

Features

- Higher System Efficiency
- Reduced Cooling Requirements
- 175°C operating temperature
- Increased Power Density
- Increased System Switching Frequency

Key Parameters

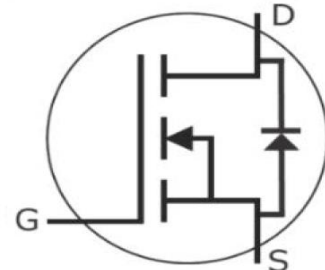
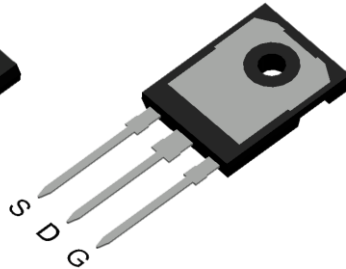
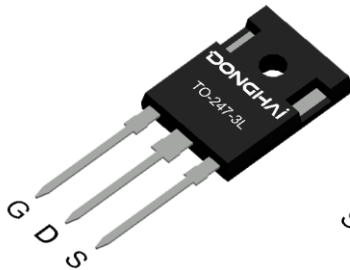
V_{DS}	1700V
$R_{DS(on)typ}$	40mΩ
I_D	67A
V_{th}	2.6V

Applications

- Motor Drives
- Power Supplies
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Pulsed Power applications



TO-247-3



Marking & Packing Information

Part #	Package	Marking	Tube/Reel	Qty(pcs)
DCC040M170G2	TO-247-3	DCC040M170G2	Tube	300/box

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage (V _{GS} =0V, I _D =100μA)	V _{DS}	1700	V
Gate-Source voltage	V _{GSmax}	-8/+22	V
Recommend Gate-Source Voltage	V _{GSop}	-4/+18	V
Continuous drain current (V _{GS} =18V) TC = 25°C TC = 100°C	I _D	67 47	A
Pulsed drain current (T _C = 25°C, t _p limited by T _{jmax})	I _{D pulse}	150	A
Power dissipation (T _C = 25°C)	P _{tot}	357	W
Operating junction and storage temperature	T _j , T _{stg}	-55~175	°C

Thermal Resistance

Parameter	Symbol	typ	max	Unit
Thermal resistance, junction – case.	R _{thJC}	0.42	-	°C/W
Thermal resistance, junction – ambient(min. footprint)	R _{thJA}	-	40	

Electrical Characteristic (at T_j = 25 °C, unless otherwise specified)

Static Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Drain-source breakdown voltage	BV _{DSS}	1700	-	-	V	V _{GS} =0V, I _D =100μA
Gate threshold voltage	V _{GS(th)}	1.9	2.6	4.0	V	V _{DS} =V _{GS} , I _D =15mA T _j =25°C
		-	1.8	-		T _j =175°C
Zero gate voltage drain current	I _{DSS}	-	-	100	μA	V _{DS} =1700V, V _{GS} =0V T _j =25°C
Gate-source leakage current	I _{GSS+}	-	10	250	nA	V _{GS} =22V, V _{DS} =0V
	I _{GSS-}	-	10	250	nA	V _{GS} =-8V, V _{DS} =0V
Drain-source on-state resistance	R _{DS(on)}	-	40	49	mΩ	V _{GS} =18V, I _D =40A, T _j =25°C
		-	81	-		T _j =175°C
Transconductance	g _{fs}	-	27.4	-	S	V _{DS} =20V, I _D =40A T _j =25°C
		-	26.5	-		T _j =175°C

Dynamic Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Input Capacitance	C_{iss}	-	3046	-	pF	$V_{GS}=0V, V_{DS}=1000V,$ $f=1MHz, V_{AC}=25mV$
Output Capacitance	C_{oss}	-	107	-		
Reverse Transfer Capacitance	C_{rss}	-	12	-		
Gate Total Charge	Q_G	-	179	-	nC	$V_{GS}=-4V/18V,$ $V_{DS}=800V, I_D=40A$
Gate-Source charge	Q_{gs}	-	45	-		
Gate-Drain charge	Q_{gd}	-	32	-		
Turn-on delay time	$t_{d(on)}$	-	43	-	ns	$V_{GS}=-4/18V,$ $I_D=40A, V_{DS}=800V,$ $R_{G_ext}=2.5\Omega,$ $R_L=20\Omega$
Rise time	t_r	-	21	-		
Turn-off delay time	$t_{d(off)}$	-	48	-		
Fall time	t_f	-	19	-		
Internal Gate Resistance	$R_{G(int)}$	-	3.1	-	Ω	$f=1\text{ MHz}, V_{AC}=25mV$
Turn-On Switching Energy	E_{ON}	-	1.1	-	mJ	$V_{DS}=800V,$ $V_{GS}=-4V/18V,$ $I_D=40A, R_{G(ext)}=2.5\Omega,$ $L=100\mu H$
Turn-Off Switching Energy	E_{OFF}	-	0.7	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode Max Current	I_S	-	-	67	A	$T_C=25^\circ C$
Diode Forward Voltage	V_{SD}	-	4.2	-	V	$V_{GS}=-4V, I_{SD}=20A$
		-	3.9	-		$V_{GS}=-4V, I_{SD}=20A,$ $T_J=175^\circ C$
Diode Reverse Recovery Time	t_{rr}	-	26	-	ns	$V_R=800V, I_{SD}=40A,$
Diode Reverse Recovery Charge	Q_{rr}	-	230	-	nC	
Peak Reverse Recovery Current	I_{rrm}	-	13	-	A	

Typical Characteristics Diagram

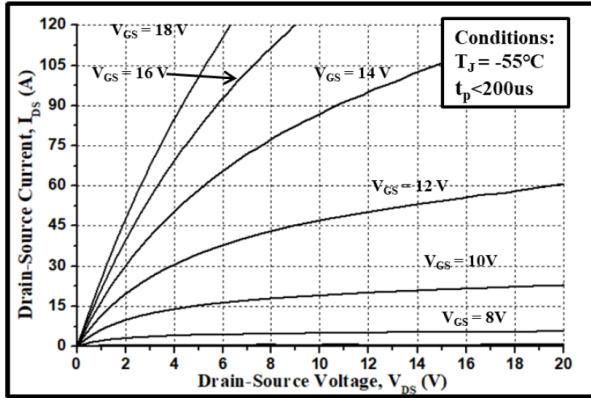


Figure 1. Output Characteristics $T_j = -55^\circ\text{C}$

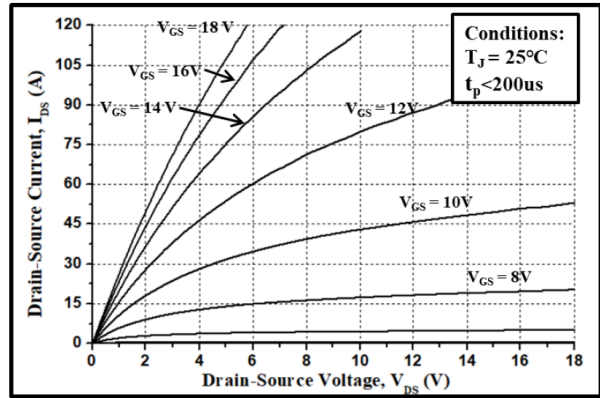


Figure 2. Output Characteristics $T_j = 25^\circ\text{C}$

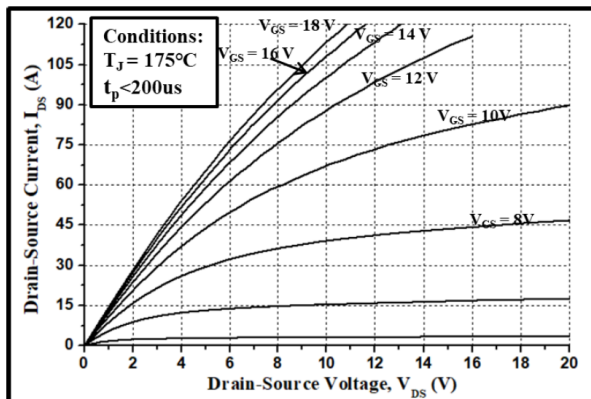


Figure 3. Output Characteristics $T_j = 175^\circ\text{C}$

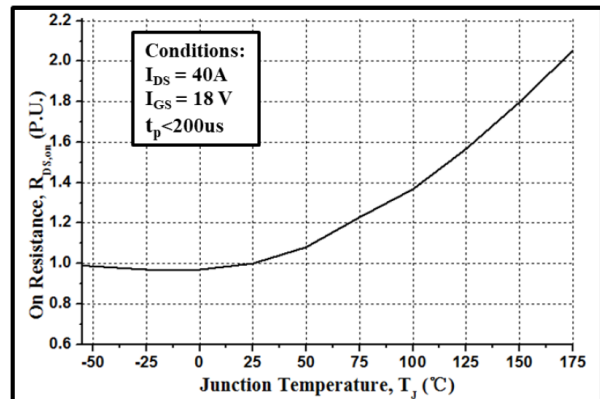


Figure 4. Normalized On-Resistance vs. Temperature

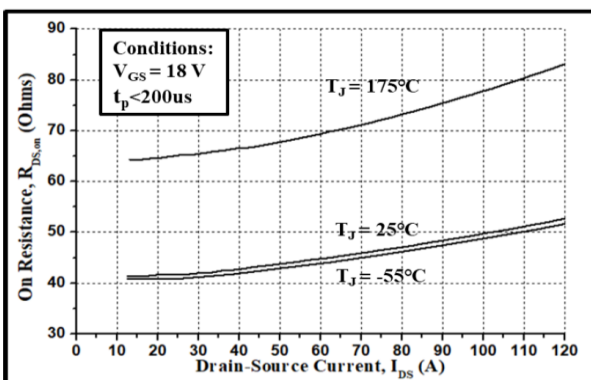


Figure 5. On-Resistance vs. Drain Current
For Various Temperatures

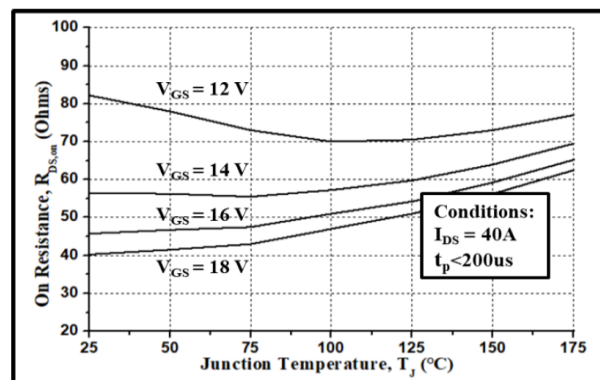


Figure 6. On-Resistance vs. Temperature
For Various Gate Voltage

Typical Characteristics Diagram

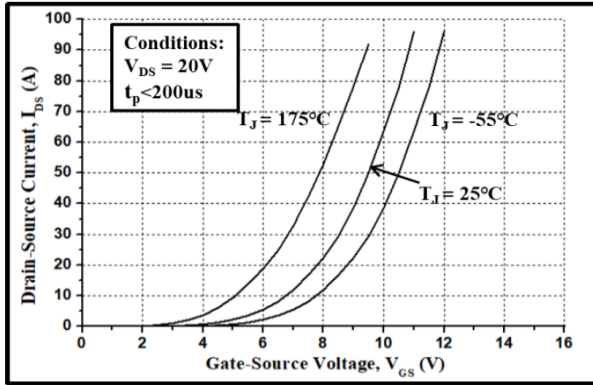


Figure 7. Transfer Characteristic for Various Junction Temperatures

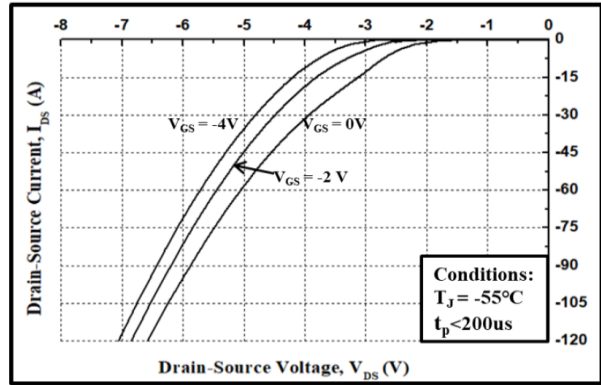


Figure 8. Body Diode Characteristic at -55°C

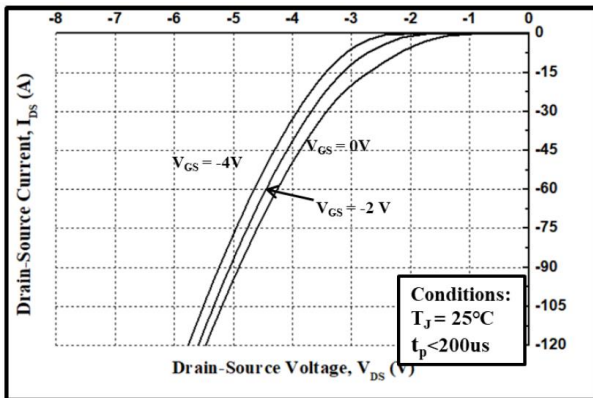


Figure 9. Body Diode Characteristic at 25°C

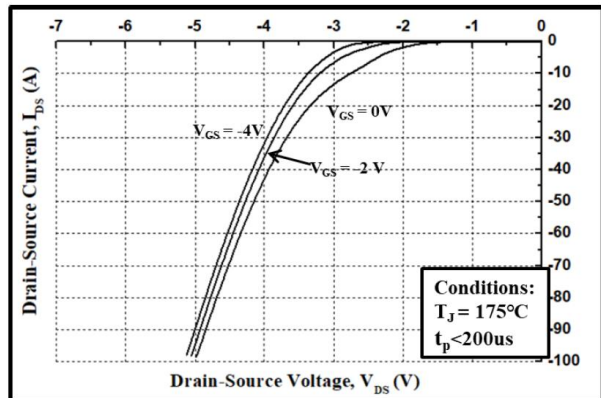


Figure 10. Body Diode Characteristic at 175°C

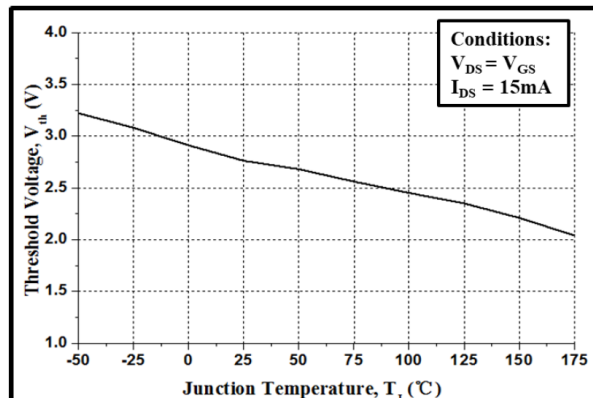


Figure 11. Threshold Voltage vs. Temperature

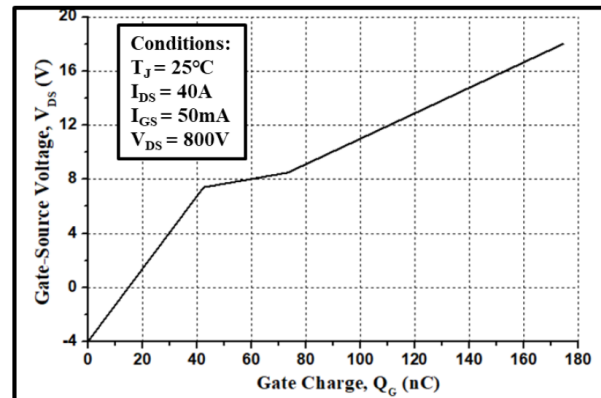


Figure 12. Gate Charge Characteristics

Typical Characteristics Diagram

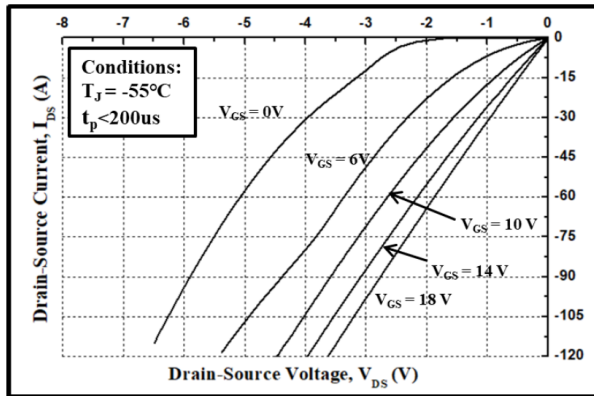


Figure 13. 3rd Quadrant Characteristic at -55°C

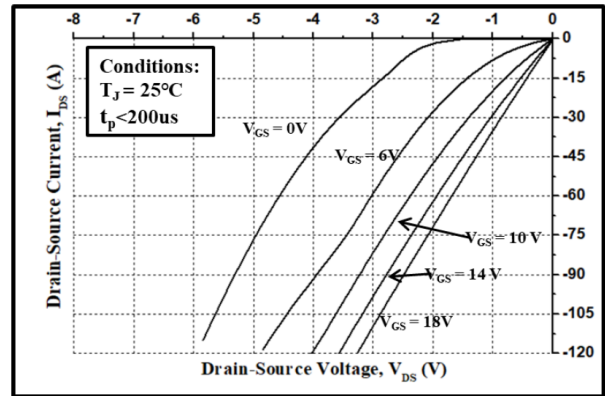


Figure 14. 3rd Quadrant Characteristic at 25°C

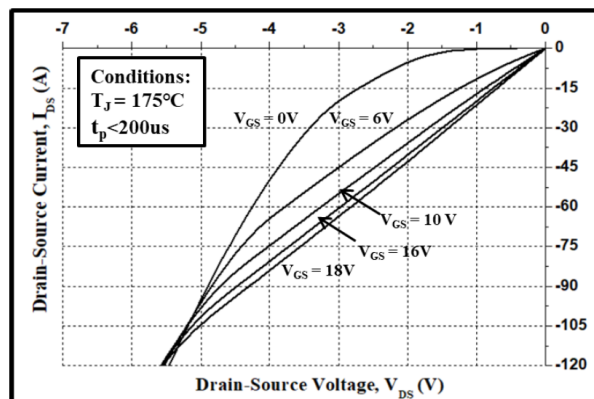


Figure 15. 3rd Quadrant Characteristic at 175°C

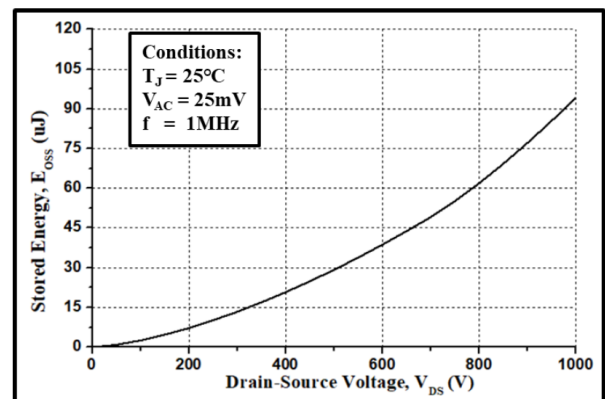


Figure 16. Output Capacitor Stored Energy

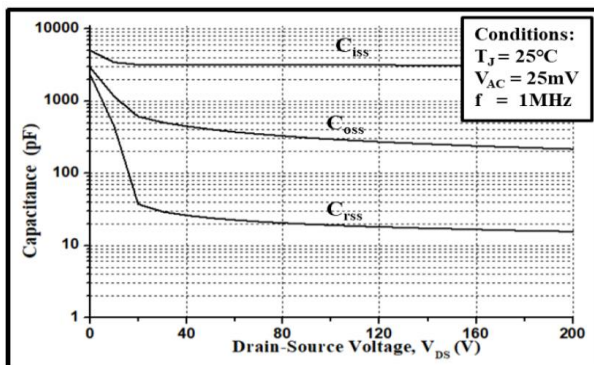


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

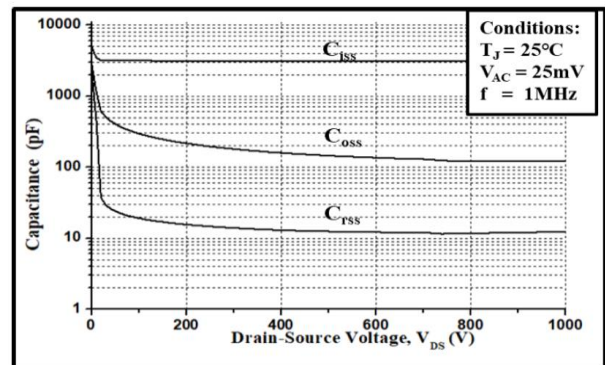


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1000V)

Typical Characteristics Diagram

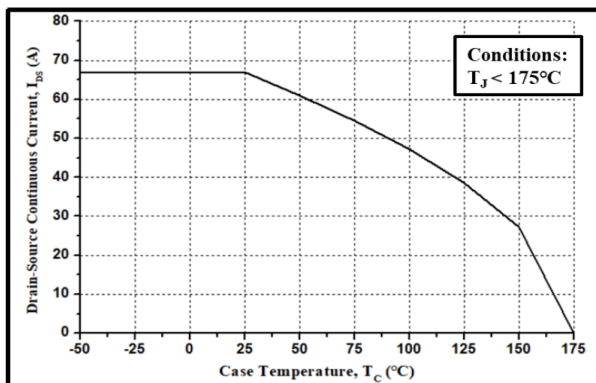


Figure 19. Continuous Drain Current Derating vs. Case Temperature

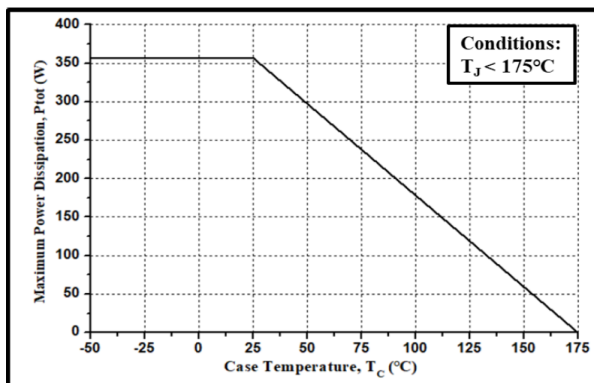
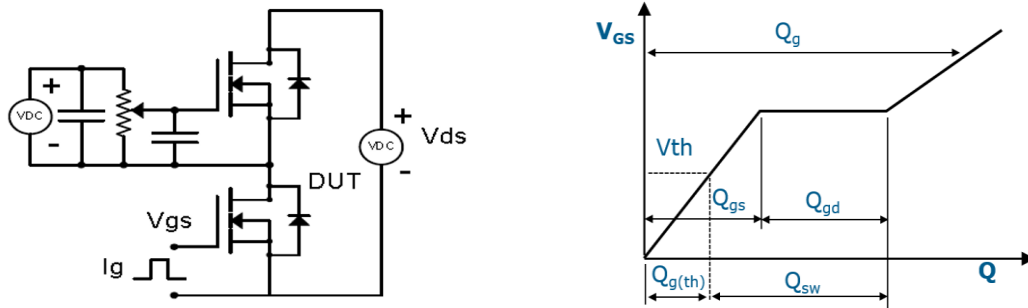


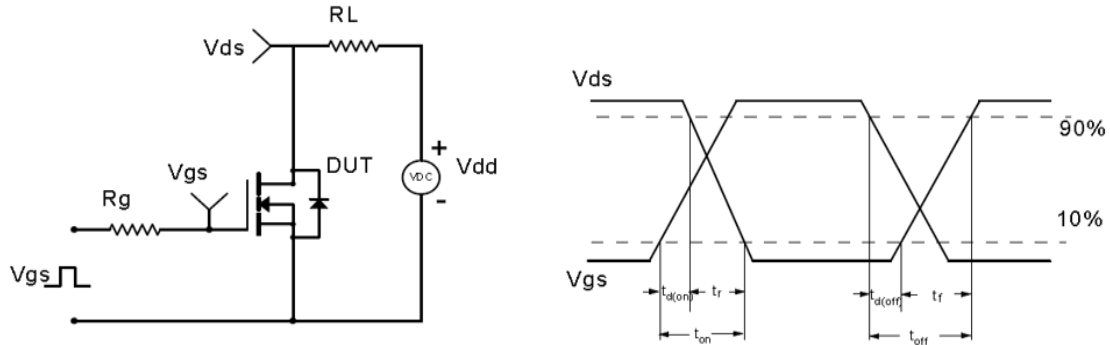
Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

Test Circuit & Waveform

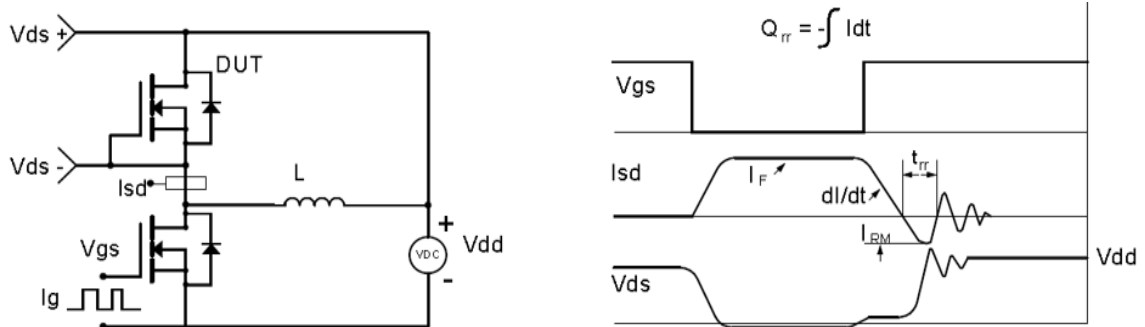
Gate Charge Test Circuit & Waveform



MOSFET Switching Test Circuit & Waveform

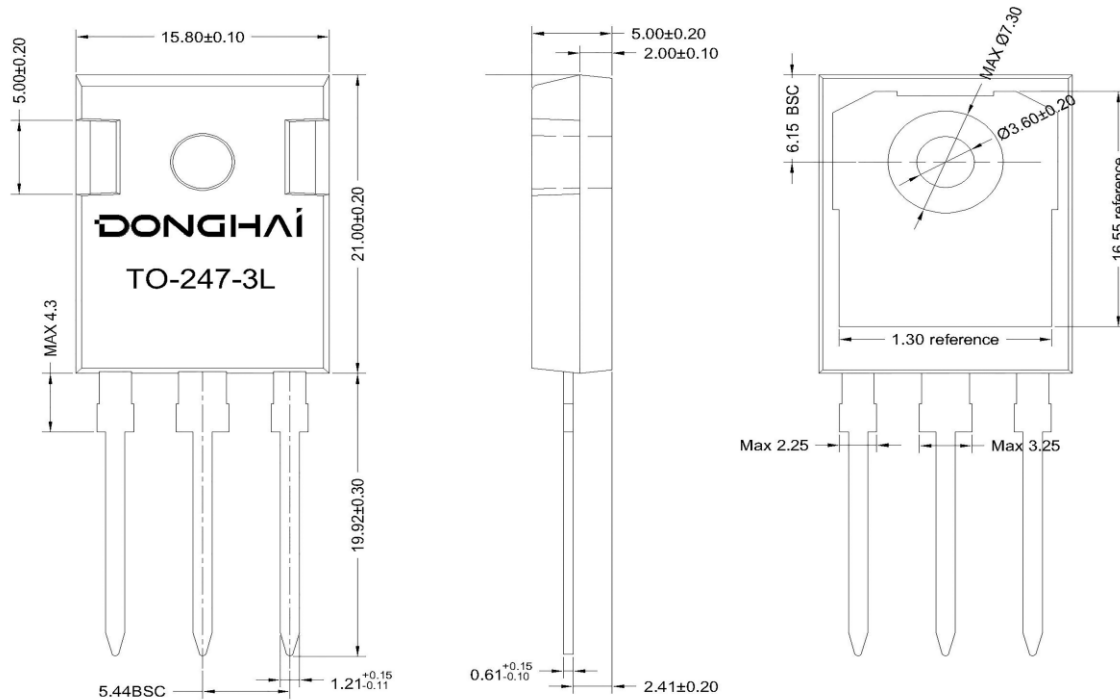


Diode Recovery Test Circuit & Waveform



Package Outline : TO-247-3L

*Dimensions in mm



Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation, aerospace, life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are responsible for providing adequate safe measures when design their systems.

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