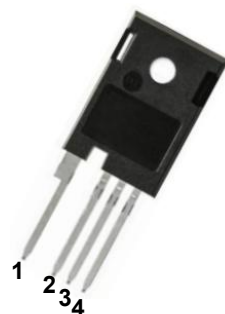
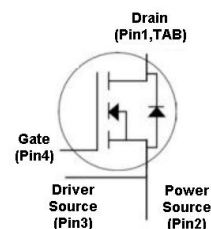


**Main Product Characteristics:**

$V_{DS}$	1200V
$I_D$	38A
$R_{DS(on)}$	70m $\Omega$



TO -247-4L



Schematic Diagram

**Features and Benefits:**

- High blocking voltage with low on-resistance
- High speed switching, very low switching losses
- High blocking voltage with low on-resistance
- Fast intrinsic diode with low reverse recovery ( $Q_{rr}$ )
- Temperature independent turn-off switching losses


**Applications:**

- On-board charger/PFC
- EV battery chargers
- Booster/DC-DC converter
- Switch mode power supplies

**Absolute Max Rating:**

Symbol	Parameter	Value	Units
$V_{DS}$	Drain Source Voltage	1200	V
$V_{GS,max}$	Gate Source Voltage, Absolute Maximum Values	-8 / +22	V
$V_{GS,op}$	Gate Source Voltage, Recommended Operational Values	-4 / +18	V
$I_D$	Continuous Drain Current @ $T_C = 25^\circ C$	38	A
	Continuous Drain Current @ $T_C = 100^\circ C$	27	
$I_{D(puls)}$	Pulsed Drain Current, Pulse Width $t_p$ limited by $T_{j,max}$	80	
$P_D$	Power Dissipation @ $T_C = 25^\circ C, T_J = 175^\circ C$	214	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +175	$^\circ C$
$T_L$	Soldering Temperature	260	$^\circ C$

**Thermal Resistance**

Symbol	Characterizes	Typ.	Max.	Units
R <sub>θJC</sub>	Thermal Resistance, Junction-to-case	—	0.7	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-ambient	—	35	°C/W

**Electrical Characteristics @T<sub>A</sub>=25°C unless otherwise specified**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	1200	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 100μA
R <sub>DS(on)</sub>	Static Drain-to-Source On-resistance	—	70	85	mΩ	V <sub>GS</sub> =18V, I <sub>D</sub> = 20A
		—	110	—		V <sub>GS</sub> =18V, I <sub>D</sub> =20A, T <sub>J</sub> =175°C
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.3	—	3.6	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 5mA
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	10	μA	V <sub>DS</sub> = 1200V, V <sub>GS</sub> = 0V
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 18V, V <sub>DS</sub> = 0V
g <sub>fs</sub>	Transconductance	—	10	—	S	V <sub>DS</sub> = 20V, I <sub>D</sub> = 20A
R <sub>g</sub>	Internal Gate Resistance	—	1.5	—	Ω	V <sub>AC</sub> = 25mV, f = 1MHz
Q <sub>g</sub>	Total Gate Charge	—	39	—	nC	V <sub>DS</sub> = 800V, V <sub>GS</sub> = -4/+18V, I <sub>D</sub> = 20A
Q <sub>gs</sub>	Gate-to-Source Charge	—	8	—		
Q <sub>gd</sub>	Gate-to-Drain("Miller") Charge	—	18	—		
t <sub>d(on)</sub>	Turn-on Delay Time	—	11	—	ns	V <sub>DS</sub> = 800V, V <sub>GS</sub> =-4/+15V I <sub>D</sub> = 20A, R <sub>g</sub> = 0Ω L = 120uH
t <sub>r</sub>	Rise Time	—	8	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	14	—		
t <sub>f</sub>	Fall Time	—	8	—		
E <sub>on</sub>	Turn on Switching Energy	—	81	—	μJ	
E <sub>off</sub>	Turn off Switching Energy	—	25	—		
C <sub>iss</sub>	Input Capacitance	—	922	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = 1000V f = 1MHz
C <sub>oss</sub>	Output Capacitance	—	58	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	—	4	—		
E <sub>oss</sub>	Coss Stored Energy	—	36	—		

**Electrical Characteristics of the Diode @T<sub>A</sub>=25°C unless otherwise specified**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous diode forward current	—	38	—	A	T <sub>C</sub> = 25°C
V <sub>SD</sub>	Diode Forward Voltage	—	4.3	—	V	V <sub>GS</sub> = -4V, I <sub>SD</sub> = 10A
t <sub>rr</sub>	Reverse recovery time	—	37.6	—	ns	V <sub>R</sub> = 800V, V <sub>GS</sub> = -4V I <sub>D</sub> = 20A, di/dt = 2670A/μS, T <sub>J</sub> = 150°C
Q <sub>rr</sub>	Reverse Recovery Charge	—	306	—	nC	
I <sub>RRM</sub>	Diode Peak Reverse Recovery Current	—	16	—	A	

Typical Electrical and Thermal Characteristics

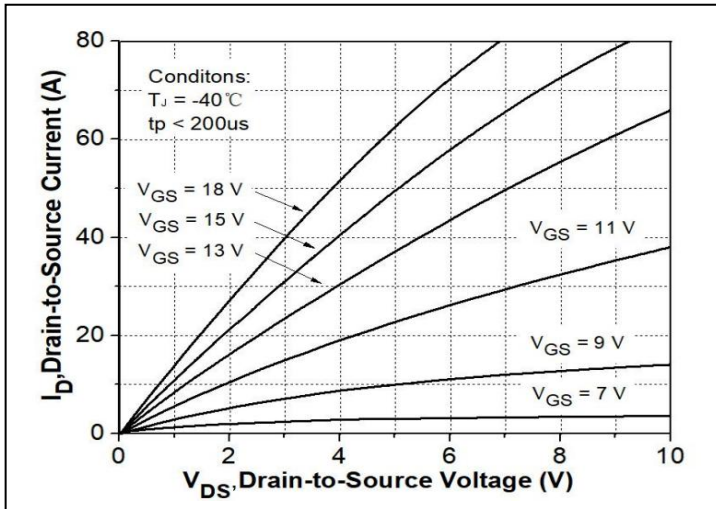


Figure1. Typical Output Characteristics@T<sub>J</sub>=-40°C

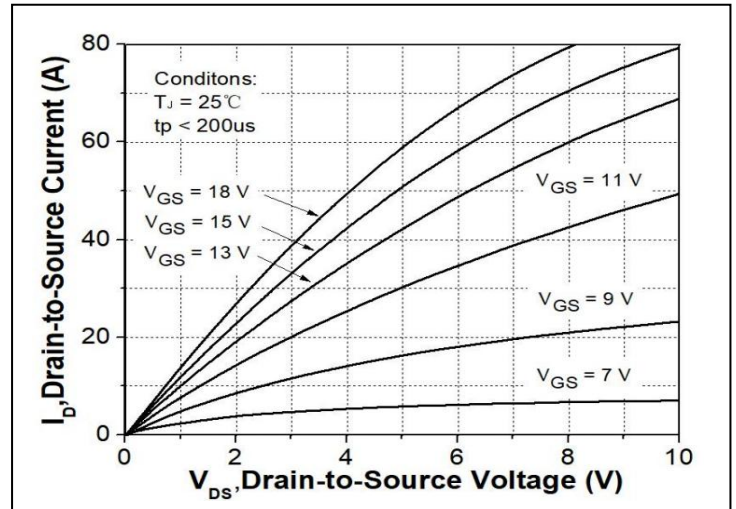


Figure2. Typical Output Characteristics@T<sub>J</sub>=25°C

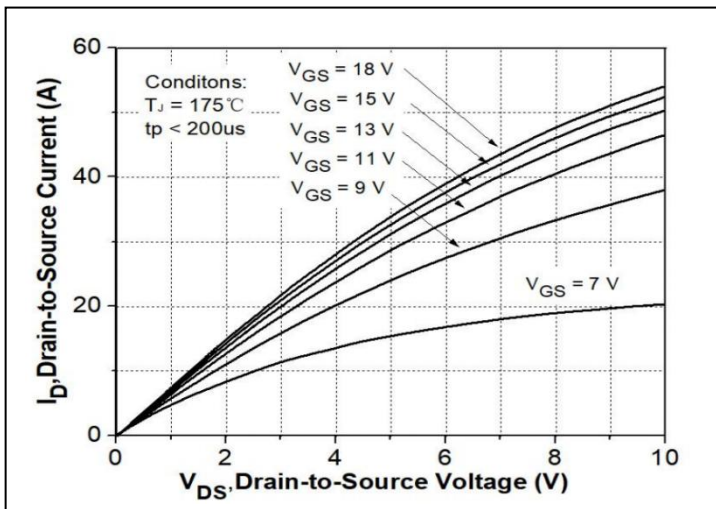


Figure3. Typical Output Characteristics@T<sub>J</sub>=175°C

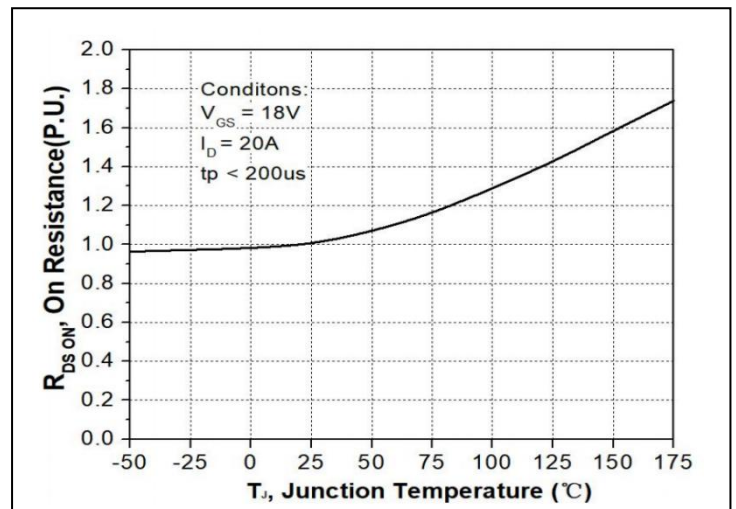


Figure4. Normalized on-resistance vs. Temperature

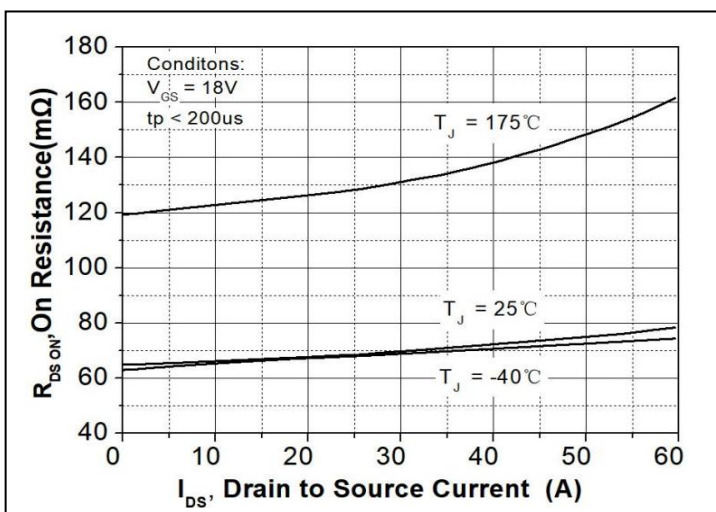


Figure5. On-resistance vs. Drain Current

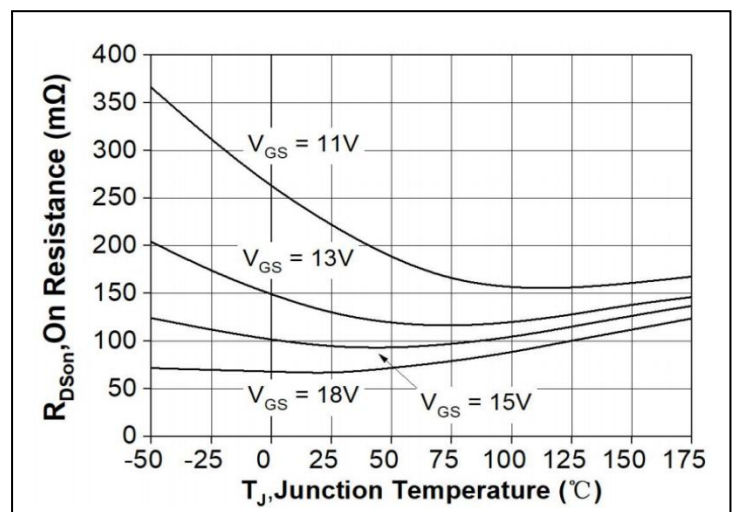


Figure6. On-resistance vs. Temperature

Typical Electrical and Thermal Characteristics

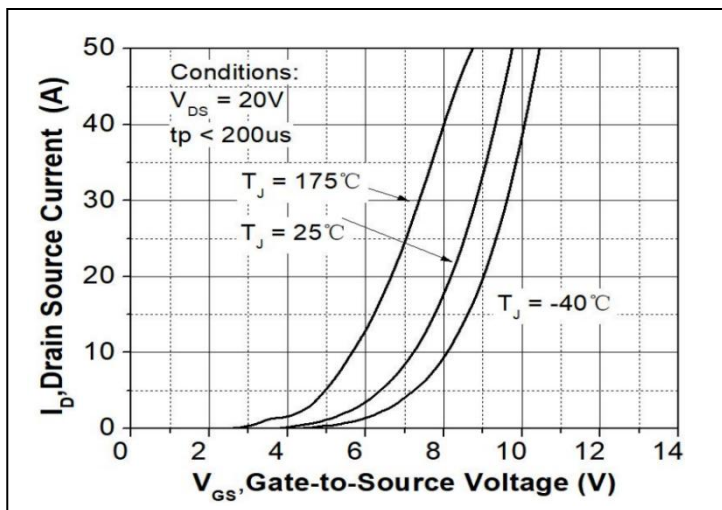


Figure7.Transfer Characteristic for Various Junction Temperatures

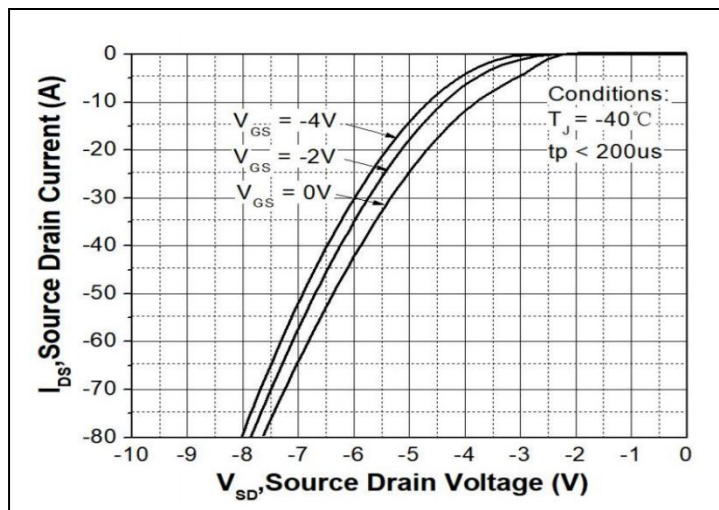


Figure8.Body Diode Characteristic @ $T_J = -40^\circ C$

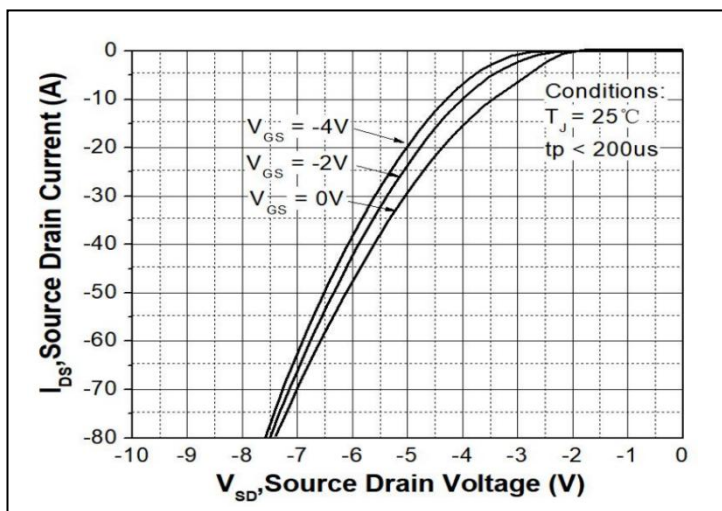


Figure9.Body Diode Characteristic @ $T_J = 25^\circ C$

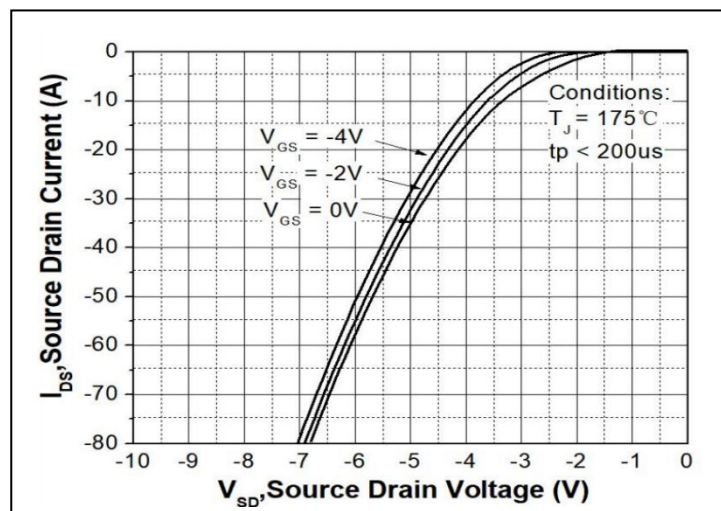


Figure10.Body Diode Characteristic @ $T_J = 175^\circ C$

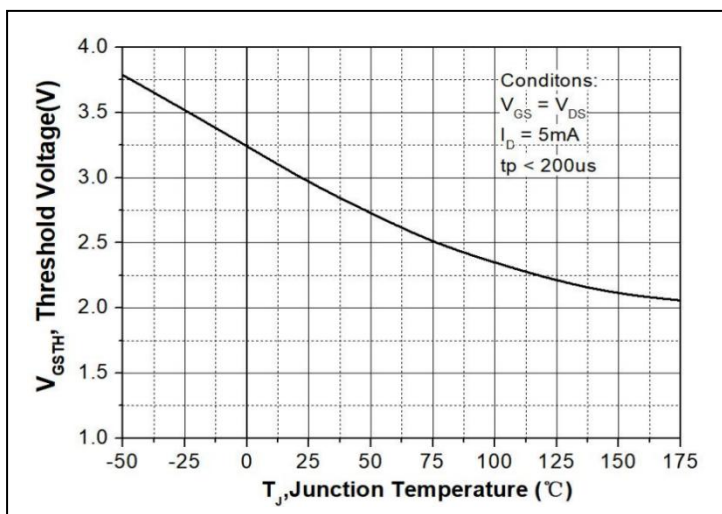


Figure11.Threshold Voltage vs. Temperature

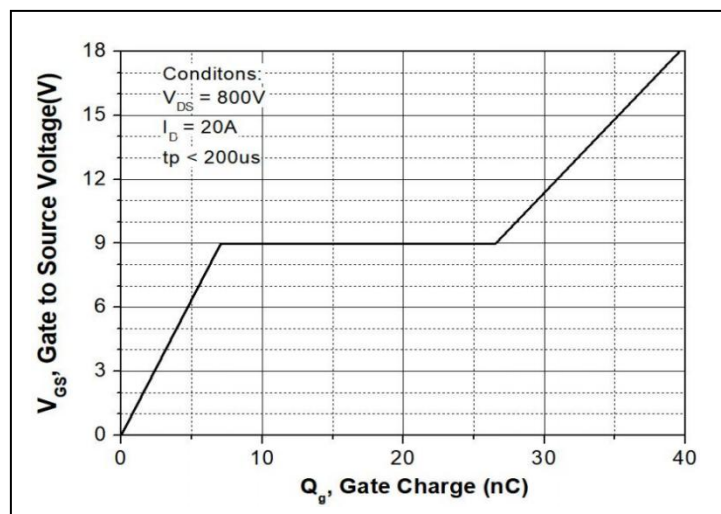


Figure12.Gate Charge Characteristic

Typical Electrical and Thermal Characteristics

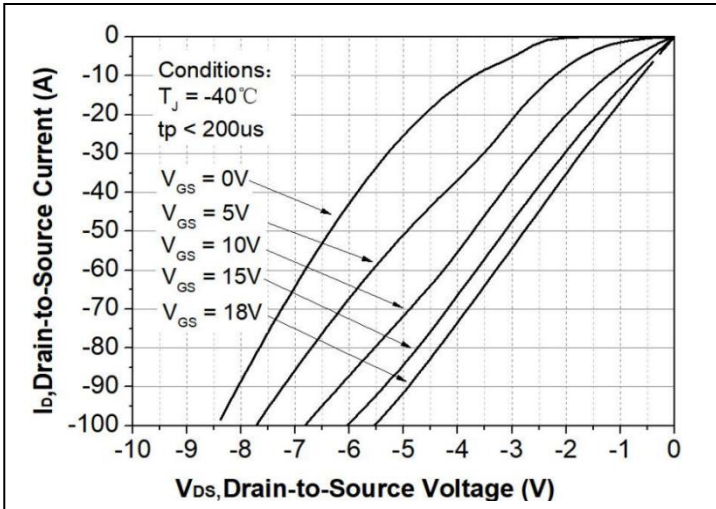


Figure13.3rd Quadrant Characteristic @  $T_J = -40\text{ }^\circ\text{C}$

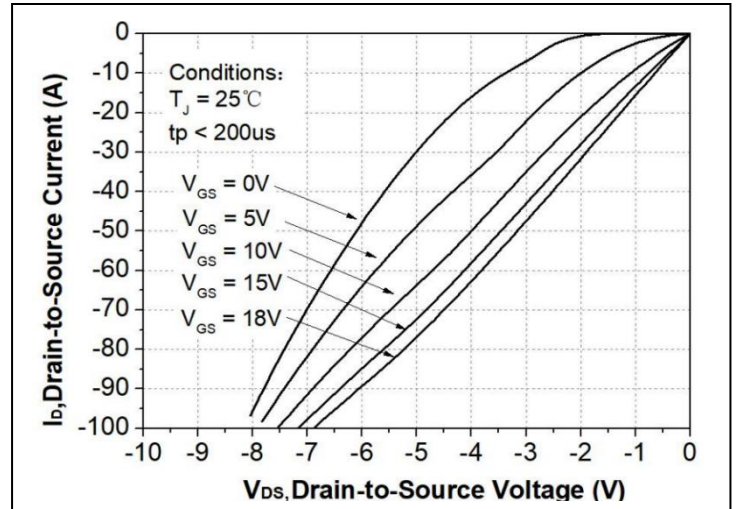


Figure14.3rd Quadrant Characteristic @  $T_J = 25\text{ }^\circ\text{C}$

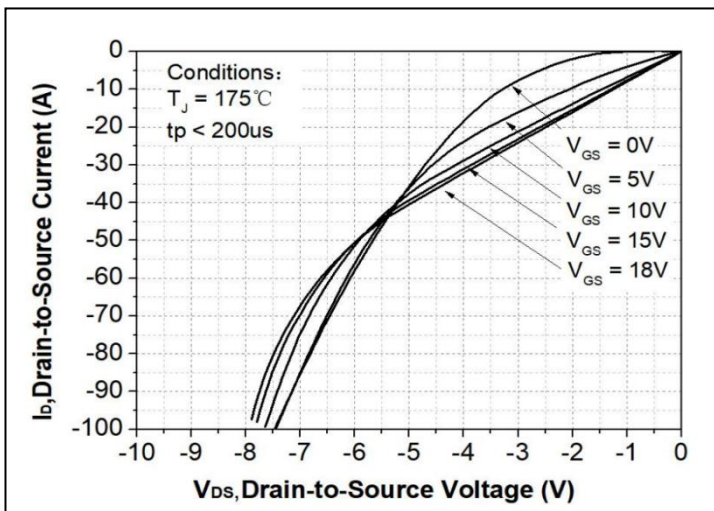


Figure15.3rd Quadrant Characteristic @  $T_J = 175\text{ }^\circ\text{C}$

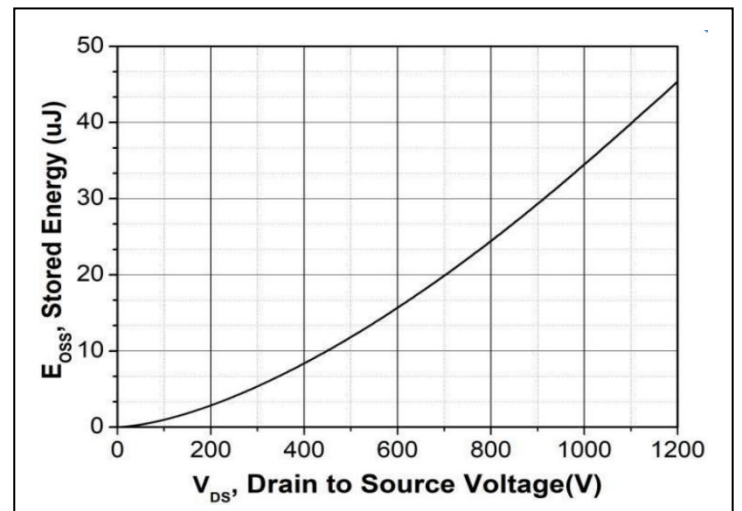


Figure16.Output Capacitor Stored Energy

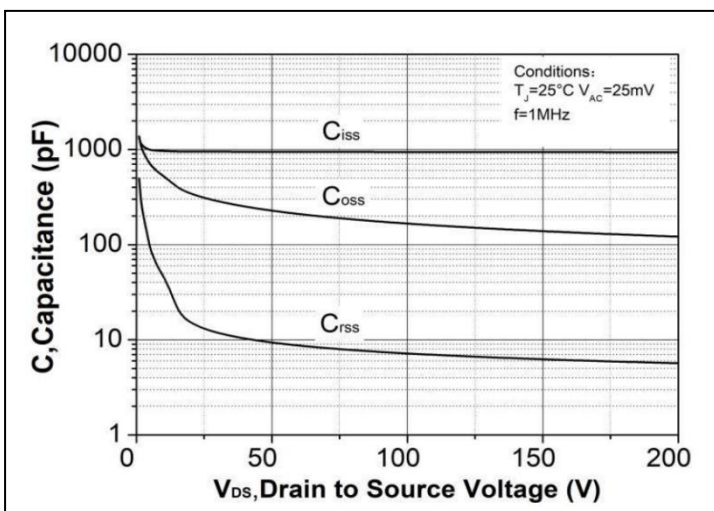


Figure17.Capacitances vs. Drain-source Voltage (0~200V)

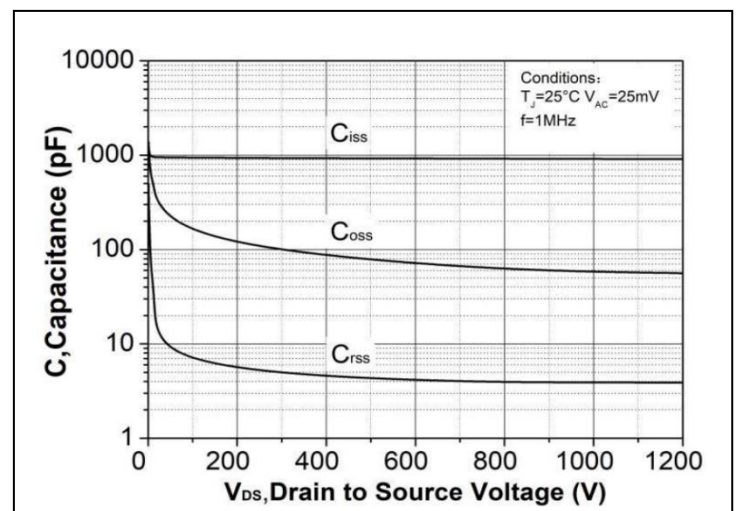


Figure18.Capacitances vs. Drain-source Voltage (0~1200V)

Typical Electrical and Thermal Characteristics

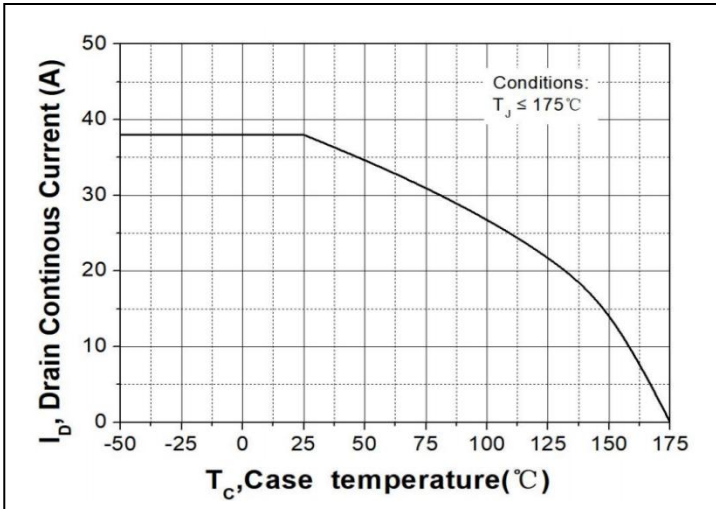


Figure19.Continuous Drain Current Derating vs.Case Temperature

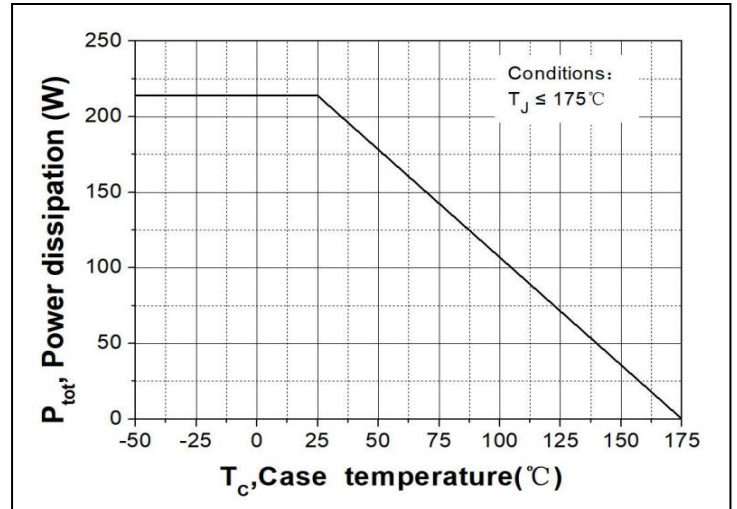


Figure20.Maximum Power Dissipation Derating vs. Case Temperature

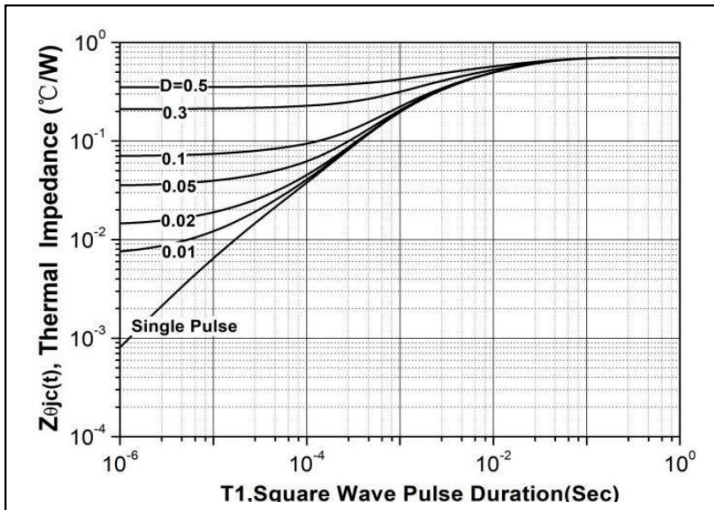


Figure21.Transient Thermal Impedance (Junction - Case)

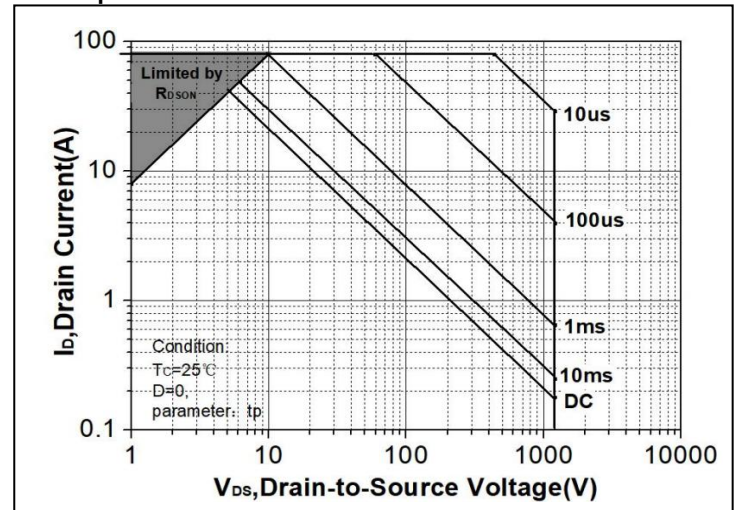


Figure22.Safe Operating Area

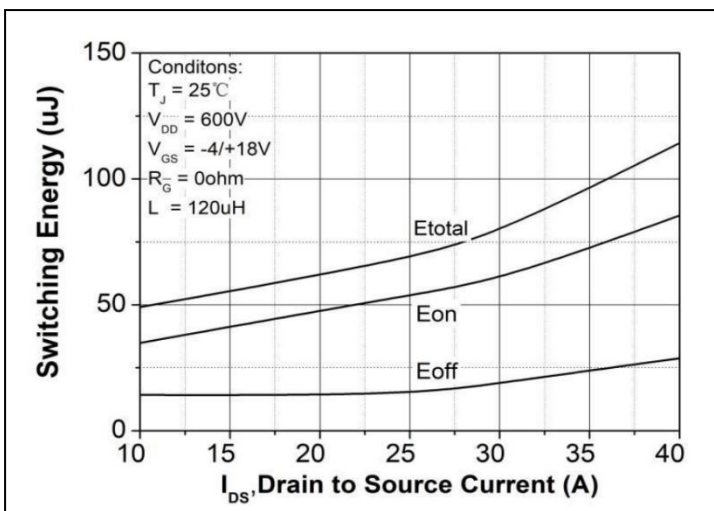


Figure23.Clamped Inductive Switching Energy vs. Drain Current (VDD = 600V)

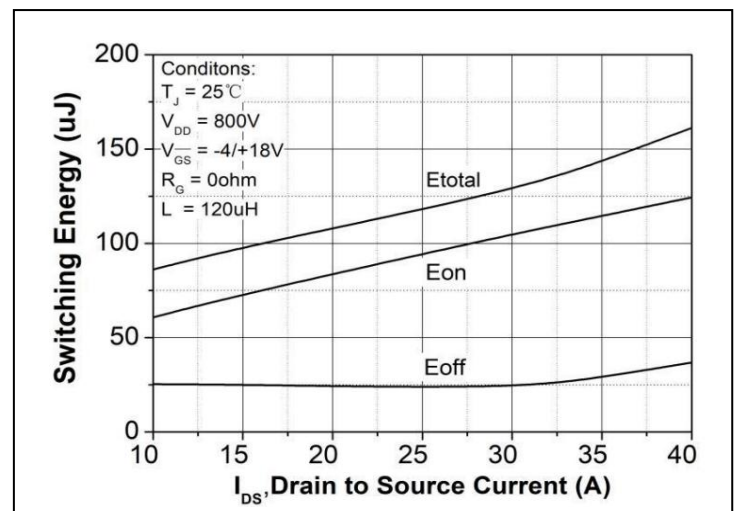


Figure24.Clamped Inductive Switching Energy vs. Drain Current (VDD = 800V)

Typical Electrical and Thermal Characteristics

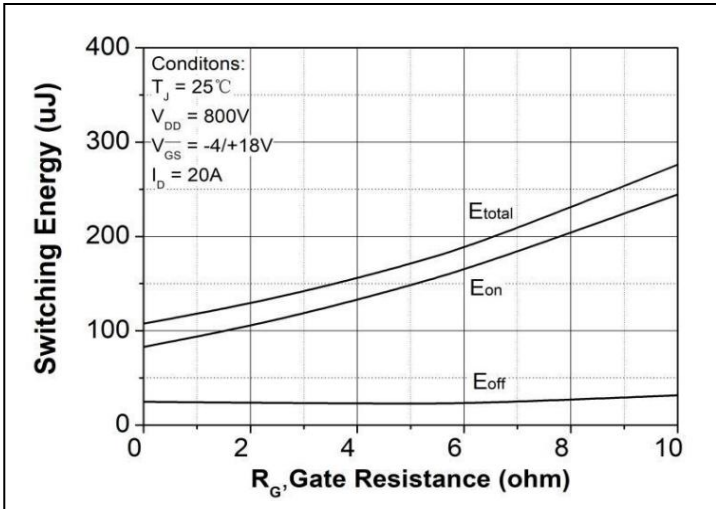


Figure25.Clamped Inductive Switching Energy vs.  $R_G(\text{ext})$

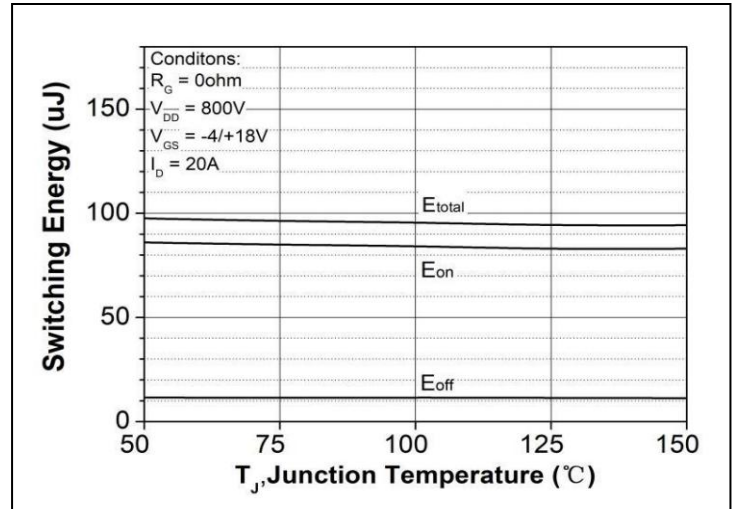


Figure26.Clamped Inductive Switching Energy vs. Temperature

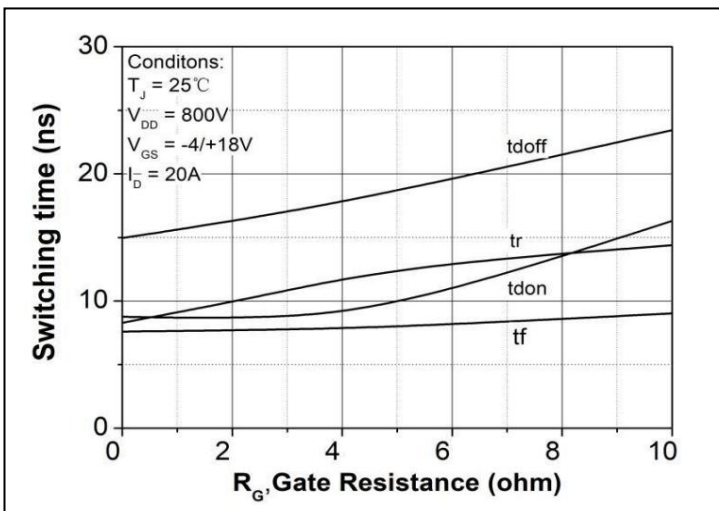


Figure27.Switching Times vs.  $R_G(\text{ext})$

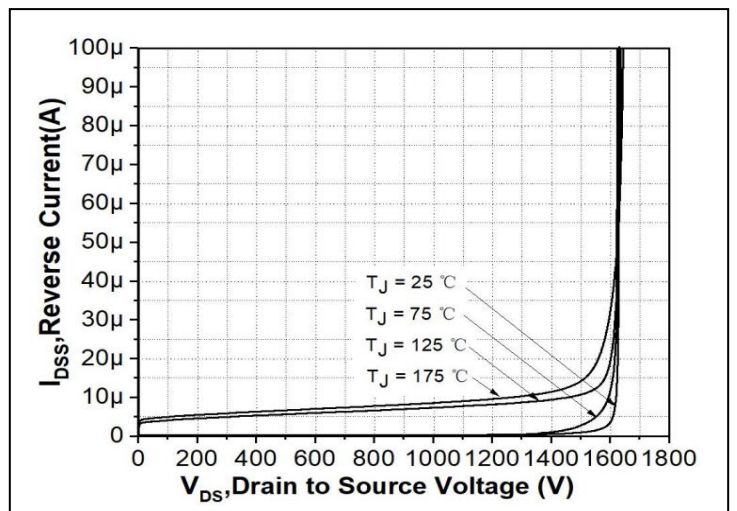
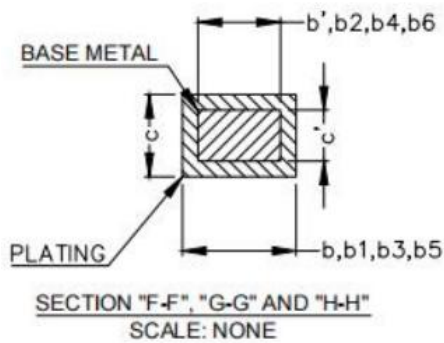
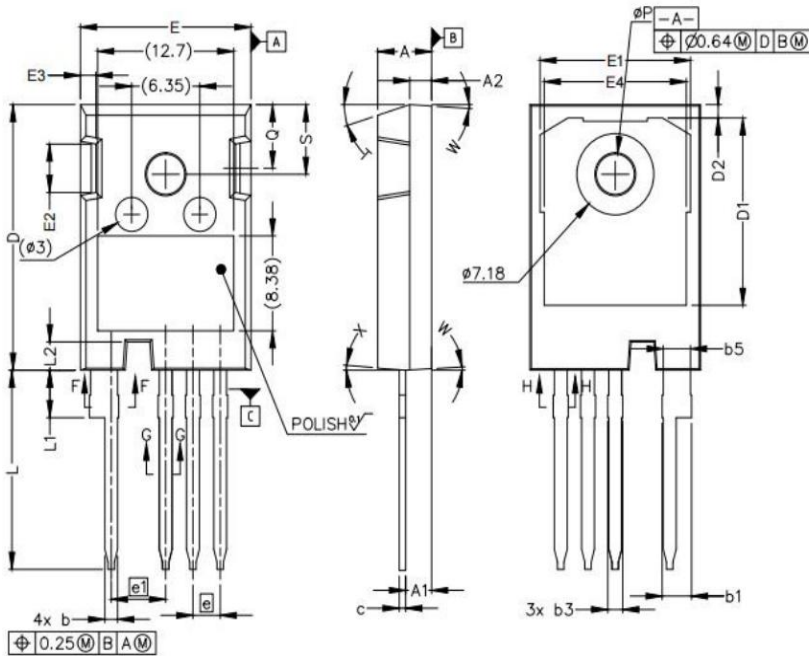


Figure28. Reverse characteristics vs.  $T_J$

**Mechanical Data:**

Unit:mm



SYMBOL	MILLIMETERS	
	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	2.39	2.94
b2	2.39	2.84
b3	1.07	1.60
b4	1.07	1.50
b5	2.39	2.69
b6	2.39	2.64
c'	0.55	0.65
c	0.55	0.68
D	23.30	23.60
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	2.54 BSC	
e1	5.08 BSC	
N	4	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
øP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF.	
W	3.5° REF.	
X	4° REF.	



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