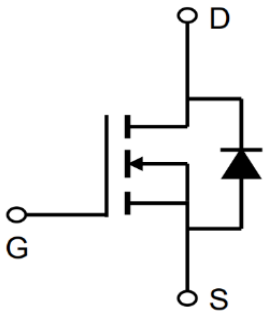
Description

These N-Channel enhancement mode power field effect transistors are using shielded gate trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance,provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.



General Features

V_{DS} = 40V I_D =180 A

$R_{DS(ON)}$ < 2.0mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply

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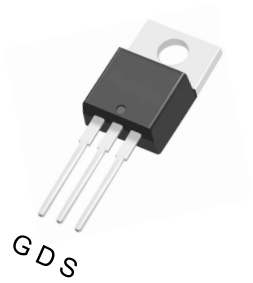

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Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	40	V
Gate source voltage	VGS	±20	V
Continuous drain current[1)]	ID	180	A
Pulsed drain current[2)]	ID, pulse	390	A
Power dissipation[3)]	P_D	140	W
Single pulsed avalanche energy[4)]	EAS	300	mJ
Operation and storage temperature	Tstg，Tj	-55 to 150	℃
Thermal resistance, junction-case	$R_{\theta JC}$	0.89	°C/W
Thermal resistance, junction-ambient[5)]	$R_{\theta JA}$	62	°C/W

Electrical Characteristics at T_j=25 ℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	40			V	V_{GS}=0 V, I_D=250 μA
Gate threshold voltage	$V_{GS(th)}$	1.3		2.5	V	V_{DS}=V_{GS}, I_D=250 μA
Drain-source on-state resistance	$R_{DS(ON)}$		1.5	2.0	mΩ	V_{GS}=10 V, I_D=55 A
Drain-source on-state resistance	$R_{DS(ON)}$		2.5	3.0	mΩ	V_{GS}=4.5 V, I_D=55 A
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=20 V
				-100		V_{GS}=-20 V
Drain-source leakage current	I_{DSS}			1	μA	V_{DS}=40 V, V_{GS}=0 V
Input capacitance	C_{iss}		6587.4		pF	V_{GS}=0 V, V_{DS}=20 V, f=100 kHz
Output capacitance	C_{oss}		2537.3		pF	
Reverse transfer capacitance	C_{rss}		178.8		pF	
Turn-on delay time	$t_{d(on)}$		26.6		ns	V_{GS}=10 V, V_{DS}=20 V, R_G=2 Ω, I_D=20 A
Rise time	t_r		9.3		ns	
Turn-off delay time	$t_{d(off)}$		96		ns	
Fall time	t_f		39.3		ns	
Total gate charge	Q_g		96.8		nC	I_D=20 A, V_{DS}=20 V, V_{GS}=10 V
Gate-source charge	Q_{gs}		14.5		nC	
Gate-drain charge	Q_{gd}		18.4		nC	
Gate plateau voltage	$V_{plateau}$		2.7		V	
Diode forward current	I_S			130	A	V_{GS}<V_{th}
Pulsed source current	I_{SP}			390		
Diode forward voltage	V_{SD}			1.3	V	I_S=20 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		205		ns	I_S=20 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		557.4		nC	
Peak reverse recovery current	I_{rrm}		4.3		A	

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) V_{DD}=30 V, R_G=50 Ω, L=0.3 mH, starting T_j=25 ℃.
5) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 ℃.

Typical Characteristics

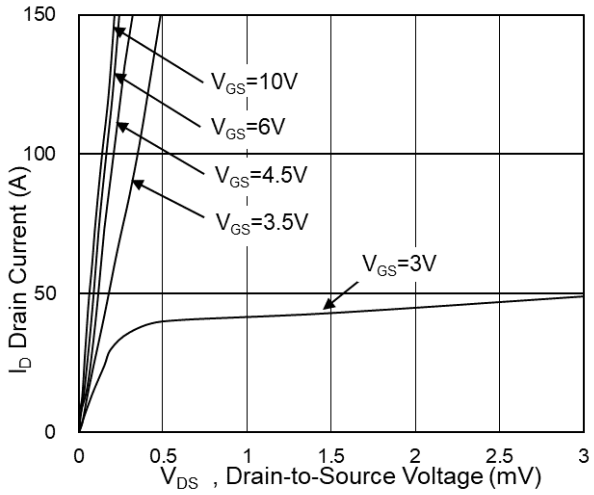

Fig.1 Typical Output Characteristics

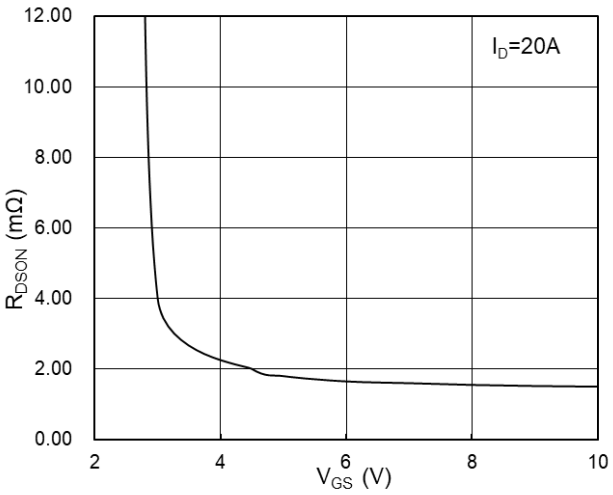

Fig.2 On-Resistance vs G-S Voltage

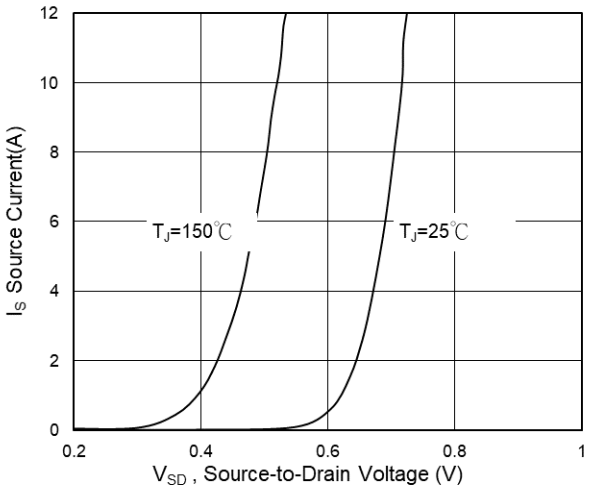

Fig.3 Source Drain Forward Characteristics

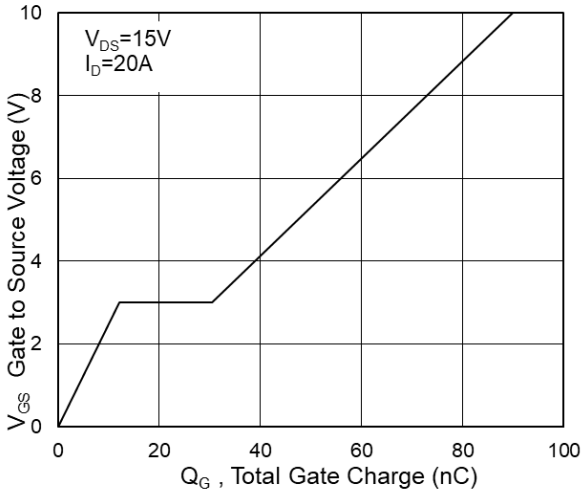

Fig.4 Gate-Charge Characteristics

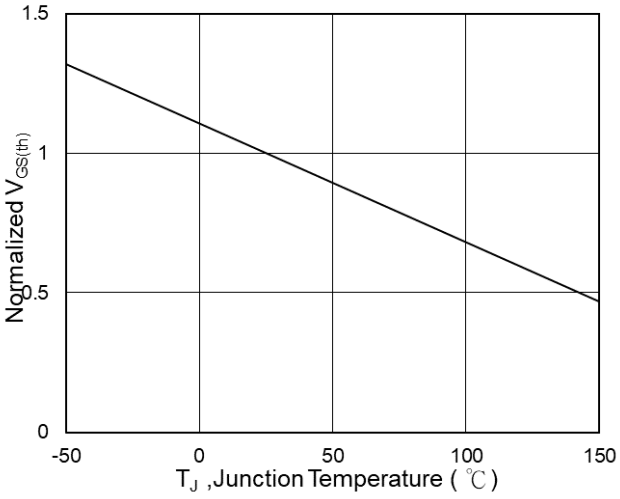

Fig.5 Normalized $V_{GS(th)}$ vs T_J

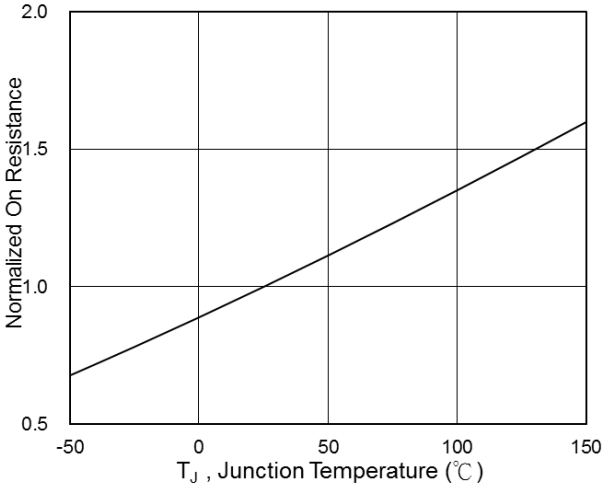

Fig.6 Normalized R_{DSON} vs T_J

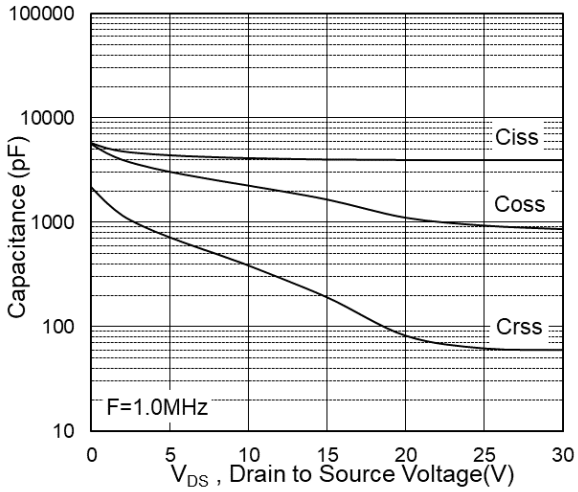

Fig.7 Capacitance

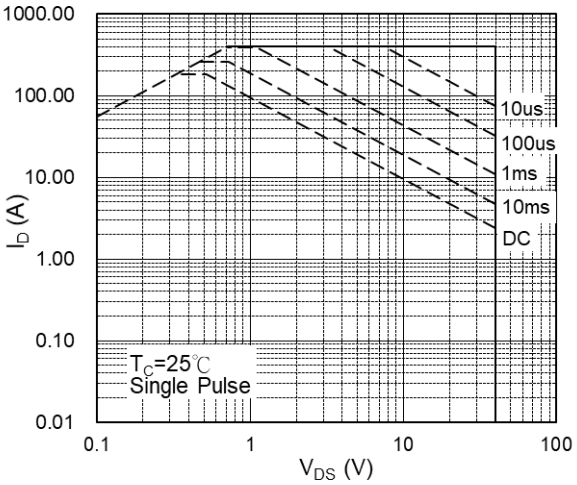

Fig.8 Safe Operating Area

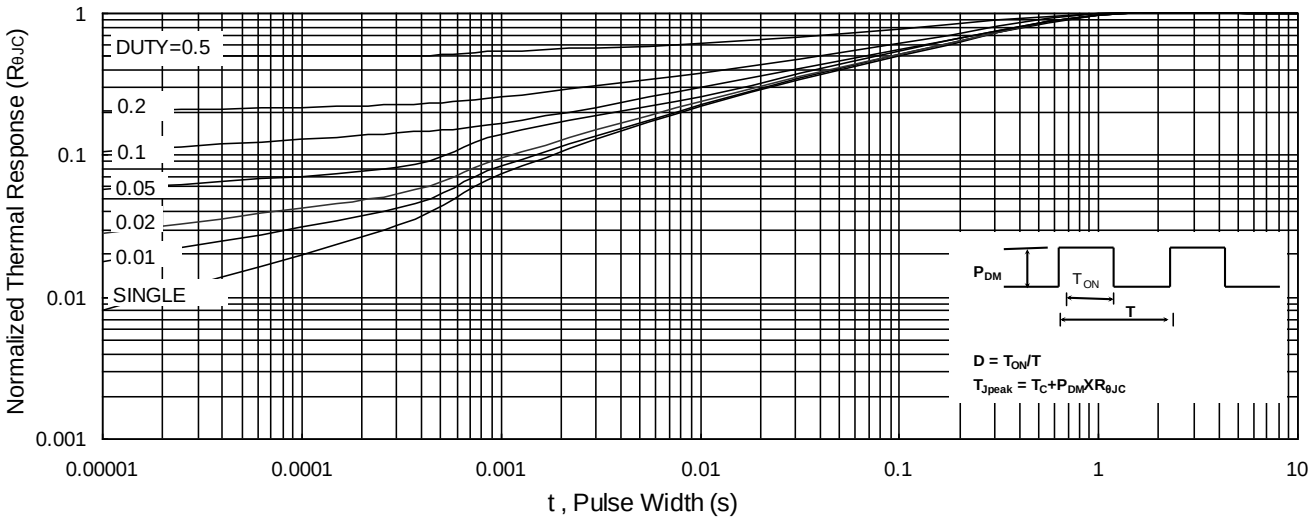

Fig.9 Normalized Maximum Transient Thermal Impedance

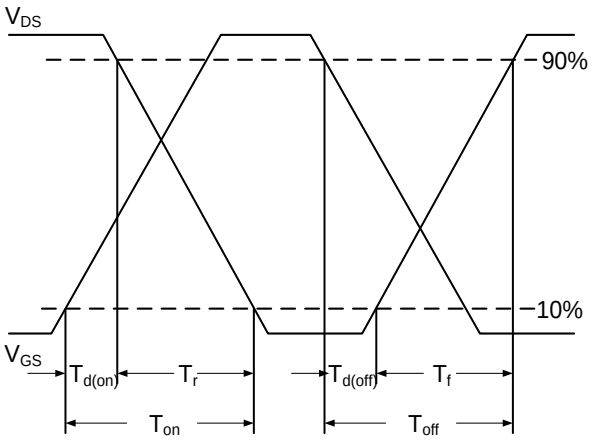

Fig.10 Switching Time Waveform

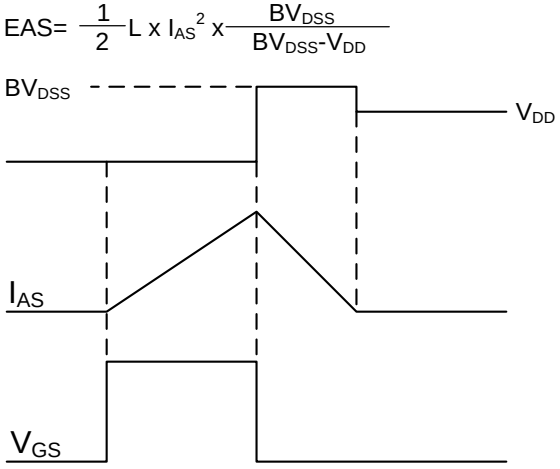

Fig.11 Unclamped Inductive Switching Waveform

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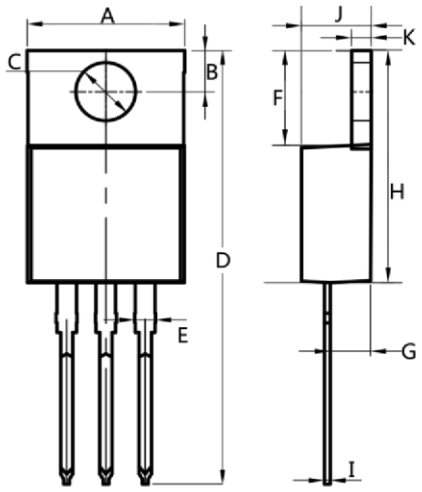

Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

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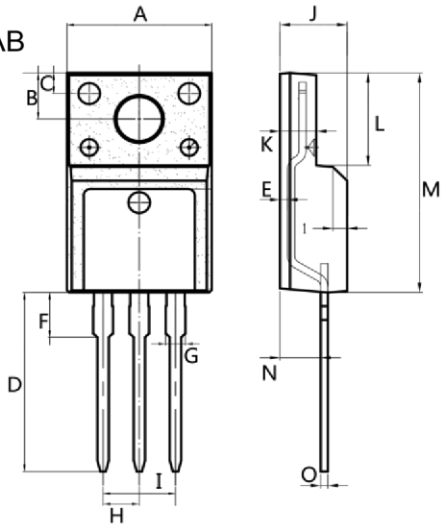

Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2. 7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60
All Dimensions in millimeter		

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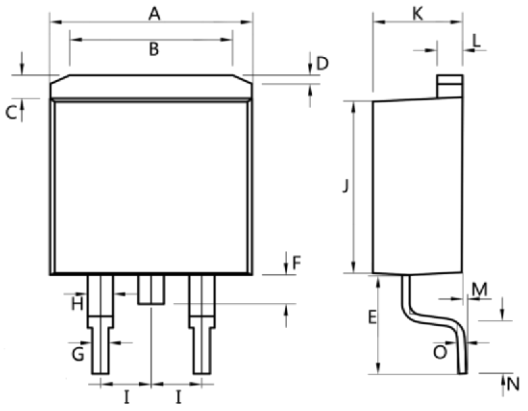

Dim.	Min.	Max.
A	10.0	10. 5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	Typ 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45
All Dimensions in millimeter		

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