

Silicon Carbide Enhancement Mode MOSFET

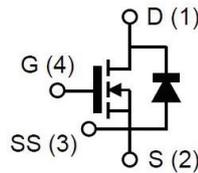
Features

- Gate charge (Typ. $Q_g=198nC$)
- Robust avalanche capability
- Fast recover time
- 100% Avalanche tested

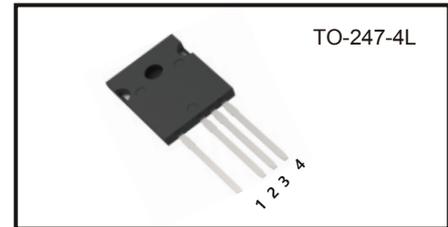
Applications

- LCD/LED/PDP TV
- EV charging station
- Telecom/server power supplies
- AC-DC Power supply
- Switch mode power supply(SMPS)

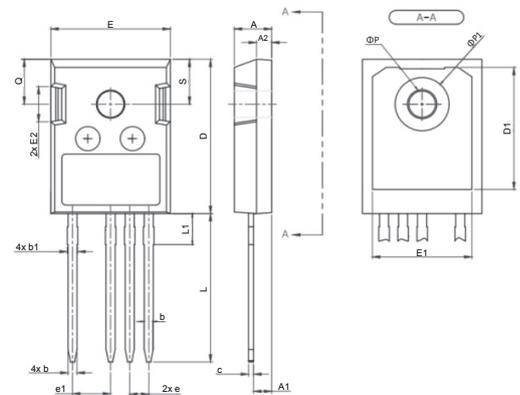
Preliminary



V_{DSS}	1200V
$I_D(@25^\circ C)$	100A
$R_{DS(ON)}$	20.5m Ω



Package Dimensions



Absolute Maximum Ratings

($T_c = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Rated	Unit
Drain-Source Voltage $V_{GS}=0V$ $I_D=100\mu A$	V_{DS}	1200	V
Gate - Source Voltage (DC)	V_{GS}	-10/+20	V
Recommended Operation Value	$V_{GS(op)}$	-5/+18	V
Drain Current-Continuous $T_c=25^\circ C$ $T_c=100^\circ C$	I_D	100 75	A
Pulse Drain Current	$I_{D,pulse}$	250	A
Total Power Dissipation	P_D	469	W
Storage Temperature Range	T_{STG}	-55 to +175	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to +175	$^\circ C$

Symbol	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.29	2.36	2.54
A2	1.90	2.00	2.10
b	1.10	1.20	1.30
b1	1.91	2.11	2.20
b2	2.92	3.10	3.20
c	0.50	0.60	0.70
D	20.80	21.07	21.34
D1	17.43	17.63	17.83
E	15.75	15.94	16.13
E1	13.06	13.26	13.46
E2	4.32	4.58	4.83
e	5.45 BSC		
L	19.85	20.00	20.25
L1	—	—	4.49
ΦP	3.55	3.60	3.65
Q	5.59	5.89	6.19
S	6.15 BSC		

Electrical Characteristics @ T_c =25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OFF Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=0.1mA$	1200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=1200V$	-	1	100	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=22V, V_{DS}=0V$	-	-	100	nA
ON Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=17mA$	2.0	3.0	4.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=18V, I_D=50A$	18	20.5	29.4	m Ω
Internal Gate Resistance	$R_{G(int.)}$		-	3.34	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=800V$ $V_{GS}=0V$ Freq.=250kHz	-	3800	-	pF
Output Capacitance	C_{oss}		-	230	-	
Reverse Transfer Capacitance	C_{rss}		-	18	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=800V$ $V_{GS}=-5/+18V$ $I_D=50A$ $R_{G(ext)}=2.0\Omega$ Inductive load	-	30	-	ns
Rise Time	t_r		-	28	-	
Turn-Off Delay Time	$t_{d(off)}$		-	65	-	
Fall Time	t_f		-	13	-	
Total Gate Charge	Q_g	$V_{DS}=800V$ $V_{GS}=-5/+18V$ $I_D=50A$ Inductive load	-	199	-	nC
Gate to Source Charge	Q_{gs}		-	49	-	
Gate to Drain Charge	Q_{gd}		-	64	-	
Body Diode Characteristics						
Inverse Diode Forward Voltage	V_{SD}	$V_{GS}=-5V, I_{SD}=50A$	-	4.2	-	V
Continuous Diode Forward Current	I_S		-	-	100	A
Reverse Recovery Time	T_{rr}	$I_{SD}=50A, V_R=800V,$ $di/dt=3000A/\mu s$ Includes Q_{oss}	-	25	-	ns
Reverse Recovery Charge	Q_{rr}		-	480	-	nC
Thermal Resistance						
Thermal Resistance, Junction-to-Case	$R_{\theta_{JC}}$		-	-	0.32	$^{\circ}C/W$

Typical Performance

Fig 1. Transient Thermal Impedance (Junction to Case)

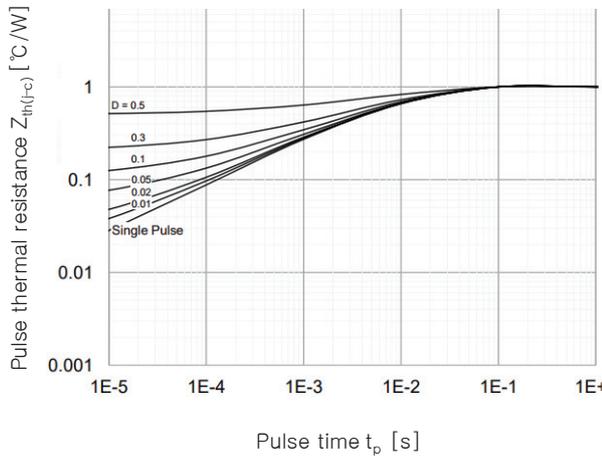


Fig 2. SOA Characteristics

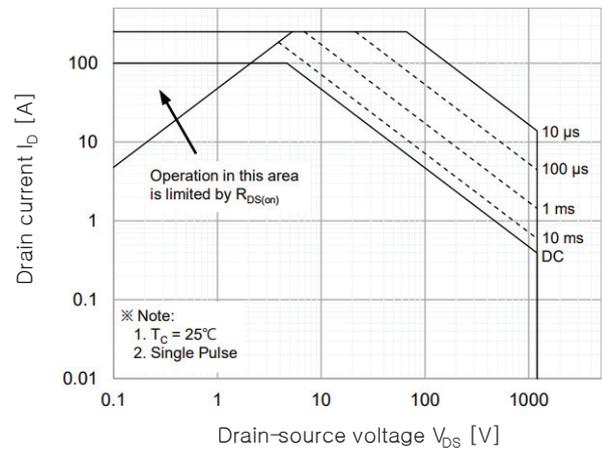


Fig 3. Output Characteristics at $T_J = 25^\circ\text{C}$

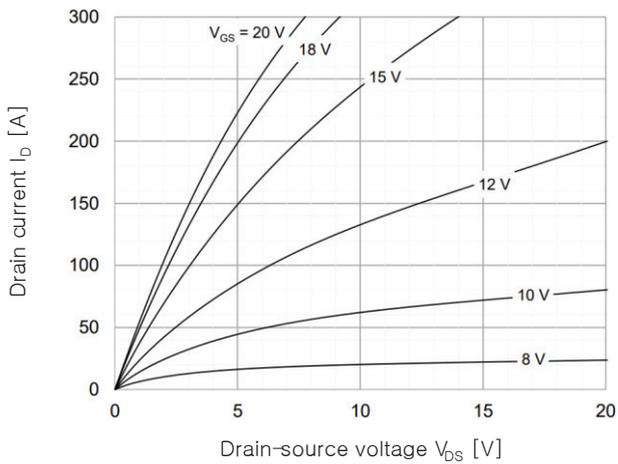


Fig 4. Output Characteristics at $T_J = 175^\circ\text{C}$

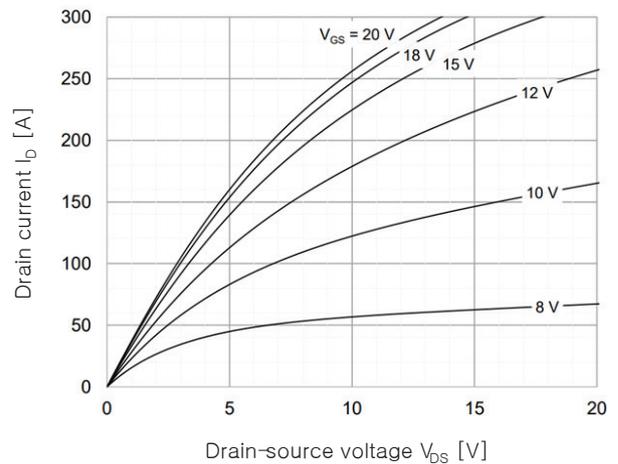


Fig 5. Normalized On-Resistance vs. Temperature

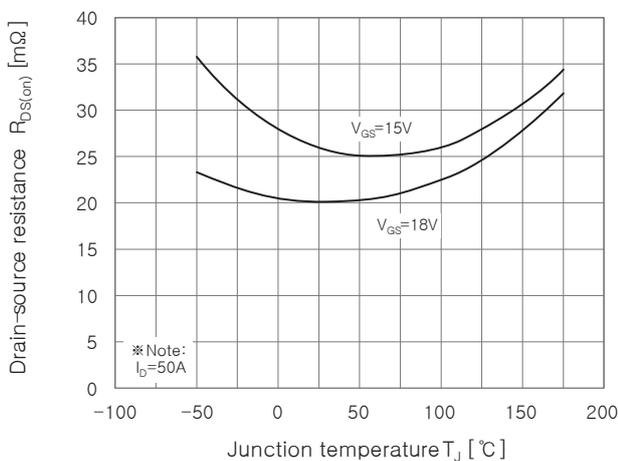
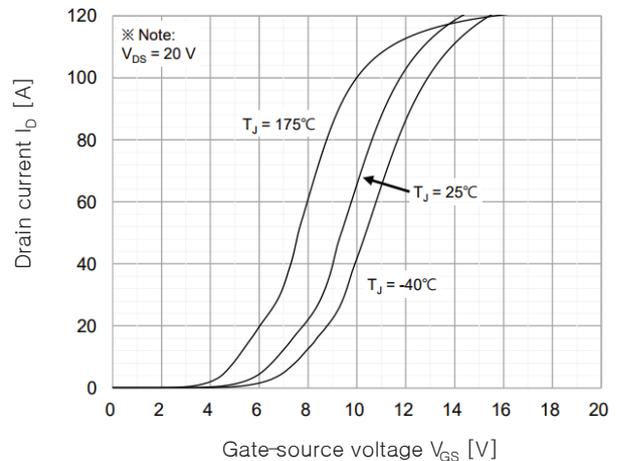
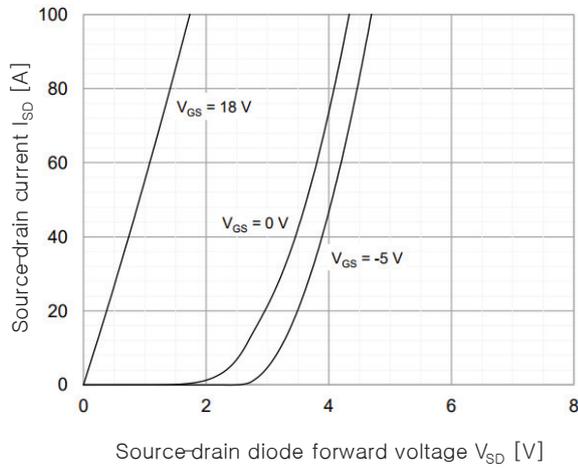
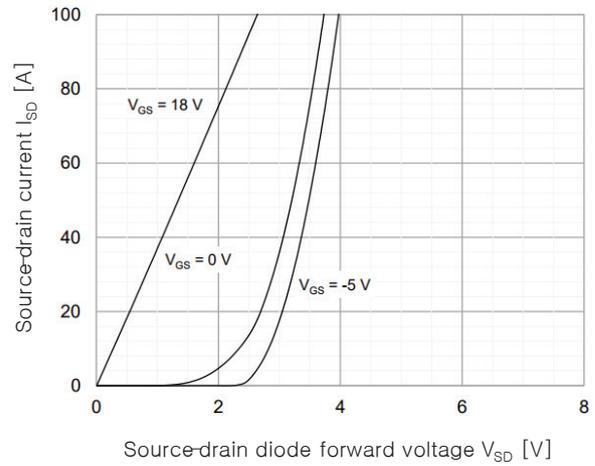
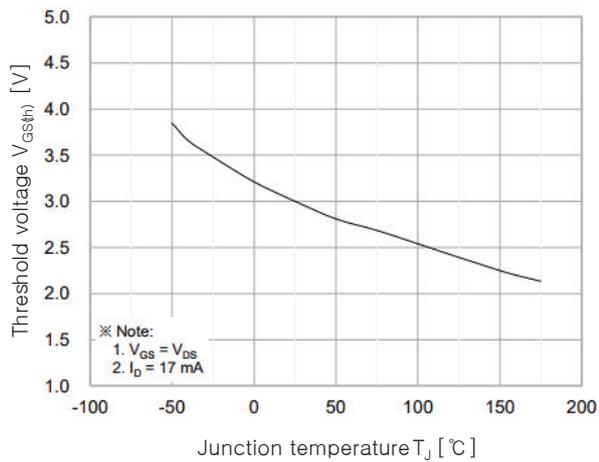
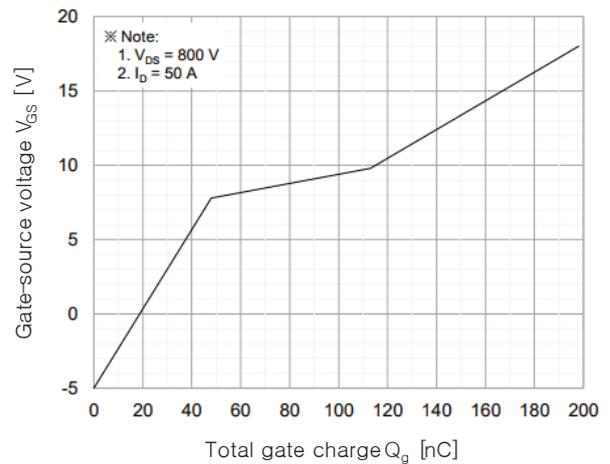
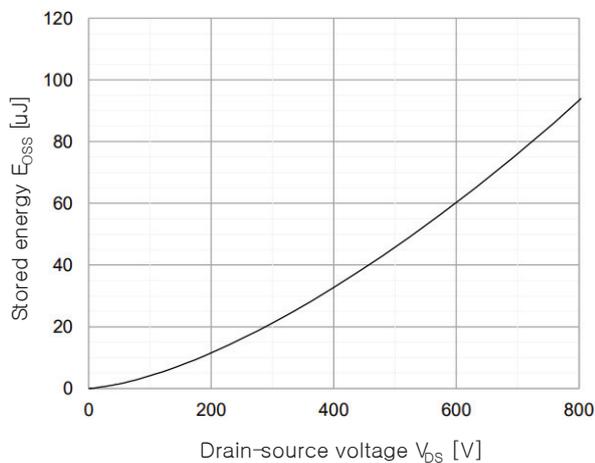
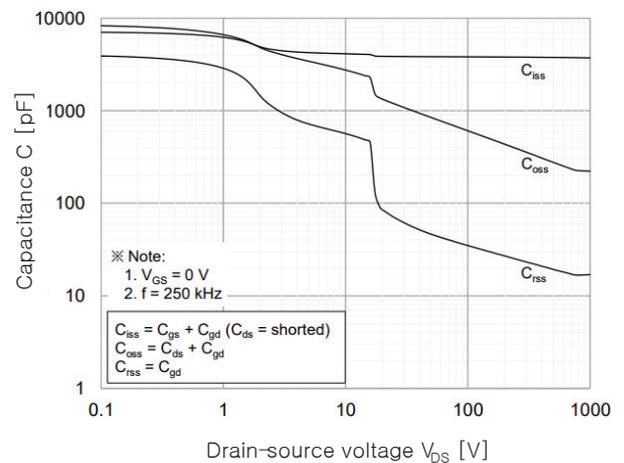
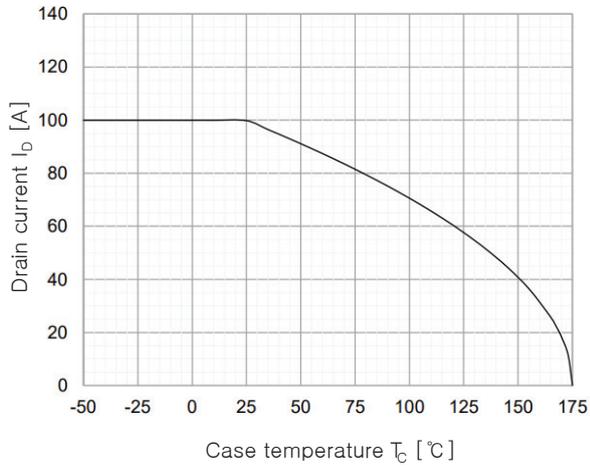
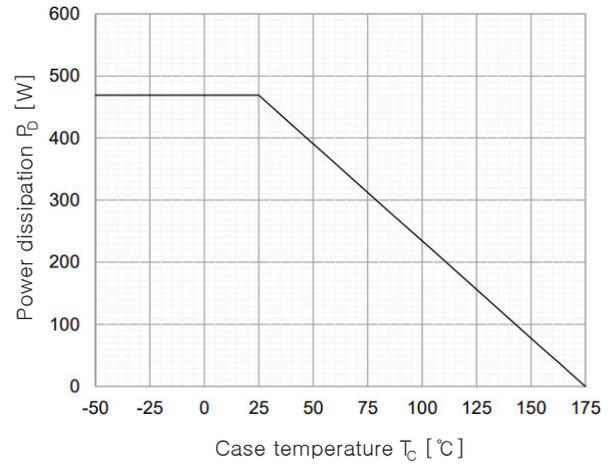


Fig 6. Transfer Characteristics



Typical Performance
Fig 7. $V_{SD} - I_{SD}$ Characteristics, $T_J = 25^\circ\text{C}$

Fig 8. $V_{SD} - I_{SD}$ Characteristics, $T_J = 175^\circ\text{C}$

Fig 9. $T_J - V_{GS(th)}$ Characteristics

Fig 10. $Q_g - V_{GS}$ Characteristics

Fig 11. $V_{DS} - E_{OSS}$ Characteristics

Fig 12. $V_{DS} - C$ Characteristics


Typical Performance
Fig 13. $T_C - I_D$ Characteristics

Fig 14. $T_C - P_D$ Characteristics


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