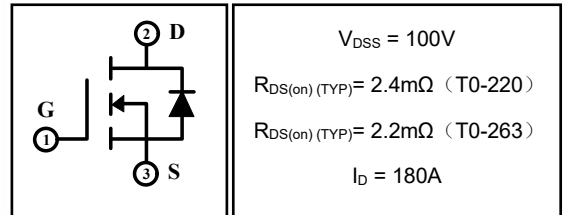


## 180A 100V N-channel Enhancement Mode Power MOSFET

### 1 Description

This N-channel enhancement mode power mosfets used advanced splite gate trench technology design, provided excellent Rdson and low gate charge. Which accords with the RoHS standard.

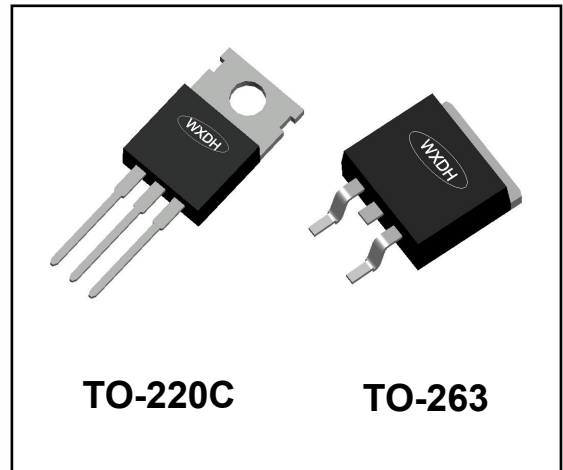


### 2 Features

- Fast switching
- Low on resistance
- Low gate charge
- High avalanche current
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100%  $\Delta V_{DS}$  test
- **AEC-Q101 qualified**

### 3 Applications

- Synchronous rectification in SMPS
- Hard switching and high speed circuit
- Power tools
- UPS
- Motor control



### 4 Electrical Characteristics

#### 4.1 Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter		Symbol	Rating	Units
Drian-to-Source Voltage		$V_{DSS}$	100	V
Gate-to-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$T_C=25^\circ C$ (Package limit)	$I_D$	180	A
	$T_C=25^\circ C$ (Silicon limit)		256	A
	$T_C=100^\circ C$		179	A
Pulsed Drain Current <sup>(1)</sup>		$I_{DM}$	720	A
Single Pulse Avalanche Energy <sup>(4)</sup>		$E_{AS}$	1722	mJ
Power Dissipation	$T_a=25^\circ C$	$P_{tot}$	2.6	W
	$T_C=25^\circ C$	$P_{tot}$	300	W
Junction Temperature Range		$T_j$	-55~175	$^\circ C$
Storage Temperature Range		$T_{stg}$	-55~175	$^\circ C$

#### 4.2 Thermal Characteristics

Parameter	Symbol	Value		Units
		Typ	Max	
Thermal Resistance, Junction to Case-sink	$R_{thJC}$	0.3	0.5	$^\circ C/W$
Thermal Resistance, Junction to Ambient	$R_{thJA}$	58	75	$^\circ C/W$

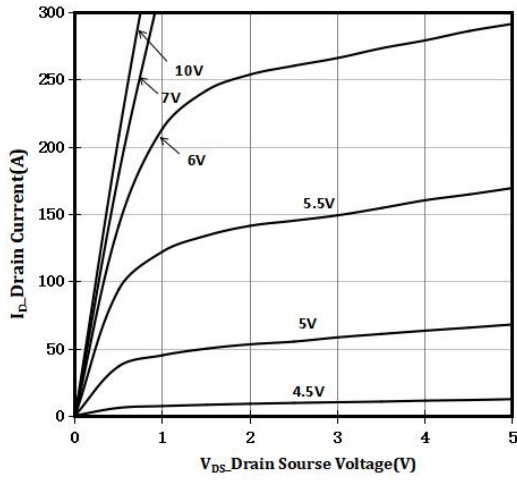
**4.3 Electrical Characteristics** (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
<b>Off Characteristics</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	100	--	--	V
Drain-to-Source Leakage Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V, T_C=25^\circ C$	--	--	1	$\mu A$
		$V_{DS}=100V, V_{GS}=0V, T_C=125^\circ C$	--	--	100	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	$\pm 100$	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-to-Source on-state Resistance	$R_{DS(on)}$ (TO-220)	$V_{GS}=10V, I_D=80A$	--	2.4	2.8	m $\Omega$
	$R_{DS(on)}$ (TO-263)	$V_{GS}=10V, I_D=80A$	--	2.2	2.6	m $\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=50V, f=1.0MHz$	--	16263	--	pF
Output Capacitance	$C_{oss}$		--	1470	--	
Reverse Transfer Capacitance	$C_{rss}$		--	77.8	--	
Gate Resisitance	$R_G$	$V_{DD}=0V, V_{GS}=0V, F=1MHz$	--	2.5	--	$\Omega$
<b>Switching Characteristics</b>						
Turn-on Delay Time	$t_{d(on)}$	$I_D=60A, V_{DD}=30V, V_{GS}=10V, R_{GEN}=3\Omega$	--	52	--	nS
Turn-on Rise Time	$t_r$		--	169	--	
Turn-off Delay Time	$t_{d(off)}$		--	158	--	
Turn-off Fall Time	$t_f$		--	162	--	
Total Gate Charge	$Q_g$	$I_D=80A, V_{DD}=50V, V_{GS}=10V$	--	247	--	nC
Gate-to-Source Charge	$Q_{gs}$		--	90	--	
Gate-to-Drain("Miller") Charge	$Q_{gd}$		--	62	--	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=60A$	--	--	1.1	V
Diode Forward Current	$I_S$		--	--	180	A
Reverse Recovery Time <sup>(3)</sup>	$t_{rr}$	$T_J=25^\circ C, I_F=80A, di_F/dt=100A/\mu S, V_{GS}=0V$	--	92	--	nS
Reverse Recovery Charge <sup>(3)</sup>	$Q_{rr}$		--	215	--	nC

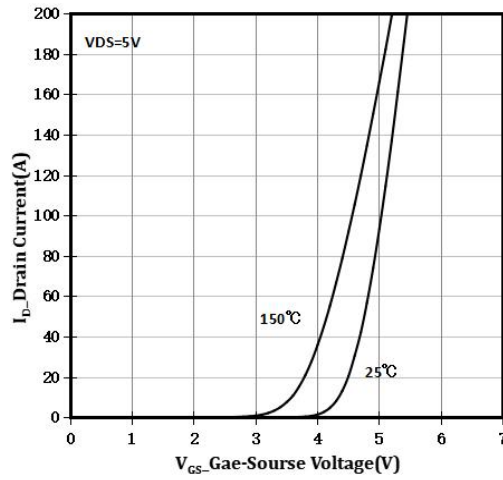
**Notes:**

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board,  $t \leq 10sec$ .
- 3: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 4:  $L=0.5mH, V_{DD}=80V, V_G=10V, Start T_J=25^\circ C$ .

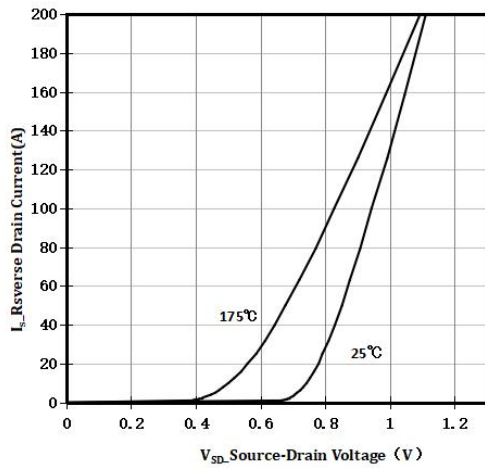
**5 Typical characteristics diagrams**



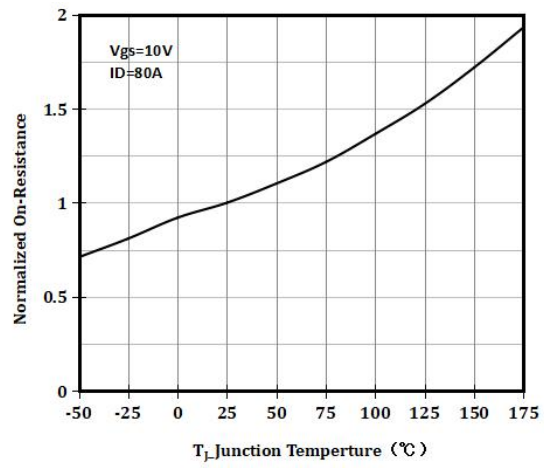
**Fig 1. Output Characteristics**



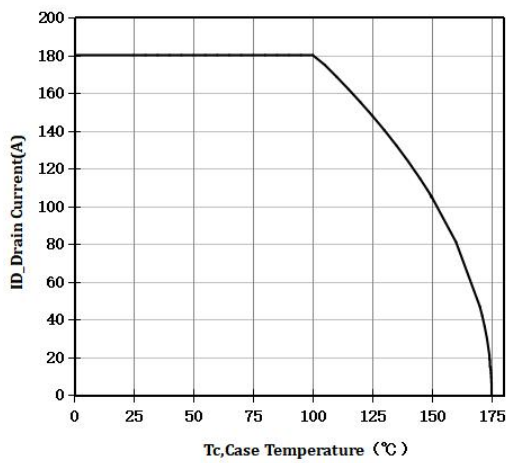
**Fig 2. Transfer Characteristics**



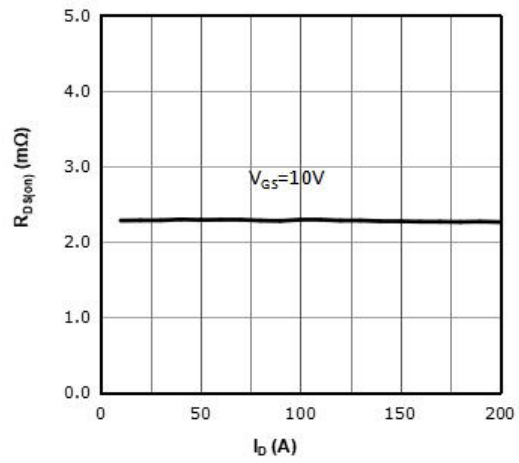
**Figure 3 Source-Drain Diode Forward**



**Fig 4. Rds(on) vs. Temperature**

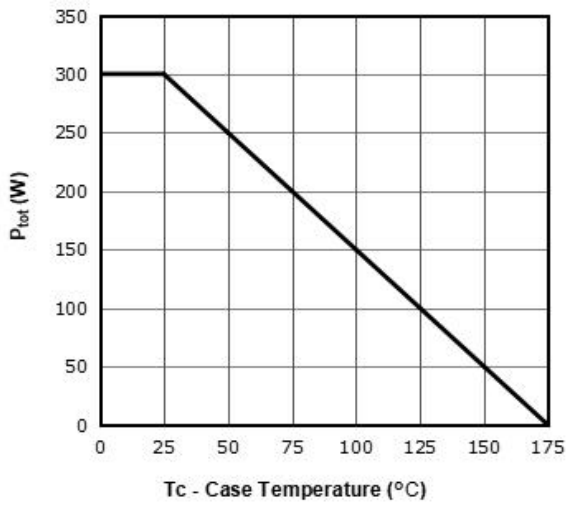


**Figure 5. ID Current Derating**

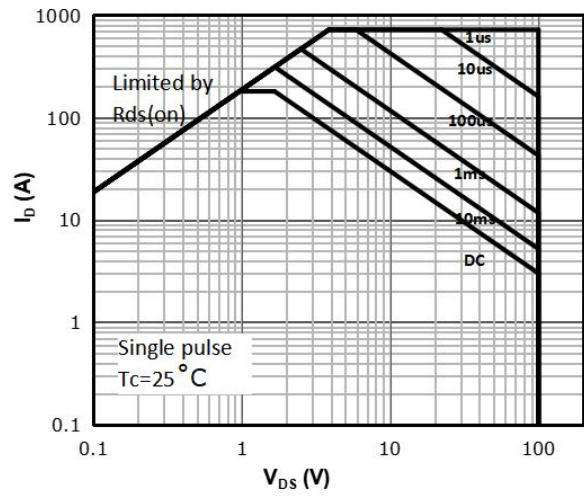


**Figure 6. Rds(on) vs Drain Current**

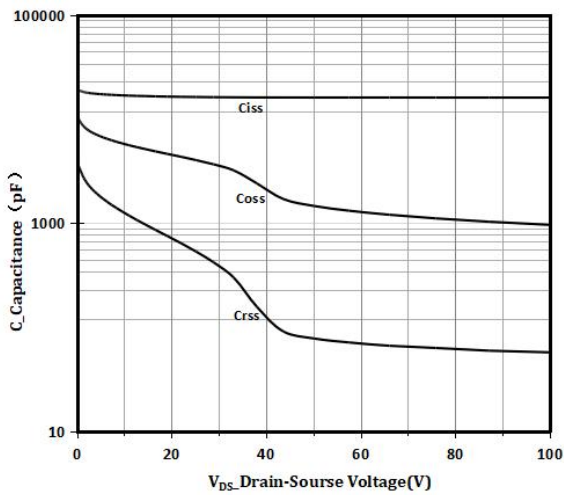
**5 Typical characteristics diagrams(continues)**



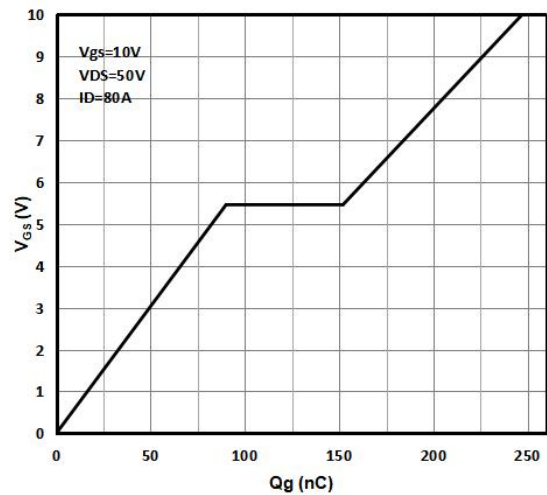
**Figure 7. Power Dissipation**



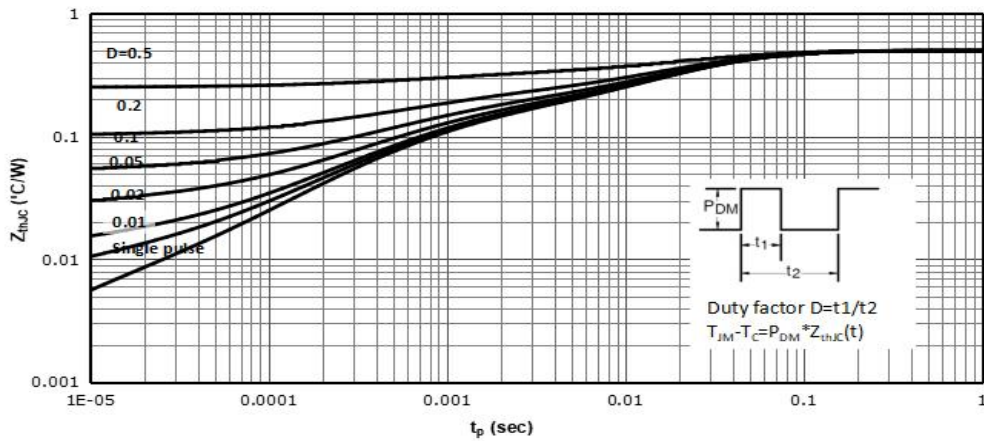
**Figure 8. Safe Operating Area**



**Figure 9. Capacitance Characteristics**

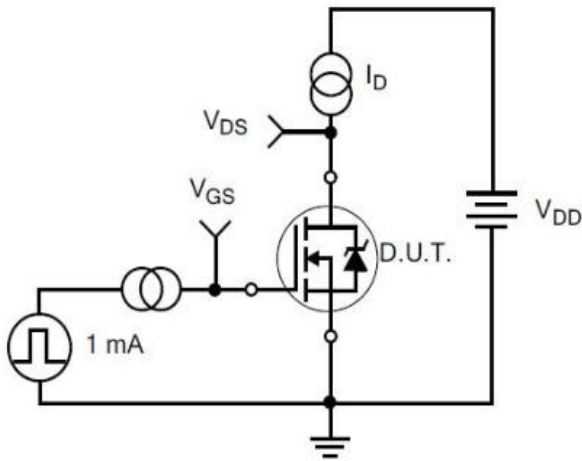


**Figure 10. Gate Charge**

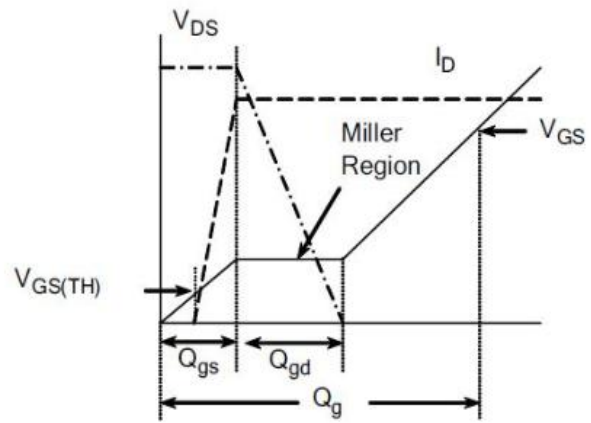


**Figure 11. Normalized Maximum Transient Thermal Impedance**

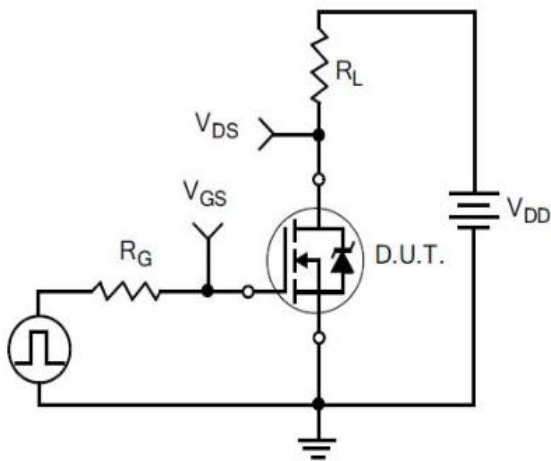
**6 Typical Test Circuit and Waveform**



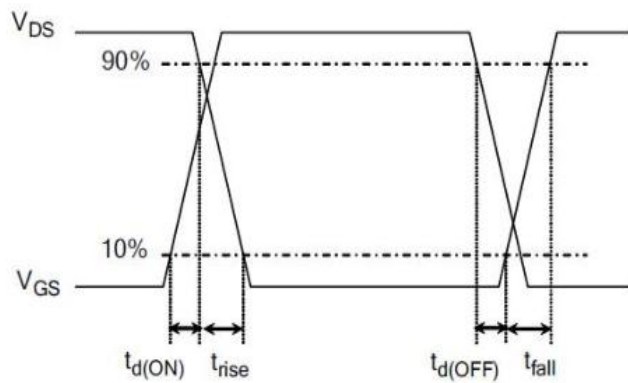
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

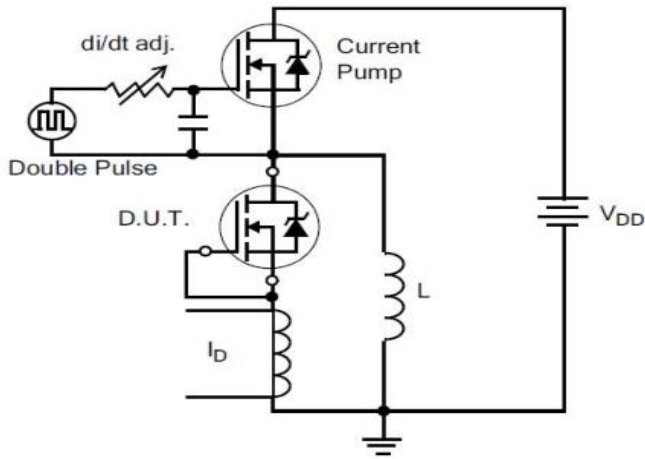


3) Resistive Switching Test Circuit

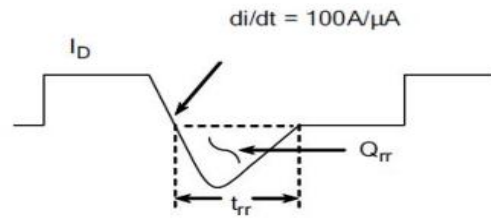


4) Resistive Switching Waveforms

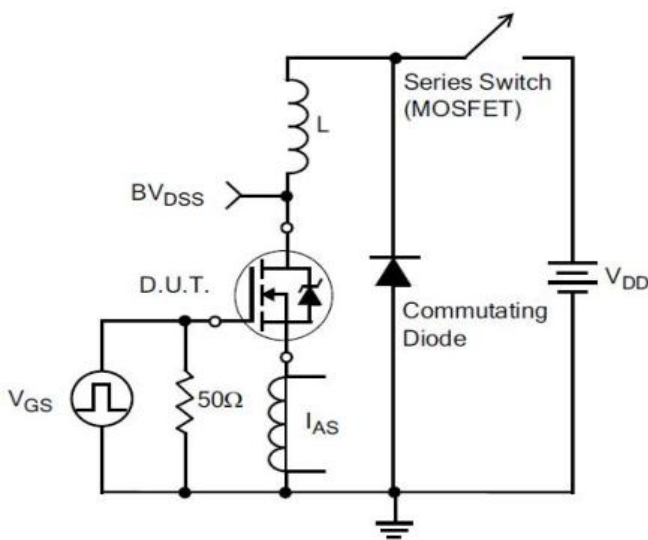
**6 Typical Test Circuit and Waveform(continues)**



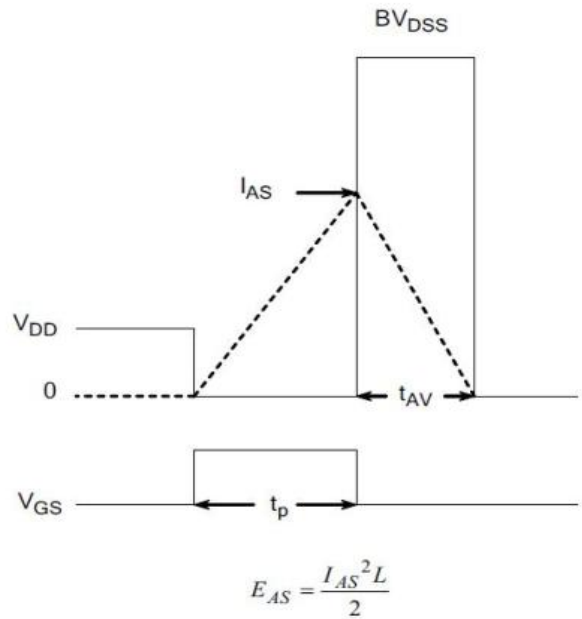
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

## 7 Product Names Rules

D A S G X X X N E X X N A

LOGO Code: D

Automotive  
Blank=Non-Automotive  
A=Automotive

Product Line Code  
T=Trench MOS  
S=SGT MOS  
P=Planar MOS

Packaging Code  
220F: F 220: G  
262: I 263: E

RDSON Specification Code  
With 3 Digitals,  
For Example:  
045 on behalf of 4.5mΩ  
050 on behalf of 5.0mΩ  
155 on behalf of 15.5mΩ

Channel Polarity Code  
N on behalf of N channel  
P on behalf of P channel

Reliability level (Last Letter)  
Blank=Consumer/Industrial  
A=AEC-Q101 Qualified

Vth Level	Vth(V)	Driver(V)
N=Normal	2.5~4.0	10~15
L=Logic	1.2~2.4	4.5~8.0
S=Super Logic	0.8~1.2	2.5
U=UltraLogic	0.5~0.8	1.8

Rated Voltage Code  
With 2-3 Digitals,  
For Example:  
06 on behalf of 60V  
08 on behalf of 80V  
045 on behalf of 45V

Special Function Code  
E on behalf of build-in ESD  
Nothing on behalf of not ESD

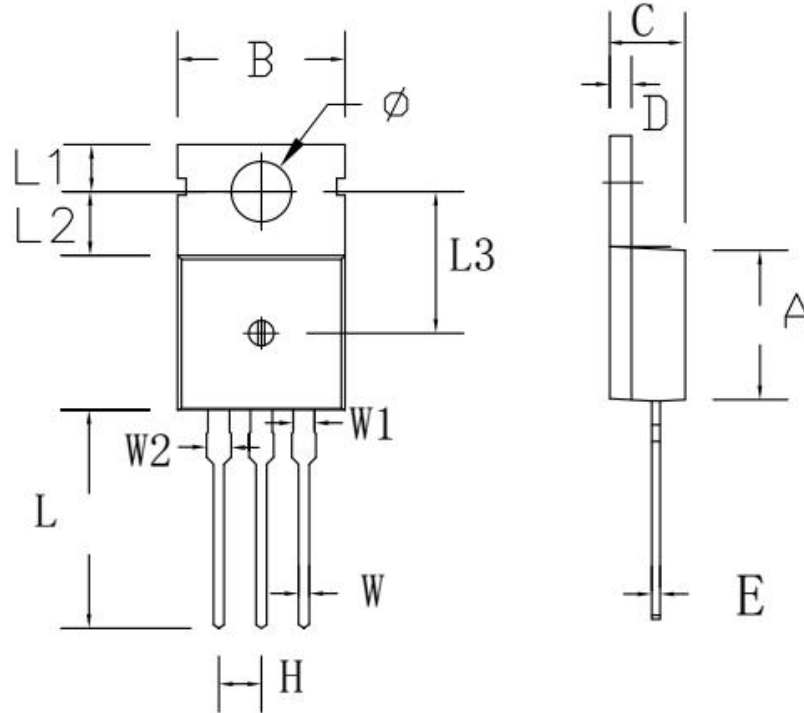
## 8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
DSG028N10NA	TO-220	DSG028N10NA	Pb-free	Tube	1000/box
DSE026N10NA	TO-263	DSE026N10NA	Pb-free	Tape & Reel	800/box



9 Dimensions

TO-220C PACKAGE OUTLINE DIMENSIONS

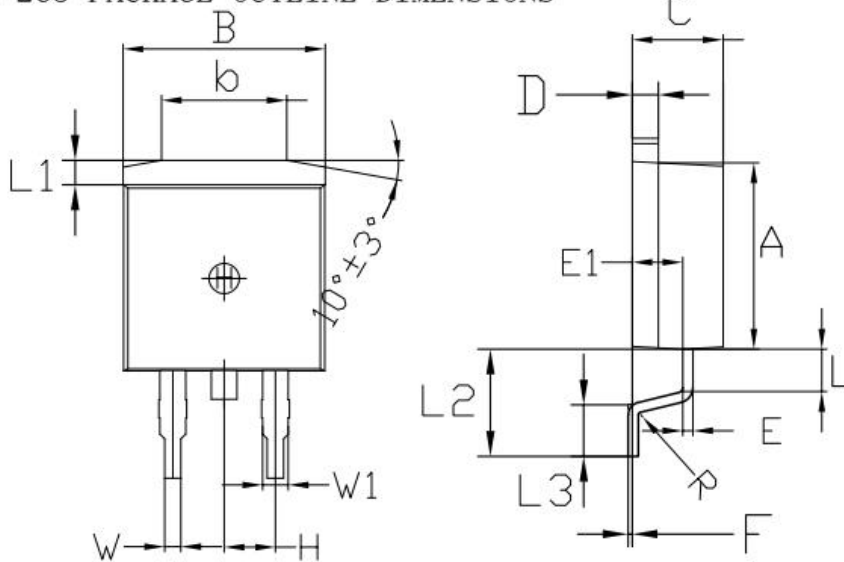


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
Φ	3.50	3.90	0.138	0.154



9 Dimensions(continues)

TO-263 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	1.90	2.30	0.075	0.091
L1	1.15	1.45	0.045	0.057
R	0.24	0.26	0.0095	0.0102
W	0.80	0.82	0.0315	0.0323
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256
E1	2.4	2.6	0.0946	0.1024
L2	5.20	5.80	0.205	0.228
L3	2.20	3.20	0.087	0.126
F	0.03	0.23	0.0012	0.0091

## 10 Attentions

- Jiangsu Donghai Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Donghai products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

## 11 Appendix

Revision history:

Date	REV.	Description	Page
2022.10.02	1.0	Original	10