



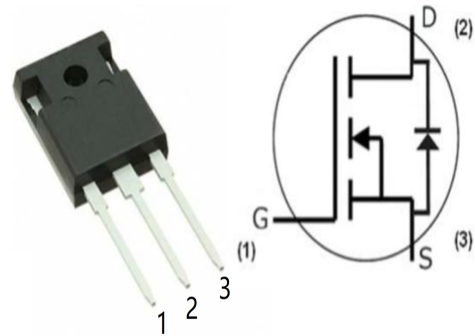
Features

- High Blocking Voltage
- High Frequency Operation
- Low on-resistance
- Fast intrinsic diode with low reverse recovery
- 100% avalanche tested

$V_{DS} = 1200\text{ V}$
 $I_D@25^\circ\text{C} = 69\text{ A}$
 $R_{DS(ON)} = 33\text{ m}\Omega$

Benefits

- Higher System Efficiency
- Parallel Device Convenience without thermal runaway
- High Temperature Application
- Hard Switching & Higher Reliability
- Easy to drive



TO-247-3
Pin definition

Applications

- Motor Drives
- Solar / Wind Inverters
- EV Charging Station
- AC/DC converters
- Uninterruptable power supplies
- DC/DC converters

Part Number	Package	Marking
LGE3M35120B	TO-247-3	LGE3M35120B

Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V _{DSmax}	Drain - Source Voltage	1200	V
V _{GSmax}	Gate - Source Voltage (dynamic), T _{surge} <100ns	-10 / +25	V
V _{GSop}	Gate - Source Voltage (static)	-5 / +20	V
I _D	Continuous Drain Current	V _{GS} = 20V, T _C =25°C	69
		V _{GS} = 20V, T _C =100°C	49
I _{D(pulse)}	Pulsed Drain Current at T _C =25°C	114	A
E _{AS}	Avalanche Energy	V _{DD} = 100V, V _{GS} =20V, L=2mH	576
I _{AV}	Avalanche Peak Current		24
P _D	Total power dissipation	T _C =25°C	330
T _J	Operating Junction Temperature		-40 to 175
T _{STG}	Storage Temperature		-40 to 175

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.



Electrical Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 100μA	1200			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 10mA	1.8	2.6	3.5	V
		V _{DS} = V _{GS} , I _D = 10mA, T _J = 150°C		1.9		
		V _{DS} = V _{GS} , I _D = 10mA, T _J = 175°C		1.8		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 1200V, V _{GS} = 0V	0	1	50	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 20V, V _{DS} = 0V	0	1	200	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = -5V, V _{DS} = 0V	-200	-1	0	nA
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 20V, I _D = 40 A		33	44	mΩ
		V _{GS} = 20V, I _D = 40 A, T _J = 150°C		51		
		V _{GS} = 20V, I _D = 40 A, T _J = 175°C		58		
Transconductance	g _{fs}	V _{DS} = 20V, I _D = 40 A,		26		S
		V _{DS} = 20V, I _D = 40 A, T _J = 150°C		23		
		V _{DS} = 20V, I _D = 40 A, T _J = 175°C		22		
Input capacitance	C _{iss}	V _{DS} = 1000V, V _{GS} = 0V f = 1MHz		2660		pF
Output capacitance	C _{oss}			128		
Reverse transfer capacitance	C _{rss}			9		
C _{oss} Stored Energy	E _{oss}			84		
Total gate charge	Q _g	V _{DS} = 800V, V _{GS} = -5V / 20V I _D = 40 A,		135		nC
Gate-source charge	Q _{gs}			36		
Gate-drain charge	Q _{gd}			53		
Internal gate input resistance	R _{g(int)}	f = 1MHz, I _D = 0A		2.5		Ω
Turn-On Switching Energy	E _{ON}	V _{DS} = 800 V, V _{GS} = -5V/20V, I _D = 40A, R _{G(ext)} = 2Ω, L = 100μH		1050		μJ
Turn-Off Switching Energy	E _{OFF}			33		
Turn-On Delay Time	t _{d(on)}			35		ns
Rise Time	t _r			18		
Turn-Off Delay Time	t _{d(off)}			41		
Fall Time	t _f			10		

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Reverse Diode Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Diode Forward Voltage	V _{SD}	V _{GS} = -5V, I _{SD} = 20A,		4.6		V
		V _{GS} = -5V, I _{SD} = 20A, T _J = 150°C		4.1		
		V _{GS} = -5V, I _{SD} = 20A, T _J = 175°C		4.0		
Continuous Diode Forward Current	I _S	V _{GS} = -5V			55	A
Reverse Recovery time	t _{rr}	V _{GS} = -5V, I _{SD} = 40A, V _R = 800V, dif/dt = 1700 A/μs		45		ns
Reverse Recovery Charge	Q _{rr}			370		nC
Peak Reverse Recovery Current	I _{rrm}			16		A

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
R _{th(j-c)}	Thermal resistance from junction to case		0.35	0.45	°C/W
R _{th(j-a)}	Thermal resistance from junction to ambient		30	40	°C/W

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Typical Performance

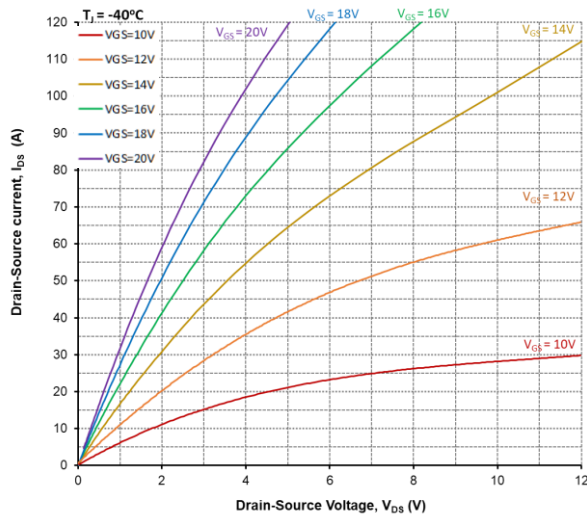


Figure 1. Output Characteristics, $T_J = -40^\circ\text{C}$

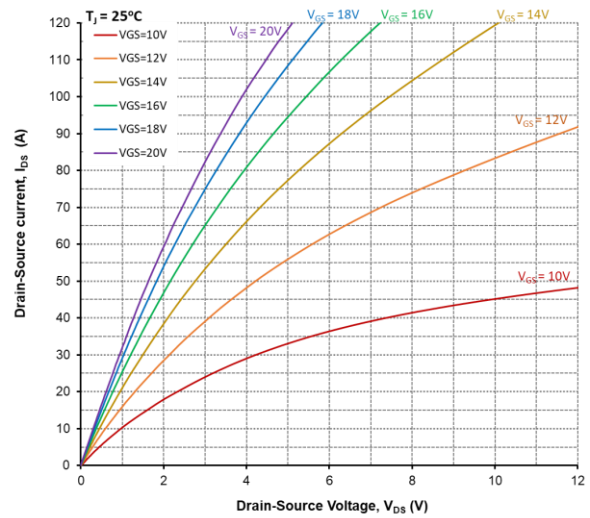


Figure 2. Output Characteristics, $T_J = 25^\circ\text{C}$

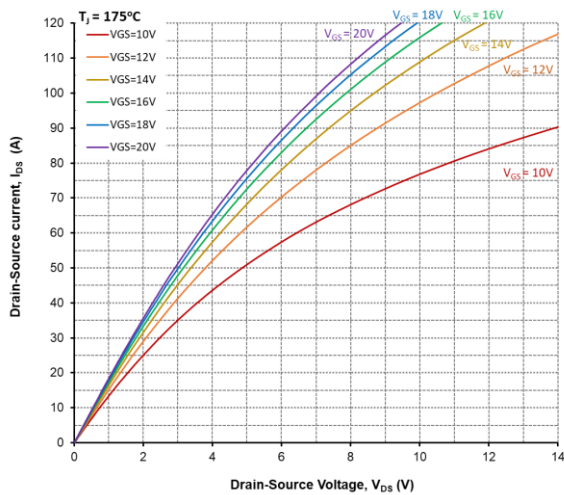


Figure 3. Output Characteristics, $T_J = 175^\circ\text{C}$

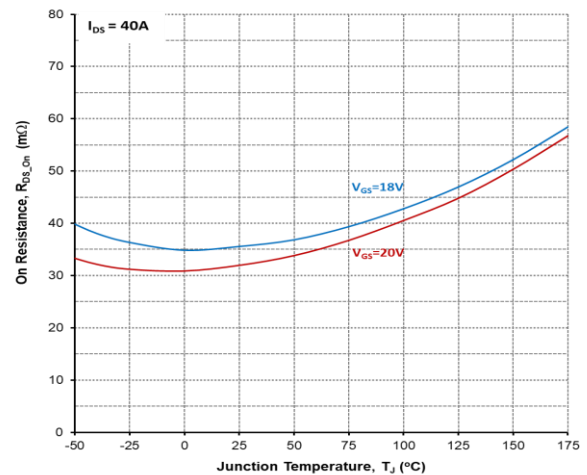


Figure 4. On-Resistance vs. Temperature

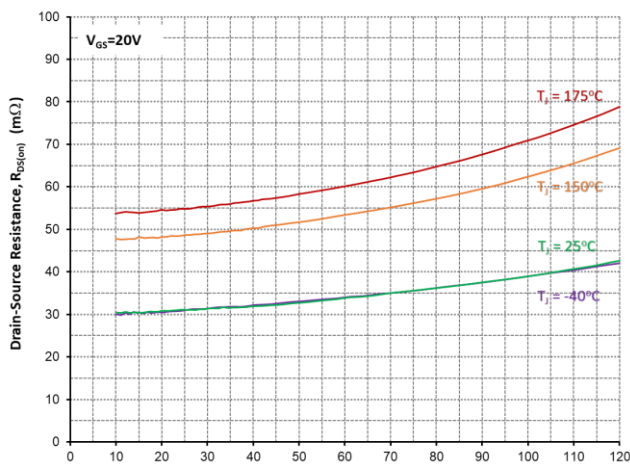


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

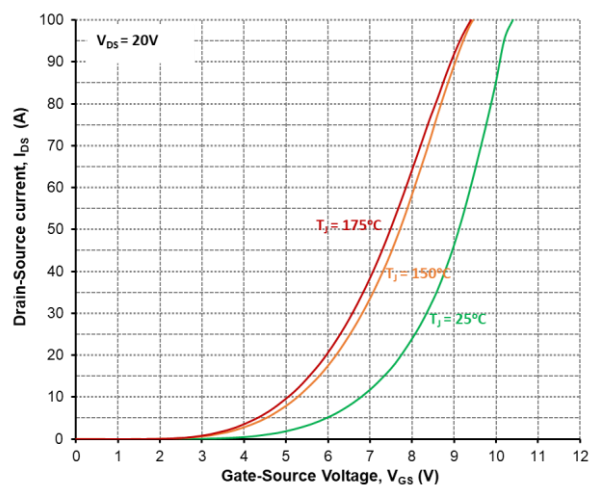


Figure 6. Transfer Characteristic For Various Junction Temperatures

Caution: This device is sensitive to electrostatic discharge. Users should follow ESD handling procedures.



Typical Performance

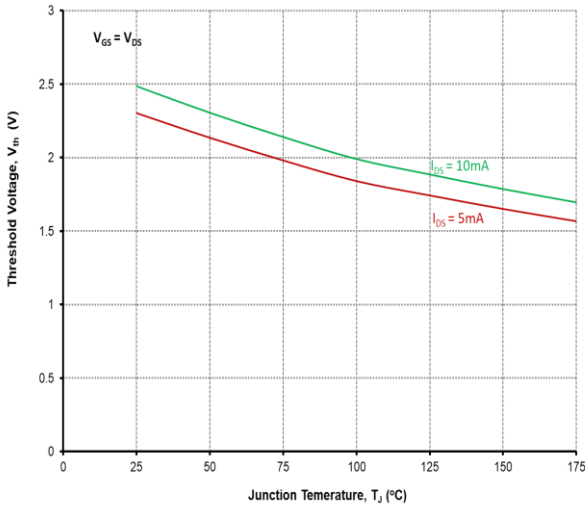


Figure 7. Threshold Voltage vs. Temperature

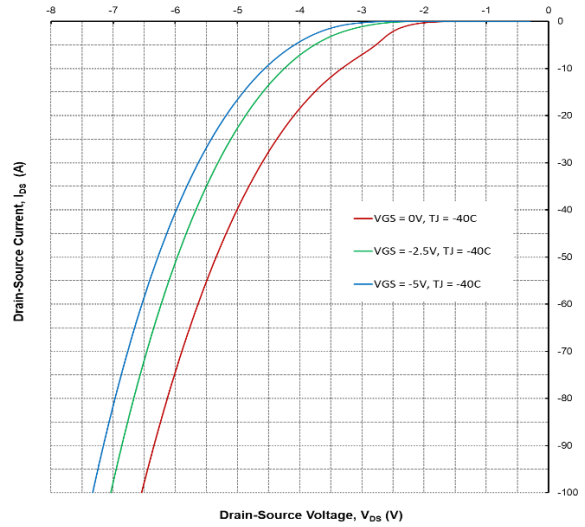


Figure 8. Body Diode Characteristics @ -40°C

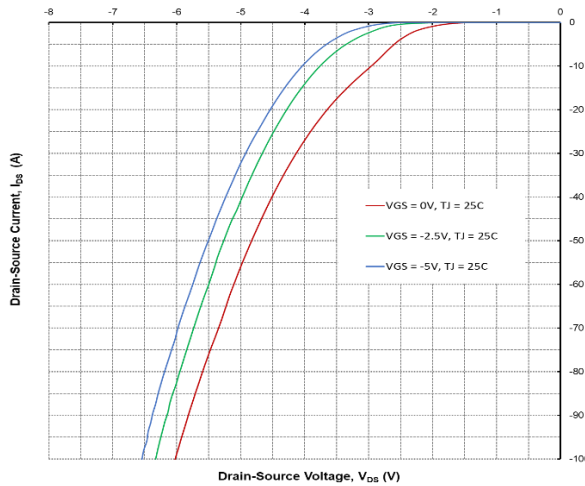


Figure 9. Body Diode Characteristics @ 25°C

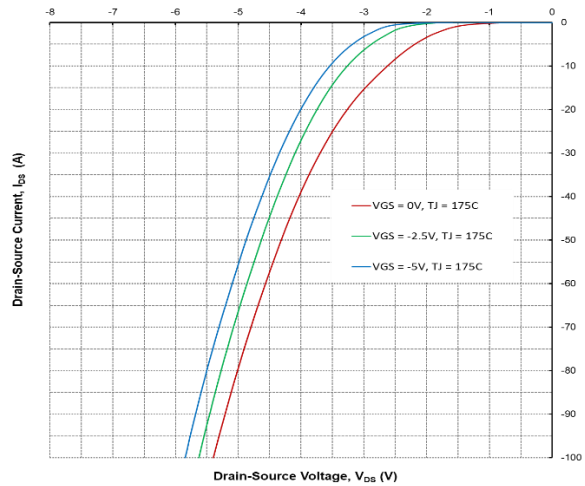


Figure 10. Body Diode Characteristics @ 175°C

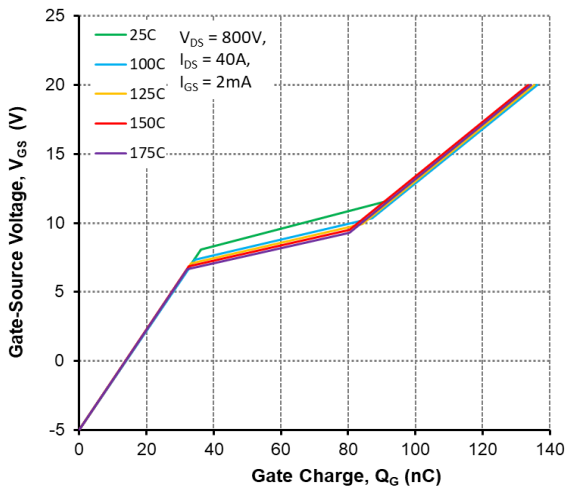


Figure 11. Gate Charge Characteristics

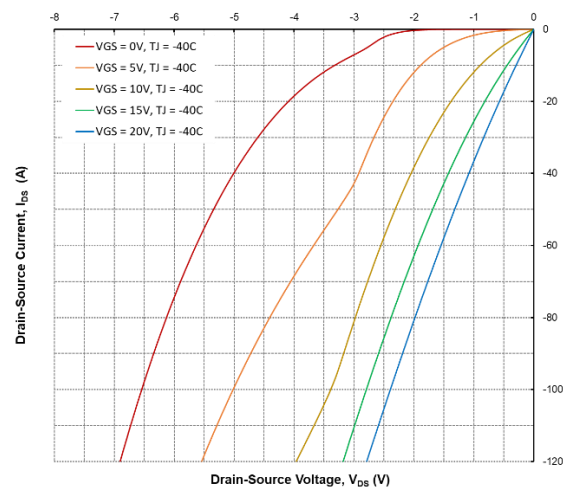


Figure 12. 3rd Quadrant Characteristics @ -40°C

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handling procedures.



Typical Performance

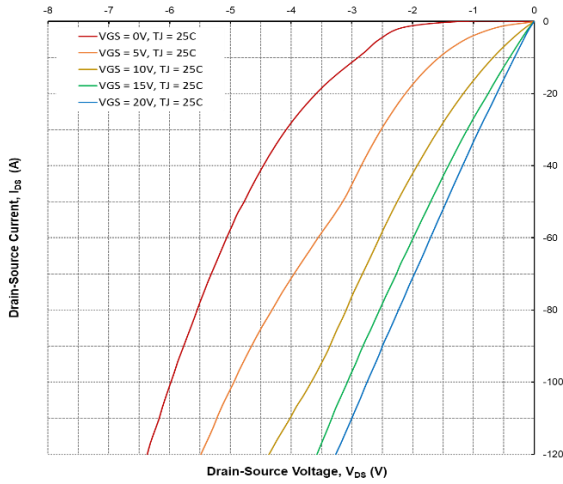


Figure 13. 3rd Quadrant Characteristics @ 25°C

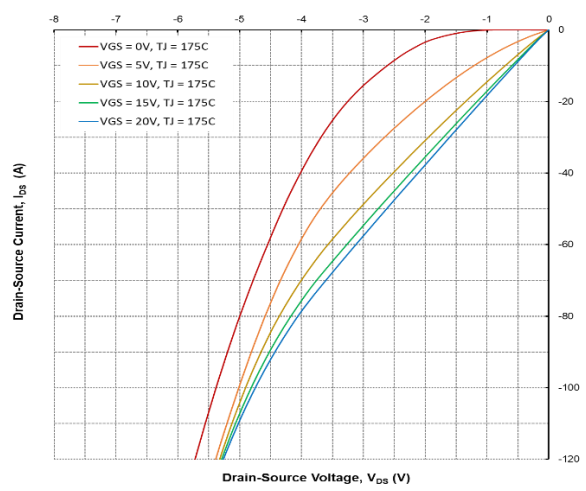


Figure 14. 3rd Quadrant Characteristics @ 175°C

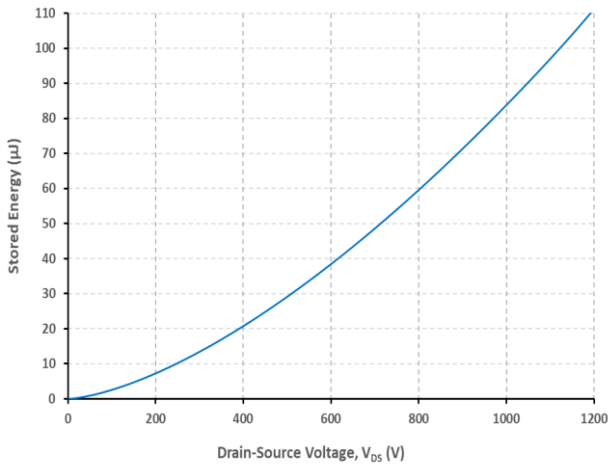


Figure 15. Output Capacitor Stored Energy

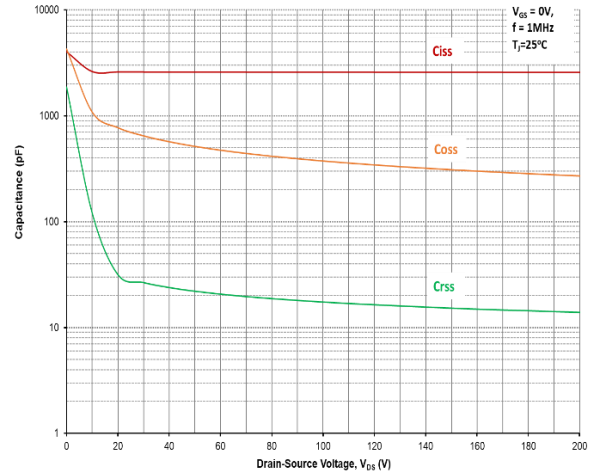


Figure 16. Capacitances vs. Drain-Source Voltage (0-200V)

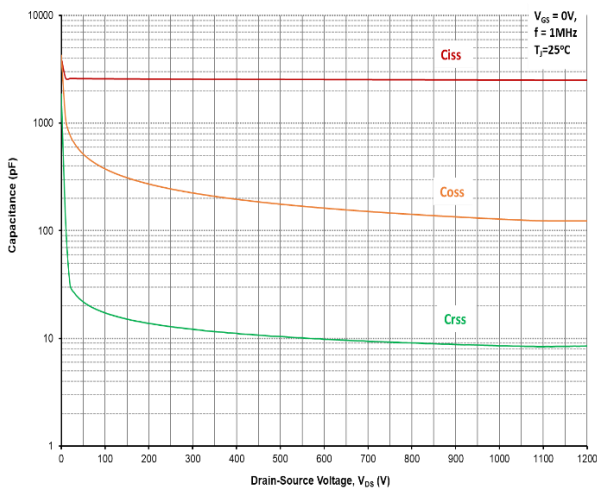


Figure 17. Capacitances vs. Drain-Source Voltage (0-1200V)

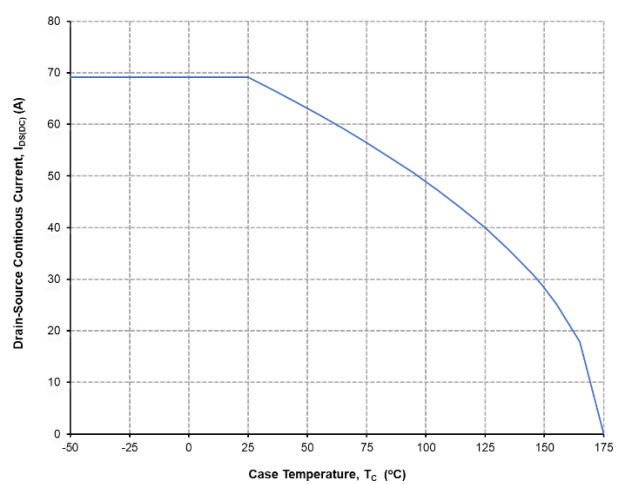


Figure 18. Continuous Drain Current Derating vs. Case Temperature

Caution: This device is sensitive to electrostatic discharge. Users should follow ESD handling procedures.



Typical Performance

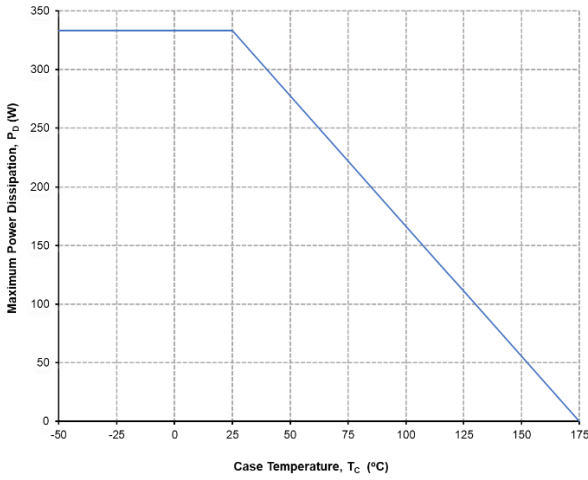


Figure 19. Maximum Power Dissipation Derating vs. Case Temperature

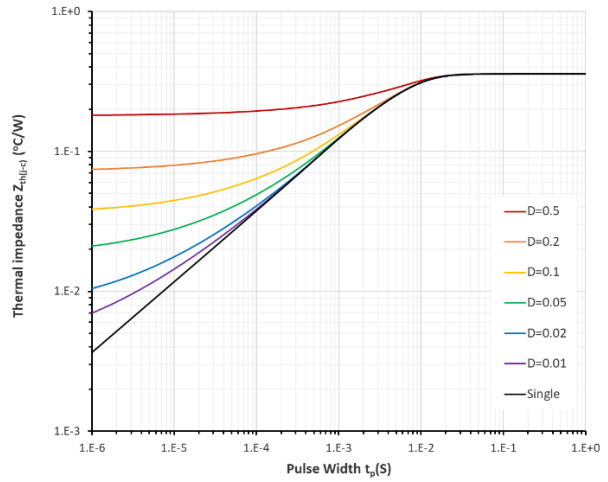


Figure 20. Transient Thermal Impedance (Junction to Case)

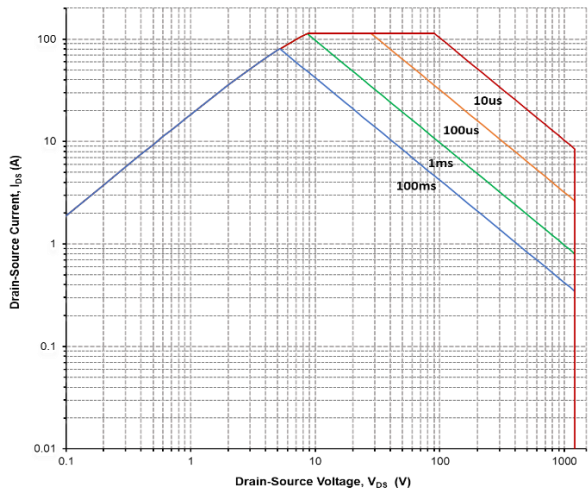


Figure 21. Safe Operating Area

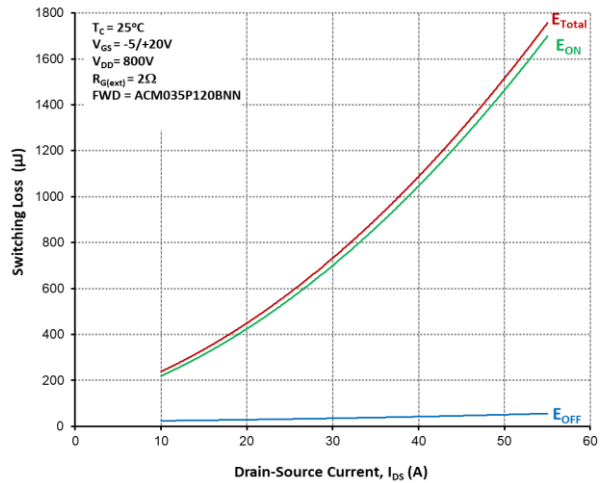


Figure 22. Switching energy vs Drain current

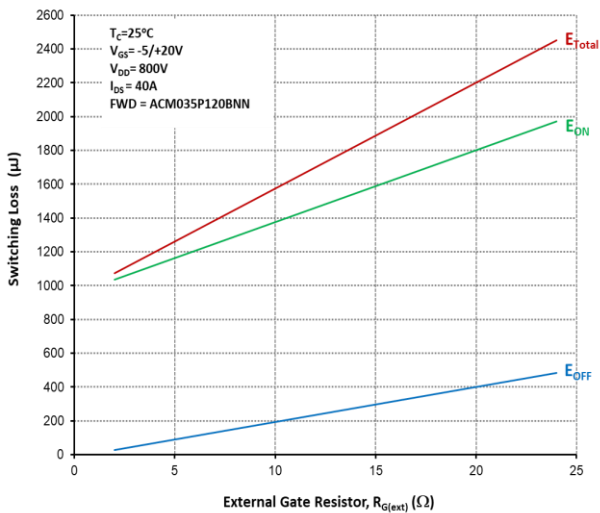


Figure 17. Switching energy vs External Gate Resistor

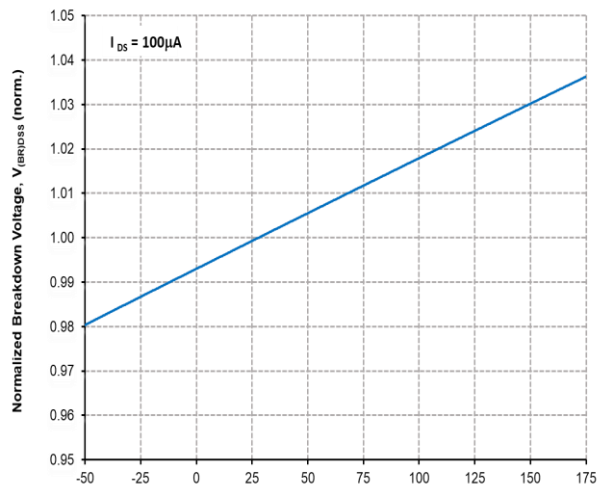
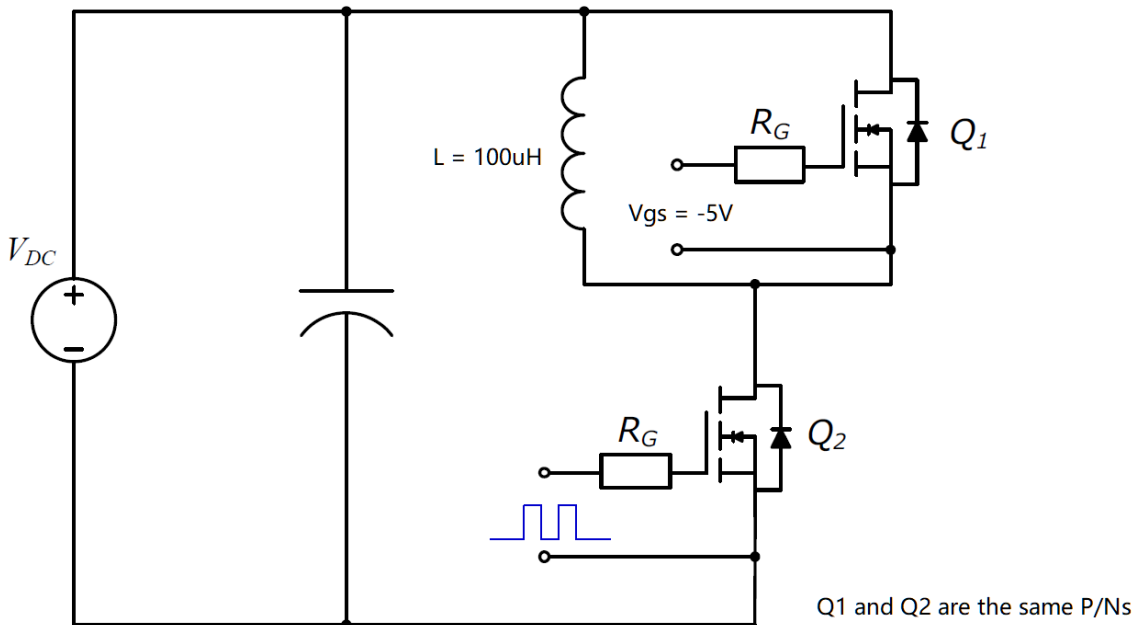
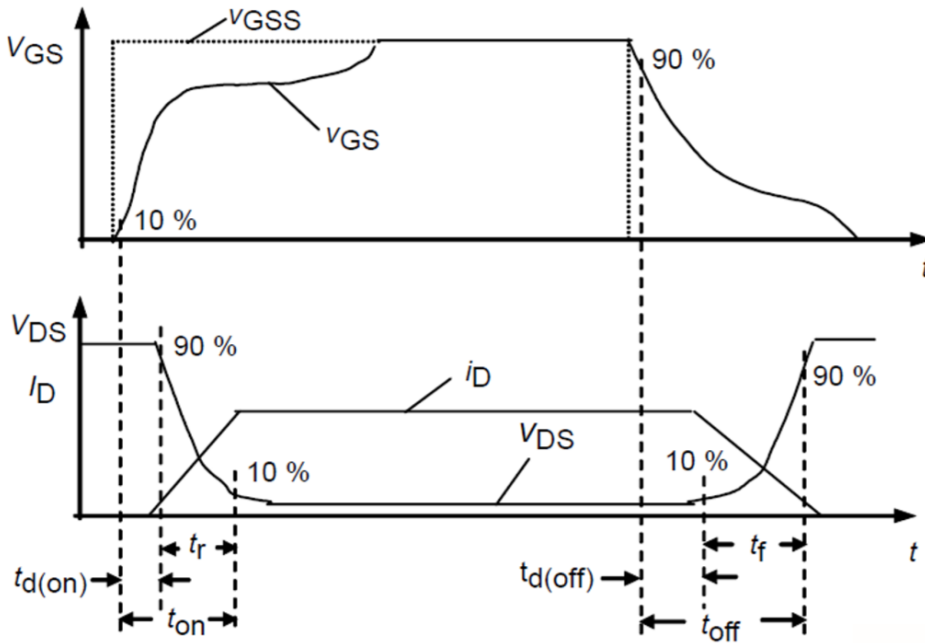


Figure 18. Normalized breakdown voltage vs Temperature

Caution: This device is sensitive to electrostatic discharge. Users should follow ESD handling procedures.

Switching Times Definition and Test Circuit



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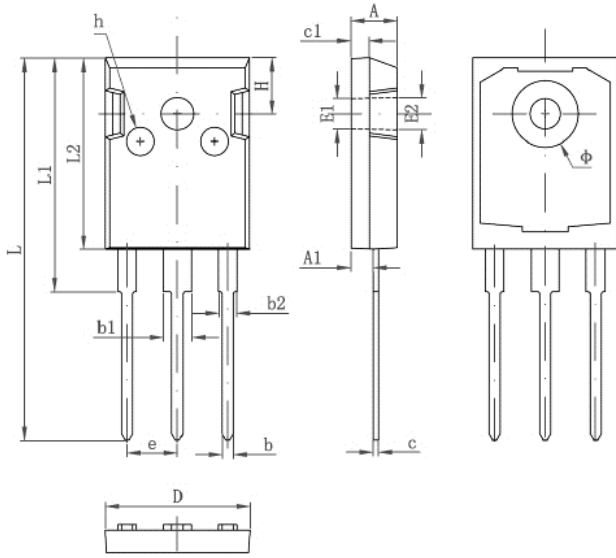
LGE3M35120B

Silicon Carbide Power MOSFET



Package Dimensions

(TO-247-3 Package)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
φ	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	
h	0.000	0.300	0.000	0.012

Package	Packing	Box Size L×W×H(mm)	Quantity(pcs/box)	Carton Size L×W×H(mm)	Quantity(pcs/carton)
TO-247	30pcs/Tube	570×155×50	450	580×340×125	1800

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<http://www.lgesemi.com>