

Silicon Carbide Enhancement Mode MOSFET

Features

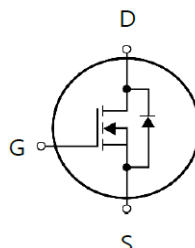
- High switching speed with a low gate charge
- Fast intrinsic diode with low reverse recovery
- Simple to drive with -5V/+18V gate
- Increased power density
- Pb-free, Halogen Free, and RoHS Compliant

Benefits

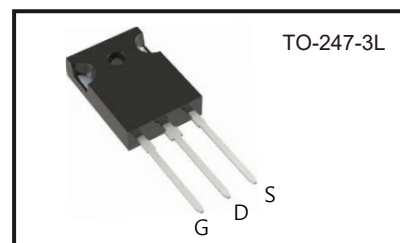
- Lower capacitance
- Higher system efficiency
- Easy to parallel

Applications

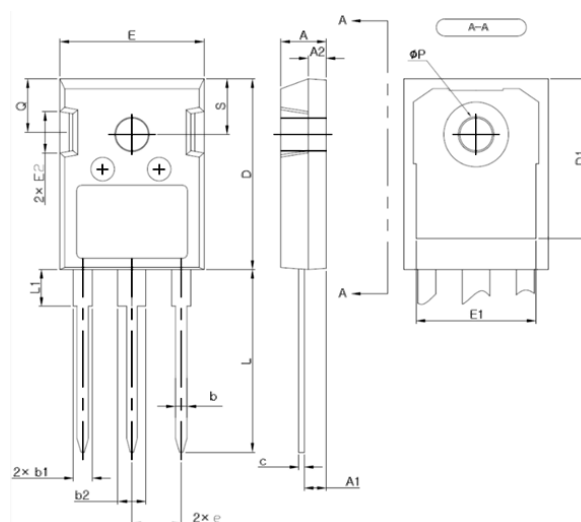
- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating
- Motor drives



V_{DSS}	1200V
$I_D(@25^{\circ}\text{C})$	30A
$R_{DS(ON)}$ typ.	80m Ω



Package Dimensions



Unit : mm

Symbol	Min	Max
A	4.80	5.20
A1	2.29	2.54
A2	1.90	2.10
b	1.10	1.30
b1	1.91	2.20
b2	2.92	3.20
c	0.50	0.70
D	20.80	21.34
D1	17.43	17.83
E	15.75	16.13
E1	13.06	13.46
E2	4.32	4.83
e	5.45 BSC	
L	19.85	20.25
L1	-	4.49
ΦP	3.55	3.65
Q	5.59	6.19
S	6.15 BSC	

Absolute Maximum Ratings

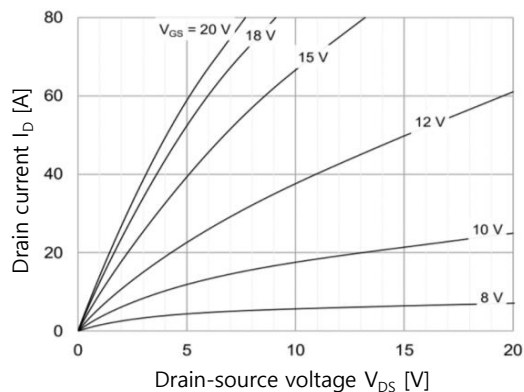
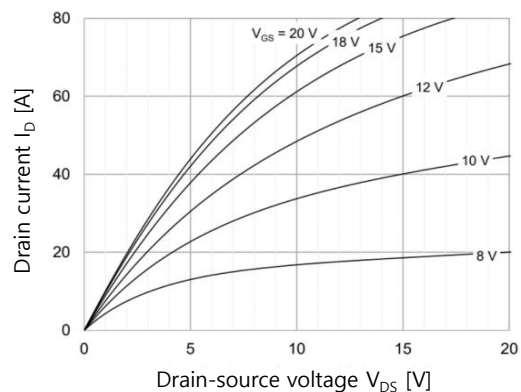
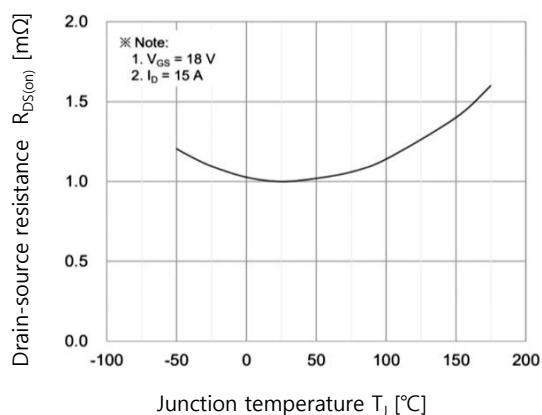
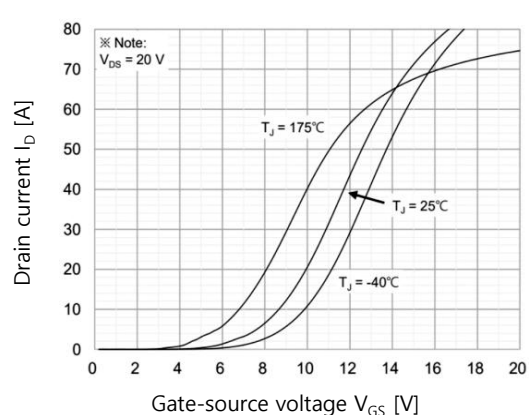
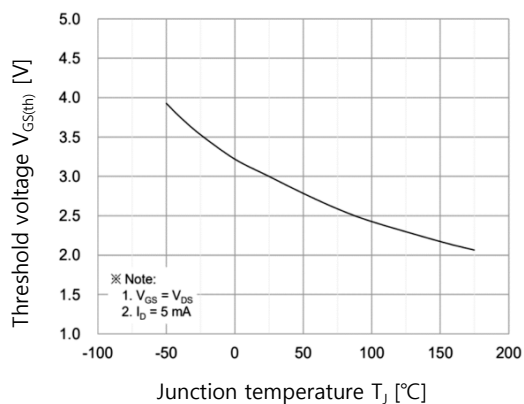
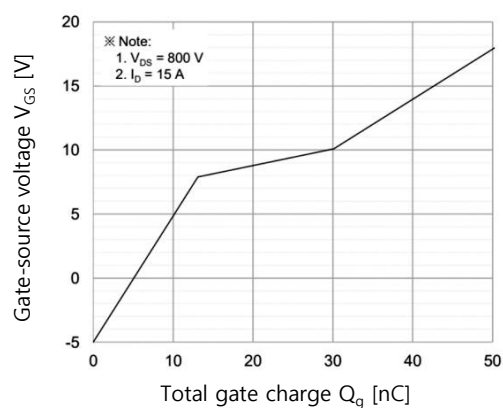
(T_c = 25°C unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	1200	V
Gate - Source Voltage (DC)	V_{GS}	-10/+22	V
Recommended Operation Value	$V_{GS(op)}$	-5/+18	V
Drain Current-Continuous T _c =25°C T _c =100°C	I_D	30 21	A
Pulse Drain Current	I_{DM}	80	A
Total Power Dissipation	P_D	150	W
Storage Temperature Range	T _{STG}	-55 to +175	°C
Operating Junction Temperature Range	T _J	-55 to +175	°C

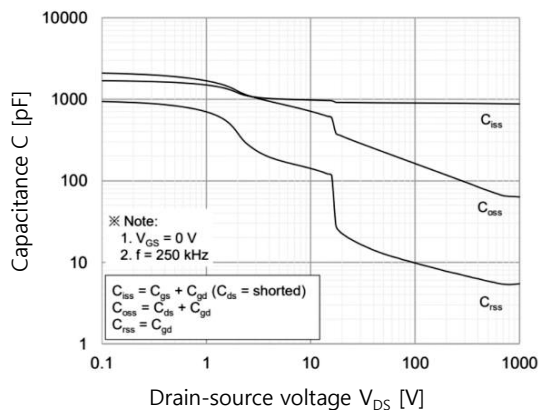
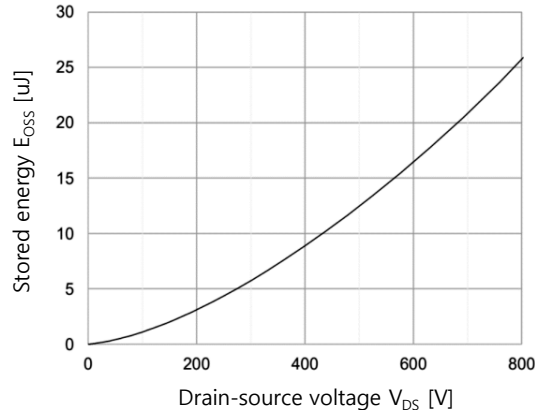
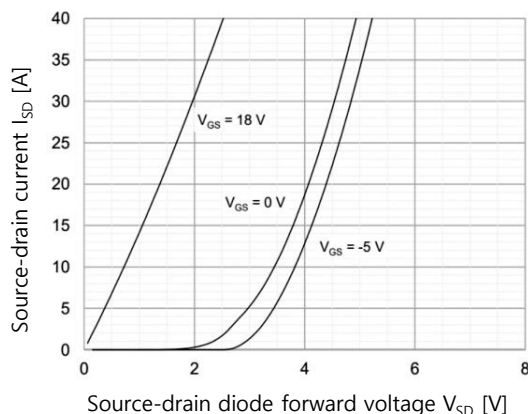
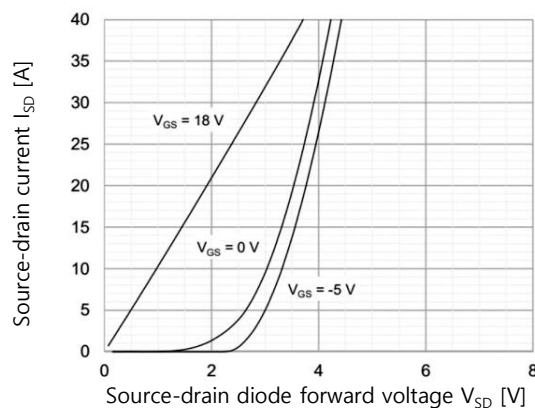
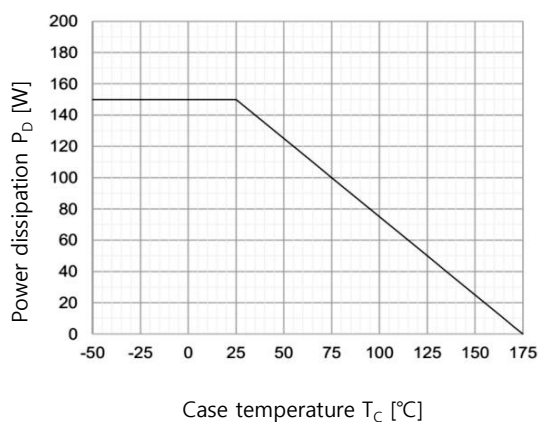
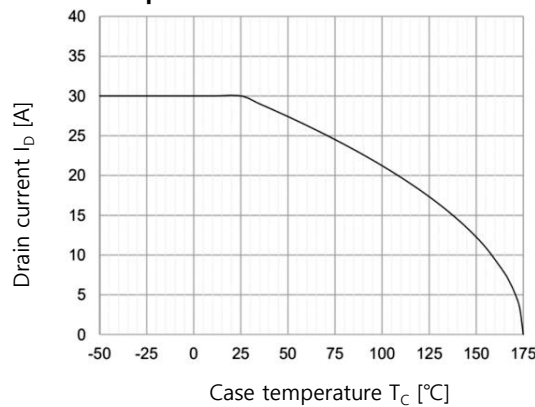
Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
OFF Characteristics							
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =1mA		1200	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1200V V _{GS} =0V	T _J =25℃	-	1	50	μA
			T _J =150℃	-	5	200	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =22V , V _{DS} =0V		-	-	100	nA
		V _{GS} =-10V , V _{DS} =0V		-	-	-100	
ON Characteristics							
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =5mA		2.0	3.0	4.5	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =18V , I _D =15A	T _J =25℃	-	80	100	mΩ
			T _J =175℃	-	128	-	
Internal Gate Resistance	R _{G(int.)}	f=1MHz , V _{AC} =25mV		-	4.0	-	Ω
Dynamic Characteristics							
Input Capacitance	C _{iss}	V _{DS} =800V V _{GS} =0V f=250kHz		-	890	-	pF
Output Capacitance	C _{oss}			-	65	-	
Reverse Transfer Capacitance	C _{rss}			-	6	-	
Turn-On Switching Energy	E _{on}	V _{DD} =800V V _{GS} =-5/+18V I _D =15A R _{G(ext)} =2.0Ω		-	186	-	μJ
Turn-Off Switching Energy	E _{off}			-	46	-	
Total Switching Energy	E _{tot}			-	232	-	
Switching Characteristics							
Turn-On Delay Time	t _{d(on)}	V _{DD} =800V V _{GS} =-5/+18V I _D =15A R _{G(ext)} =2.0Ω		-	16	-	ns
Rise Time	t _r			-	23	-	
Turn-Off Delay Time	t _{d(off)}			-	26	-	
Fall Time	t _f			-	10	-	
Total Gate Charge	Q _g	V _{DD} =800V V _{GS} =-5/+18V I _D =15A		-	53	-	nC
Gate to Source Charge	Q _{gs}			-	15	-	
Gate to Drain Charge	Q _{gd}			-	18	-	
Body Diode Characteristics							
Diode Forward Voltage	V _{SD}	V _{GS} =-5V , I _{SD} =15A		-	4.1	-	V
Diode Source Current	I _S			-	-	30	A
Maximum Diode Source Current (DC)	I _{SM}			-	-	80	A
Reverse Recovery Time	T _{rr}	I _{SD} =15A , V _{DD} =800V diF/dt=1000A/μs		-	34	-	ns
Reverse Recovery Charge	Q _{rr}			-	112	-	nC
Thermal Resistance							
Thermal Resistance, Junction-to-Case	Rθ _{Jc}			-	-	1.0	℃/W

Typical Performance

Fig 1. Output Characteristics, $T_J = 25^\circ\text{C}$

Fig 2. Output Characteristics, $T_J = 175^\circ\text{C}$

Fig 3. On-Resistance Variation vs. Temperature

Fig 4. Transfer Characteristics

Fig 5. Threshold Voltage vs. Temperature

Fig 6. Gate Charge Characteristics


Typical Performance

Fig 7. Capacitance Characteristics

Fig 8. Stored Energy in Output Capacitance

Fig 9. Body Diode Characteristics @ 25°C

Fig 10. Body Diode Characteristics @ 175°C

Fig 11. Max. P_D Derating VS Case Temperature

Fig 12. Continuous I_D Derating VS Case Temperature


Typical Performance

Fig 13. Transient Thermal Impedance

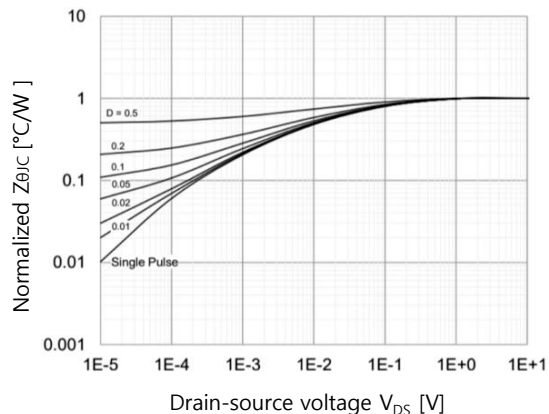


Fig 14. Safe Operating Area

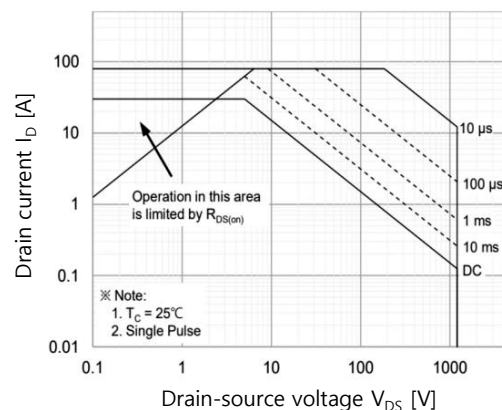


Fig 15. Clamped Inductive Switching Energy vs Drain Current

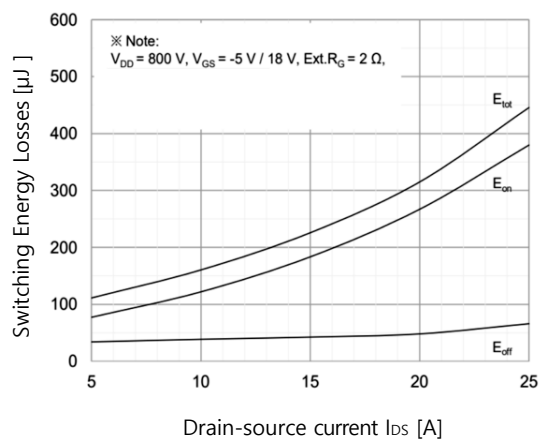
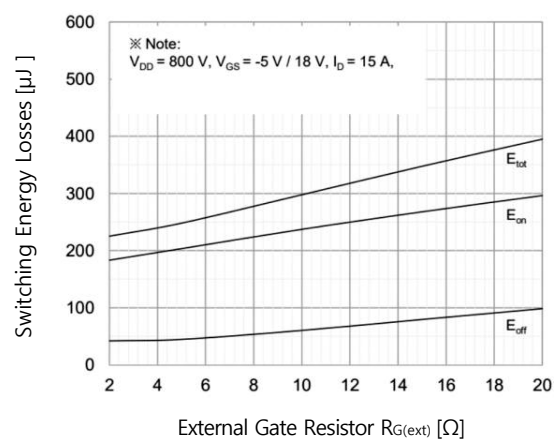


Fig 16. Clamped Inductive Switching Energy vs External Gate Resistor $R_{G(ext)}$



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