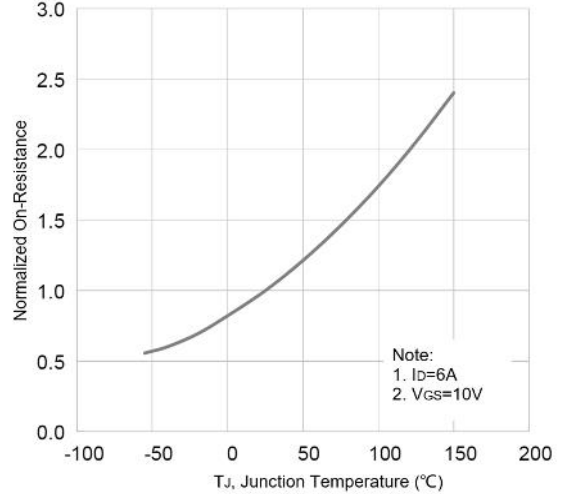
Figure6. Gate Charge

## 800V N-Channel MOSFET

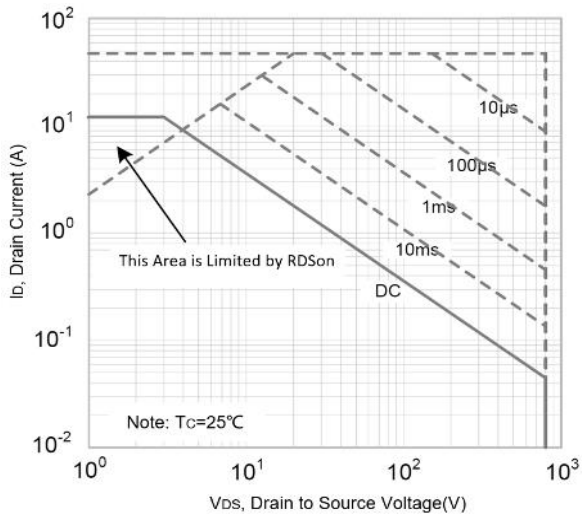
### Typical Electrical and Thermal Characteristic Curves



**Figure 7. Capacitance Characteristic**



**Figure 8. Normalized  $R_{ds(on)}$  vs.  $T_j$**



**Figure 9. Safe Operation Area**

## 800V N-Channel MOSFET

### Test Circuit & Waveform

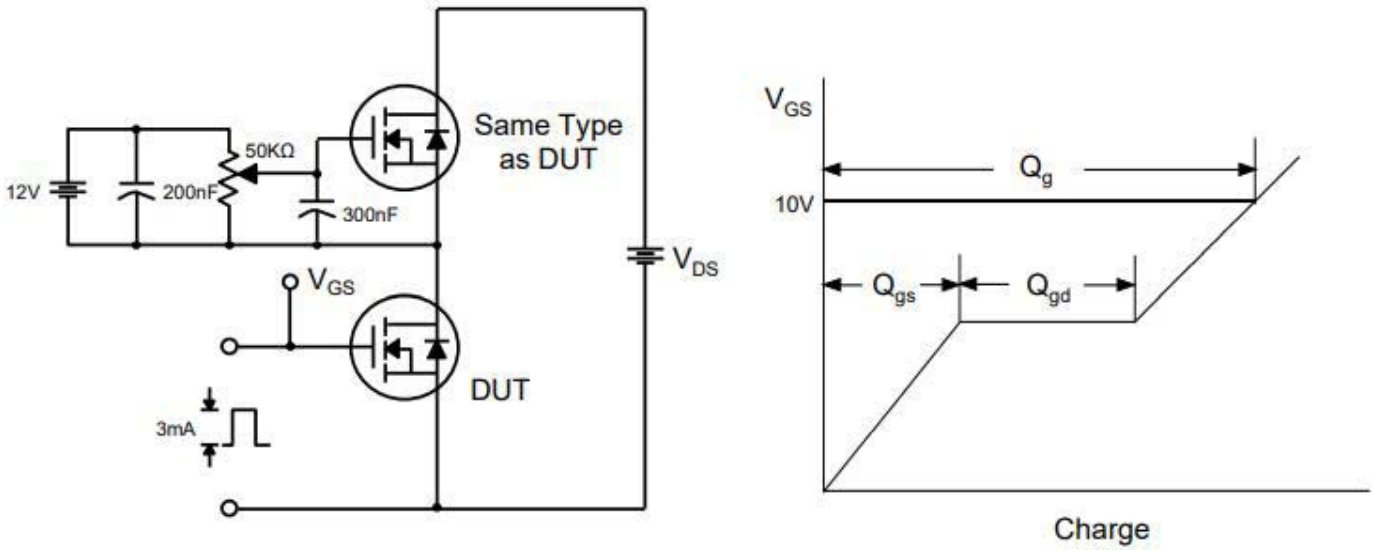


Figure 10. Gate Charge Test Circuit & Waveforms

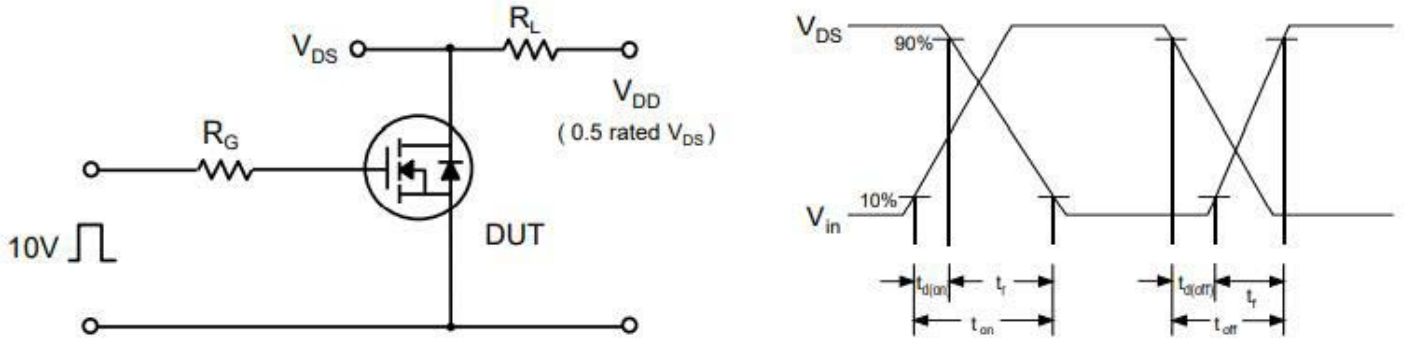


Figure 11. Resistive Switching Test Circuit & Waveforms

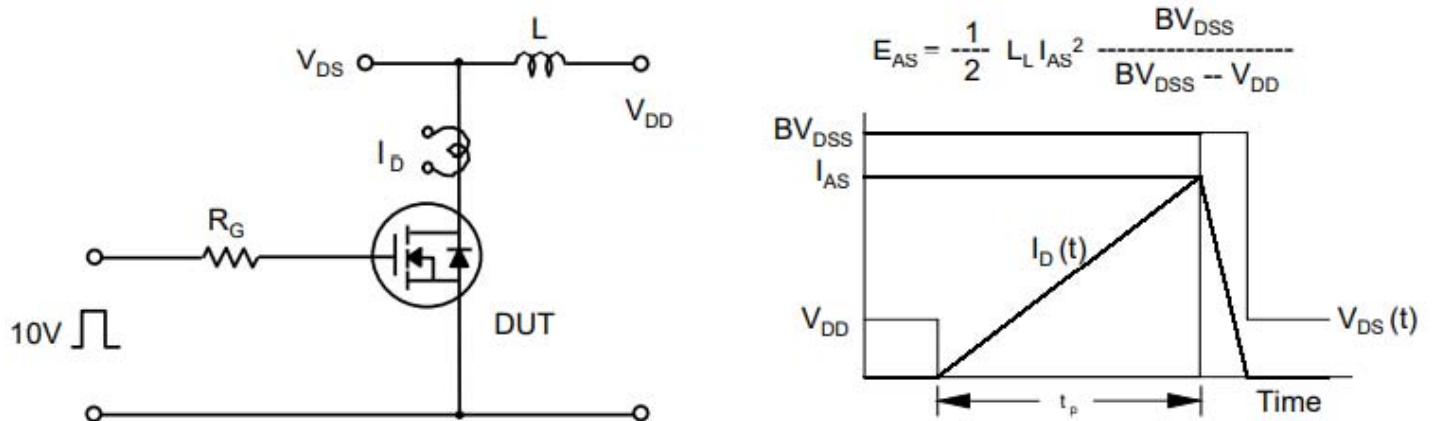
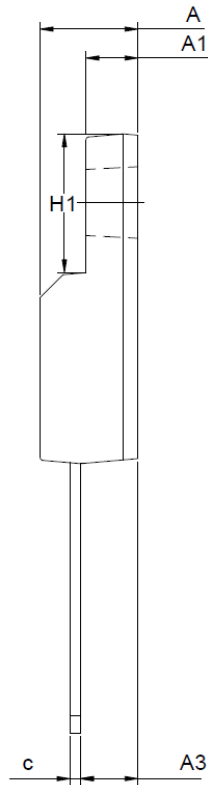
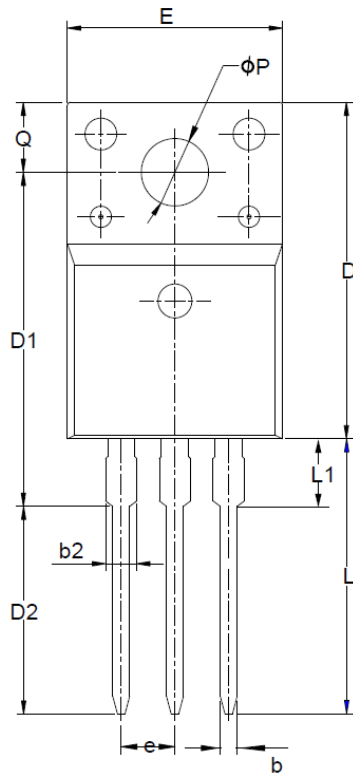


Figure 12. Unclamped Inductive Switching Test Circuit & Waveforms

## 800V N-Channel MOSFET

### Package Outline Dimensions

### TO-220F



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	3.50
$\phi P$	3.00	3.18	3.40
Q	3.05	3.30	3.55