

## Features

- High Reliability According to AEC-Q101(Note 1)
- SiC MOSFET technology
- High blocking voltage with low on-resistance
- High-speed switching with low capacitances
- Halogen Free. "Green" Device (Note 2)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note3) ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 0.68°C/W Junction to Case

## Applications

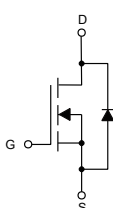
- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	1200	V
Gate-Source Voltage	$V_{GSmax}$	-8/+22	V
Gate-Source Voltage	$V_{GSop}$	-4/+18	V
Continuous Drain Current	$I_D$	38	A
Pulsed Drain Current (Note4)	$I_{DM}$	80	A
Total Power Dissipation, $T_c=25^\circ\text{C}$	$P_D$	220	W
Total Power Dissipation, $T_c=110^\circ\text{C}$	$P_D$	94	W

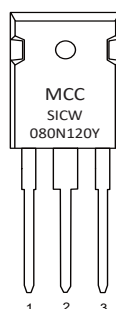
Note:

1. This part is qualified in accordance with AEC-Q101 for high reliability but do not have all the necessary attribute of automotive grade products.
2. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
3. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
4. Pulse Test: Pulse Width  $\leq 10\mu\text{s}$ , Duty Cycle  $\leq 1\%$ .

## Internal Structure

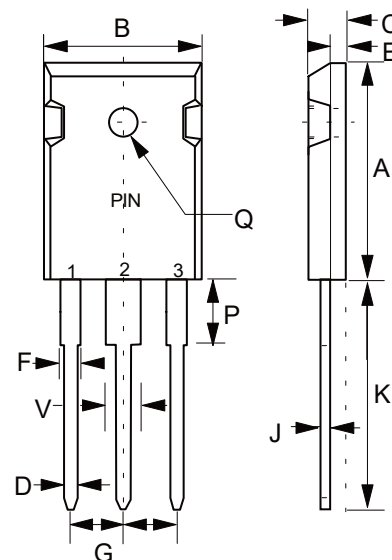


1. Gate
2. Drain
3. Source



# N-CHANNEL MOSFET

## TO-247



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.787	0.866	20.00	22.00	
B	0.598	0.638	15.20	16.20	
C	0.185	0.208	4.70	5.30	
D	0.035	0.059	0.90	1.50	
E	0.059	0.094	1.50	2.40	
F	0.067	0.091	1.70	2.30	
J	0.019	0.031	0.48	0.80	
K	0.748	0.833	19.00	21.15	
P	0.122	0.189	3.10	4.80	
Q	0.118	0.150	3.00	3.80	φ
V	0.106	0.134	2.70	3.40	
G	0.197	0.224	5.00	5.70	

**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=100\mu A$	1200			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=18V$			100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=1200V, V_{GS}=0V$		1	10	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=5mA$	2.3	2.9	3.6	V
		$V_{DS}=V_{GS}, I_D=5mA, T_j=175^\circ C$		2.2		V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=18V, I_D=20A$		77	85	m $\Omega$
		$V_{GS}=18V, I_D=20A, T_j=175^\circ C$		122		m $\Omega$
Internal Gate Resistance	$R_g$	$f=1MHz$		1.5		$\Omega$
Transconductance	$g_{FS}$	$V_{DS}=16V, I_D=20A$		10		S
		$V_{GS}=16V, I_D=20A, T_j=175^\circ C$		9.2		
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$			38		A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=-4V, I_S=10A$		3.9		V
		$V_{DS}=0V, I_{SD}=10A, T_j=175^\circ C$		3.2		V
Reverse Recovery Time	$t_{rr}$			28.24		ns
Reverse Recovery Charge	$Q_{rr}$	$V_{GS}=-4V, I_{SD}=20A,$ $di_F/dt=2095A/\mu s$		190		nC
Peak Reverse Recovery Current	$I_{rrm}$			30.08		A
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=1000V, V_{GS}=0V, f=1MHz$		890		pF
Output Capacitance	$C_{oss}$			58		
Reverse Transfer Capacitance	$C_{rss}$			4		
Coss Stored Energy	$E_{oss}$			34		$\mu J$
Total Gate Charge	$Q_g$	$V_{DS}=800V, V_{GS}=-4/+18V$ $I_D=20A$		41		nC
Gate-Source Charge	$Q_{gs}$			12		
Gate-Drain Charge	$Q_{gd}$			11		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=800V, V_{GS}=-4/+15V,$ $R_G=0\Omega, I_{DS}=20A$		21		ns
Turn-On Rise Time	$t_r$			17		
Turn-Off Delay Time	$t_{d(off)}$			14		
Turn-Off Fall Time	$t_f$			8		
Turn-On switching energy	$E_{on}$			377		$\mu J$
Turn-Off switching energy	$E_{off}$			14		

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

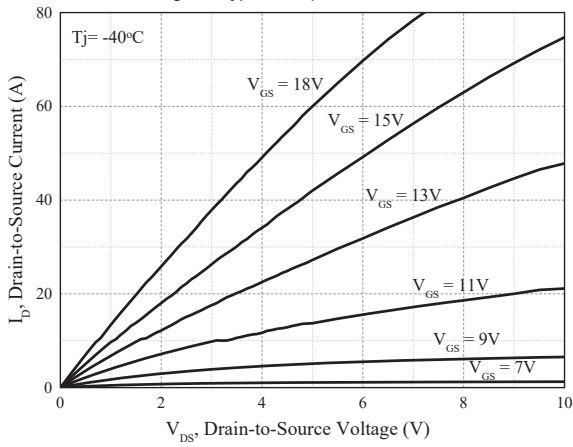


Fig. 2 - Typical Output Characteristics

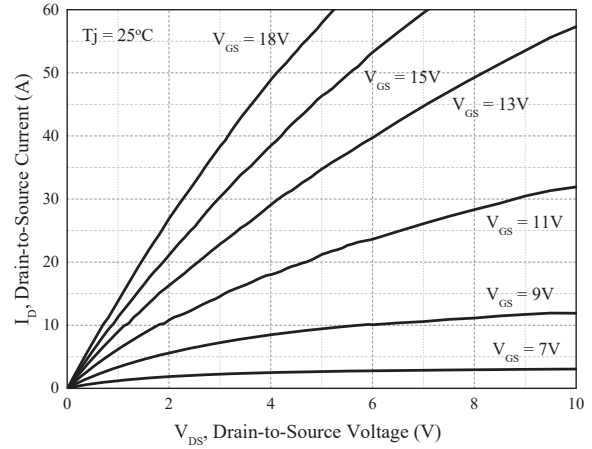


Fig. 3 - Typical Output Characteristics

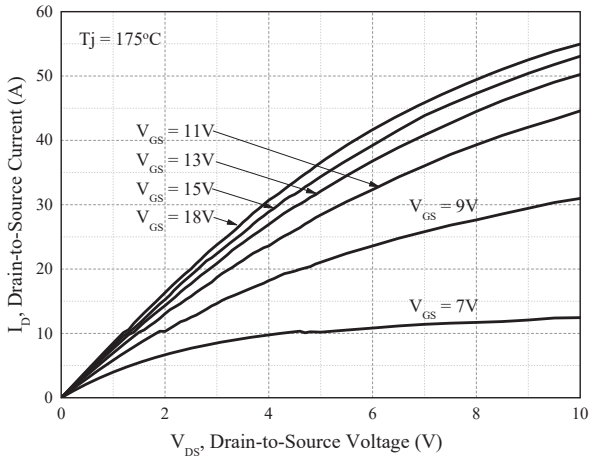


Fig. 4 - Transfer Characteristics for various junction temperature

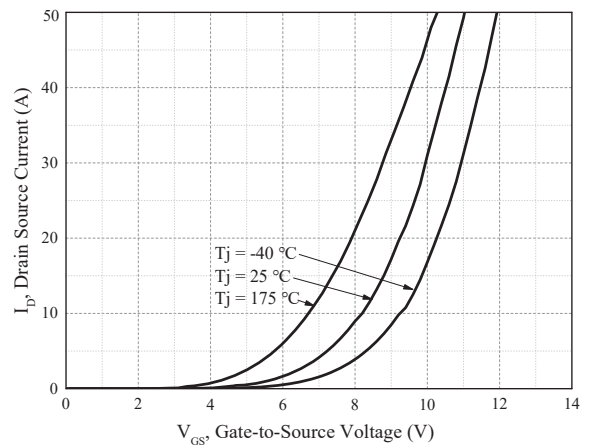


Fig. 5 - On-resistance vs temperature for various gate voltage

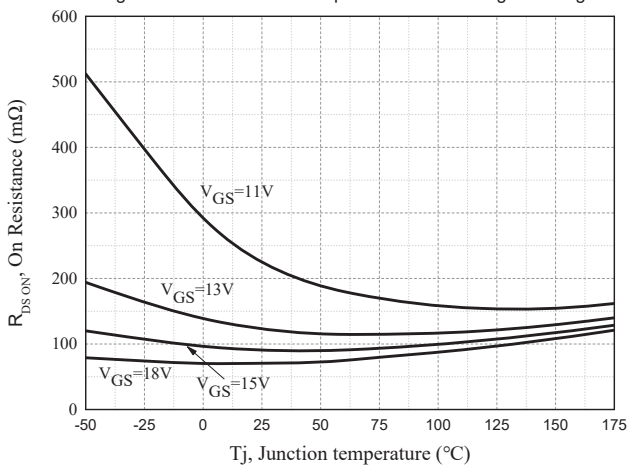
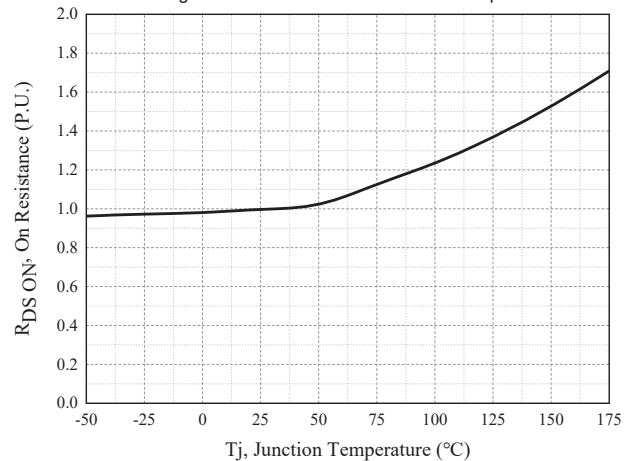


Fig. 6 - Normalized on-resistance vs temperature



## Curve Characteristics

Fig. 7 - On-resistance vs. drain current

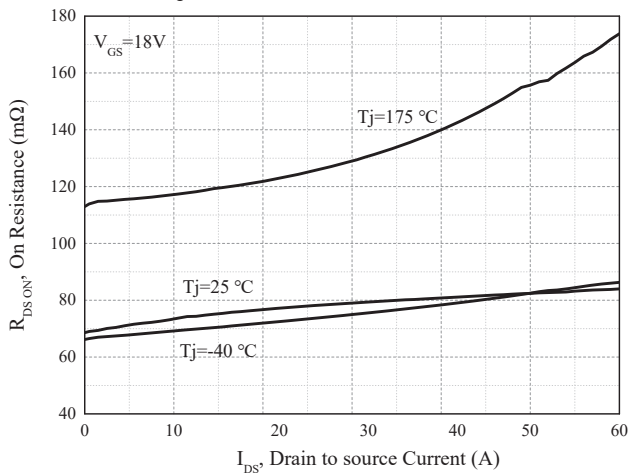


Fig. 8 - Body diode characteristic

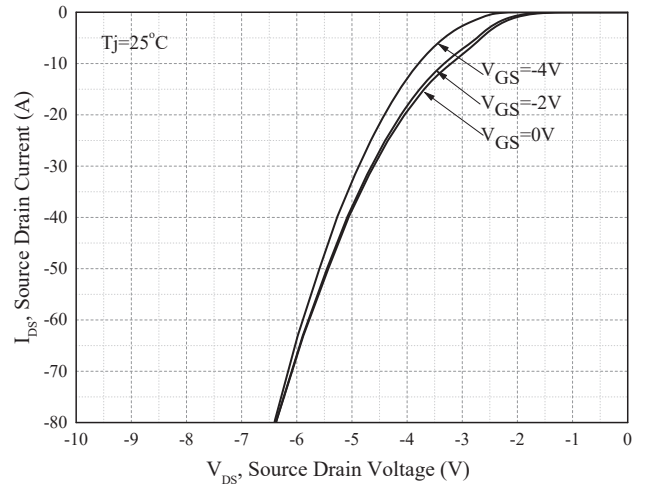


Fig. 9 - Body diode characteristic

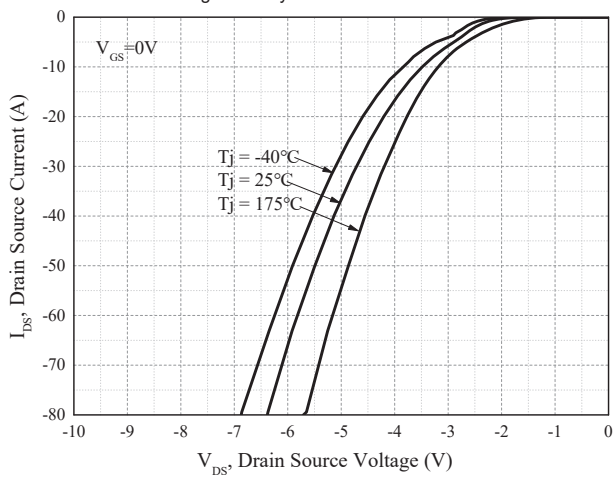


Fig. 10 - 3rd quadrant characteristic at  $T_j=25^\circ C$

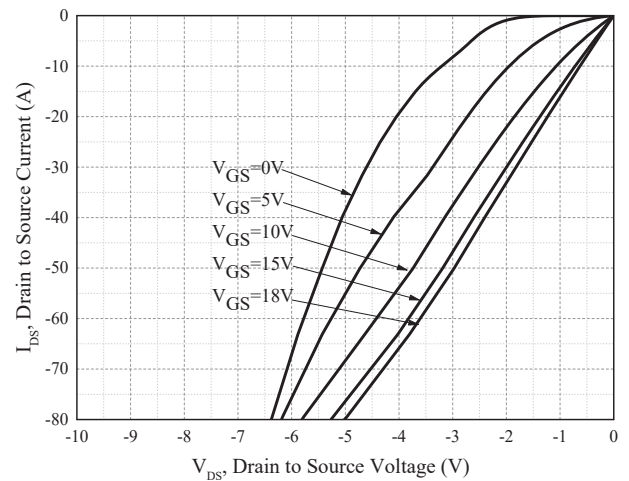


Fig. 11 - Threshold voltage vs. temperature

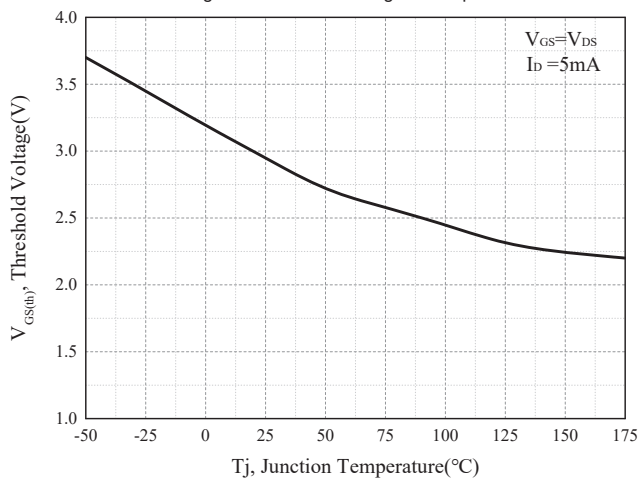
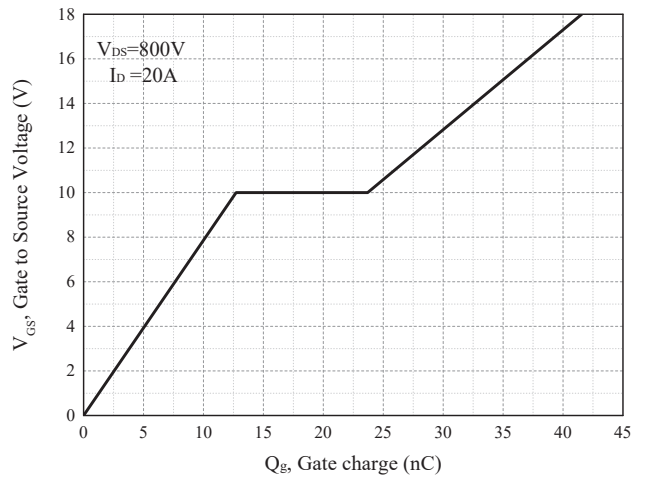


Fig. 12 - Gate charge characteristic



**Curve Characteristics**

Fig. 13 - Capacitances vs.drain source voltage (0-1000V)

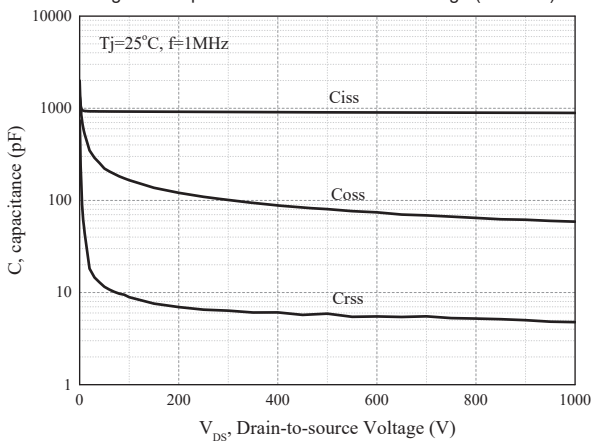


Fig. 14 - Capacitances vs.drain source voltage (0-200V)

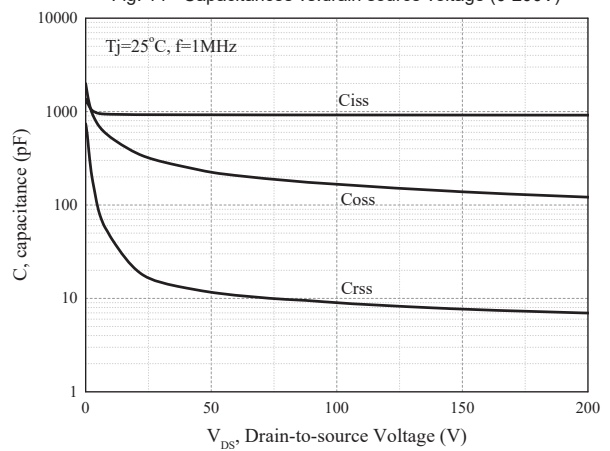


Fig. 15 - Output capacitor stored energy

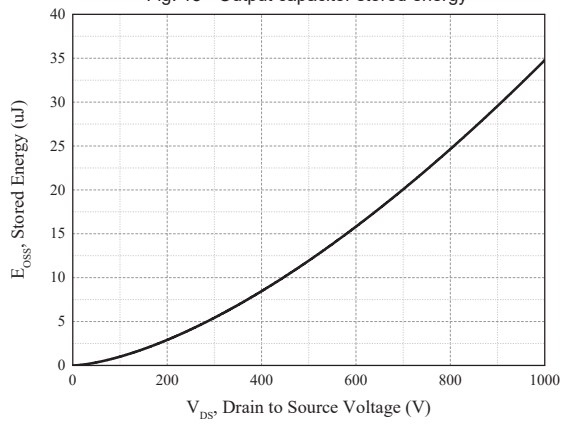


Fig. 16 - Reverse characteristics vs. Tj

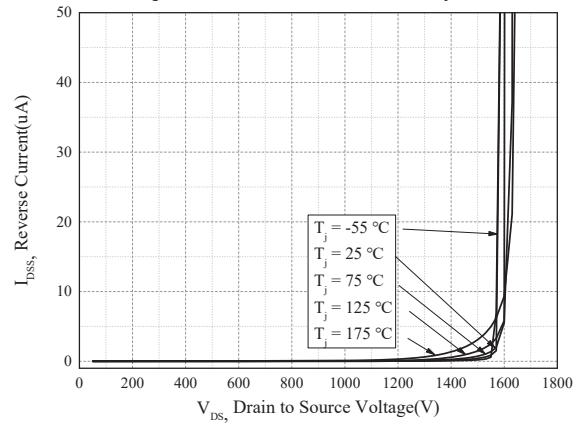


Fig. 17 - Maximum power dissipation derating vs. temperature

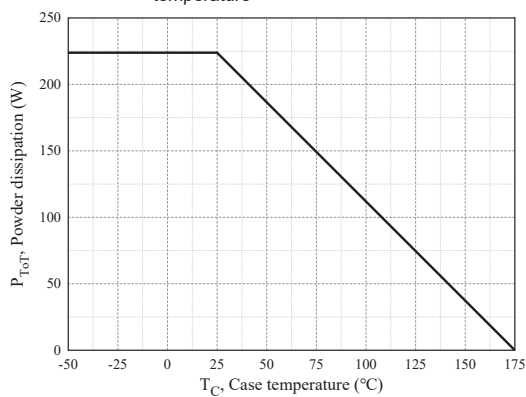
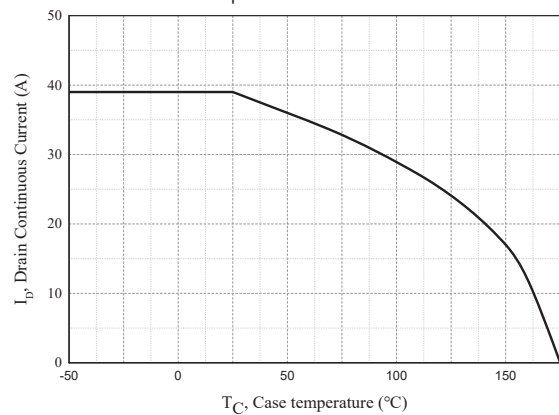
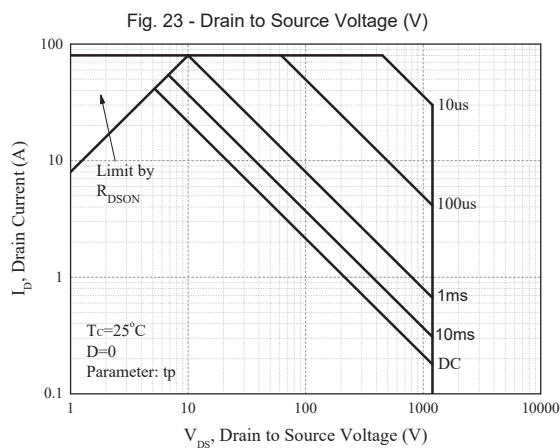
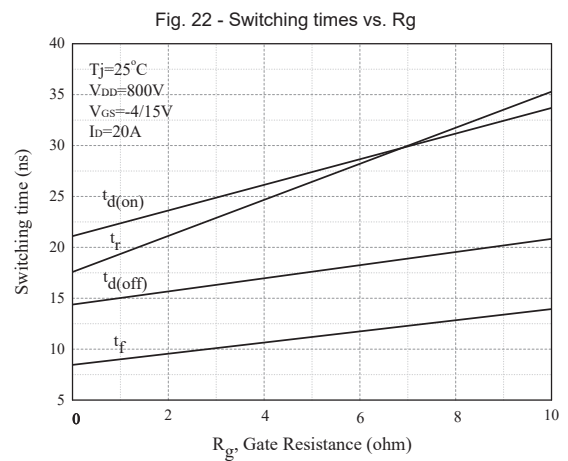
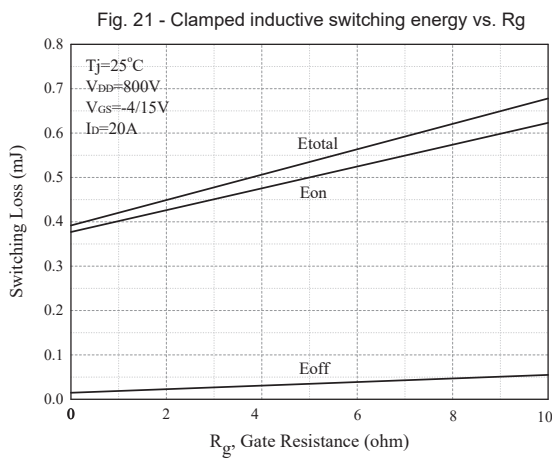
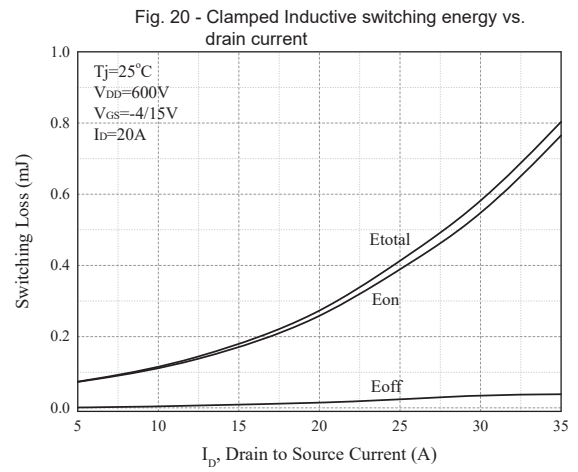
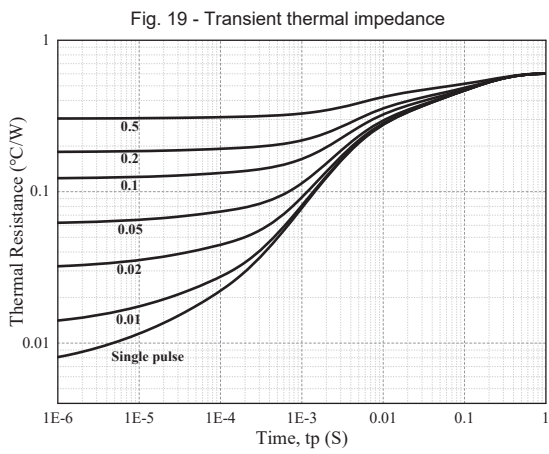


Fig. 18 - Coutinuous drain current derating vs. temperature



**Curve Characteristics**



## Ordering Information

Device	Packing
SICW080N120Y-BP	Tube:30pcs/Tube, 360pcs/Box, 1.8K/Ctn;

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