

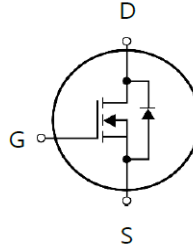
Silicon Carbide Enhancement Mode MOSFET

Features

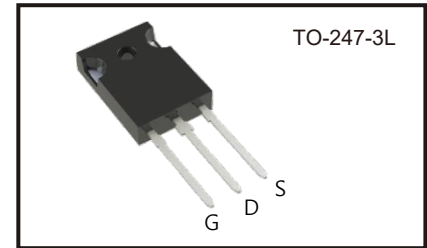
- Low Capacitance With High Speed Switching Speed
- Low Reverse Recovery (Qrr)
- Reduction of Heat Sink Requirements
- Halogen Free, and RoHS Compliant

Benefits

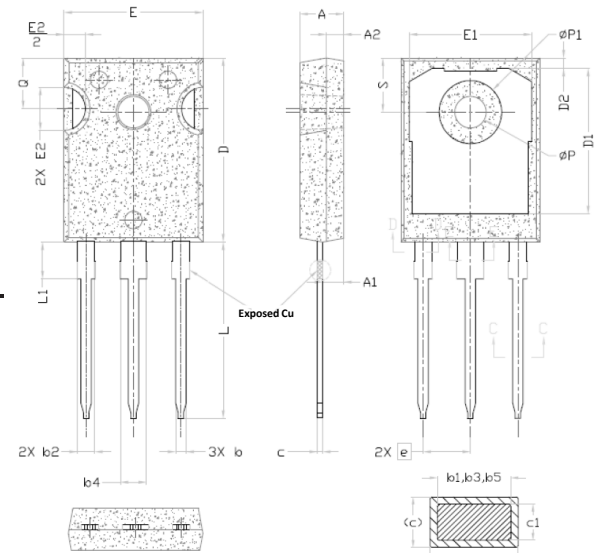
- Increase Parallel Device Convenience
- Higher System Efficiency
- Allow High Frequency Operation
- Realize Compact and Lightweight Systems



V_{DSS}	1200V
$I_{D(@25^{\circ}C)}$	58A
$R_{DS(ON) \text{ typ.}}$	40m Ω



Package Dimensions



Section C--C,D--D,E--E

Absolute Maximum Ratings

(T_c = 25°C unless otherwise specified)

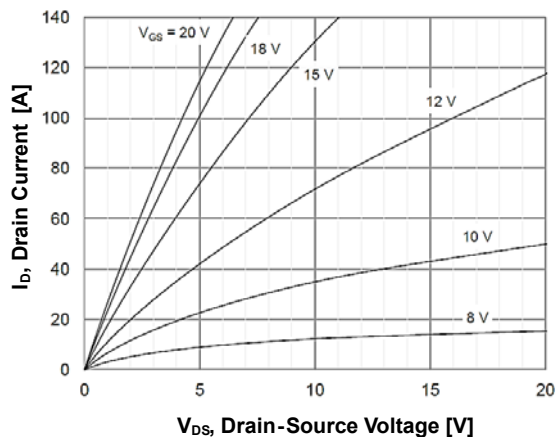
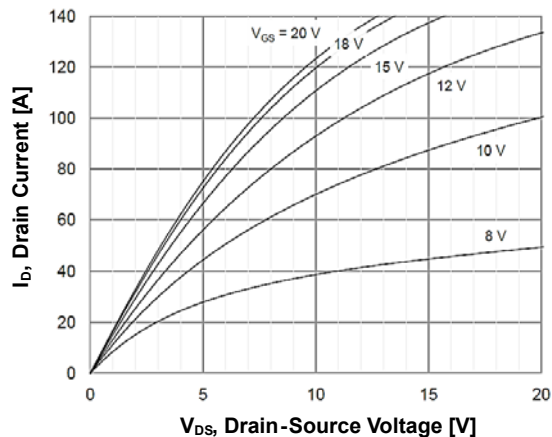
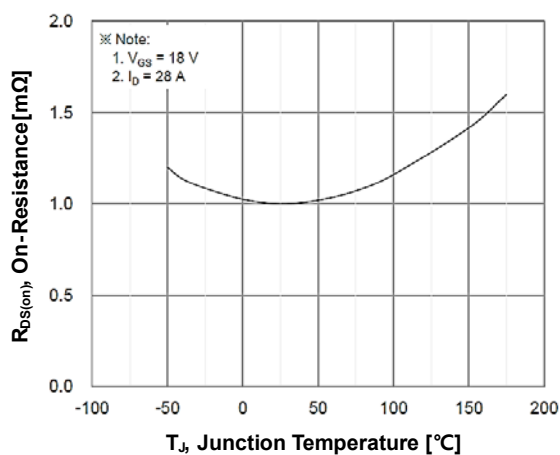
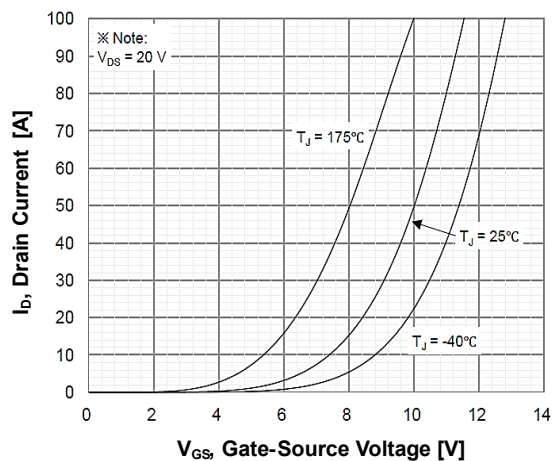
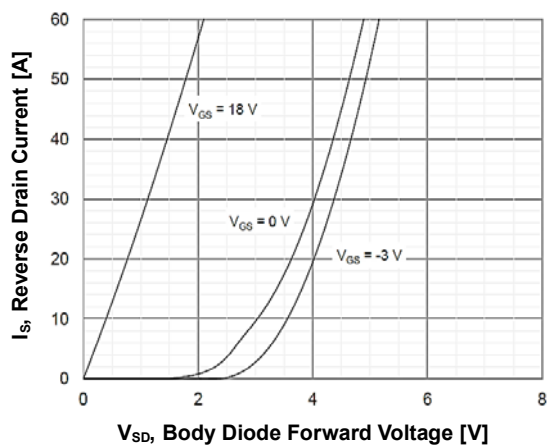
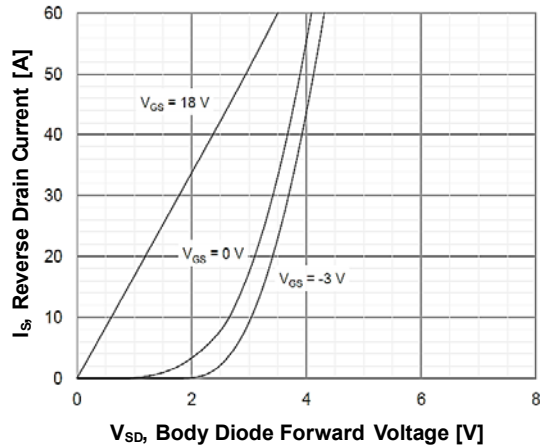
Parameter	Symbol	Ratings	Unit
Drain-Source Voltage $V_{GS}=0V$ $I_D=100\mu A$	V_{DS}	1200	V
Gate-Source Voltage	V_{GS}	-10/+22	V
Recommended Operation Value	$V_{GS(op)}$	-3/+18	V
Drain Current-Continuous @ T _c =25°C @ T _c =100°C	I_D	58 41	A
Pulse Drain Current	$I_{D,pulse}$	142	A
Power Dissipation	P_D	294	W
Storage Temperature Range	T_{STG}	-55 to +175	°C
Operating Junction Temperature Range	T_J	-55 to +175	°C
Soldering Temperature	T_L	260	°C

Symbol	Min	Max
A	4.83	5.21
A1	2.29	2.55
A2	1.50	2.49
b	1.12	1.33
b1	1.12	1.28
b2	1.91	2.39
b3	1.91	2.34
b4	2.87	3.22
b5	2.87	3.18
c	0.55	0.69
c1	0.55	0.65
D	20.80	21.10
D1	16.25	17.65
D2	0.51	1.35
E	15.75	16.13
E1	13.46	14.16
E2	4.32	5.49
e	5.44 BSC	
L	19.81	20.32
L1	4.10	4.40
ΦP	3.56	3.65
ΦP1	7.19 REF	
Q	5.39	6.20
S	6.04	6.30

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 =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 =10mA	2.0	3.0	4.5	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =18V , I _D =28A	-	40	56	mΩ
		V _{GS} =15V , I _D =28A	-	55	-	
Internal Gate Resistance	R _{G(int.)}	f = 1MHz , V _{GS} =0V	-	3.0	-	Ω
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =800V V _{GS} =0V Freq.=250kHz	-	1600	-	pF
Output Capacitance	C _{oss}		-	100	-	
Reverse Transfer Capacitance	C _{rss}		-	5	-	
Turn-On Switching Energy	E _{on}	V _{DS} =800V , V _{GS} =-3/+18V I _D =28A , R _{G(ext)} =6.8Ω Inductive Load	-	600	-	μJ
Turn-Off Switching Energy	E _{off}		-	130	-	
Total Switching Energy	E _{tot}		-	730	-	
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{DS} =800V V _{GS} =-3/+18V I _D =28A R _{G(ext)} =6.8Ω Inductive Load	-	21	-	ns
Rise Time	t _r		-	36	-	
Turn-Off Delay Time	t _{d(off)}		-	39	-	
Fall Time	t _f		-	12	-	
Total Gate Charge	Q _g	V _{DS} =800V V _{GS} =-3/+18V I _D =28A	-	63	-	nC
Gate to Source Charge	Q _{gs}		-	21	-	
Gate to Drain Charge	Q _{gd}		-	15	-	
Body Diode Characteristics						
Inverse Diode Forward Voltage	V _{SD}	V _{GS} =-3V , I _{SD} =28A	-	4.2	-	V
Continuous Diode Forward Current	I _S	V _{GS} =-3V , T _C =25°C	-	-	55	A
Reverse Recovery Time	T _{rr}	I _{SD} =28A , V _R =800V di/dt=3000A/μs	-	33	-	ns
Reverse Recovery Charge	Q _{rr}		-	180	-	nC
Reverse Recovery Charge	I _{rrm}		-	12	-	A
Thermal Resistance						
Thermal Resistance, Junction-to-Case	Rθ _{JC}		-	0.51	-	°C/W

Typical Performance

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

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

Fig 3. On-Resistance Variation vs. Temperature

Fig 4. Transfer Characteristics

Fig 5. V_{SD} - I_S Characteristics, $T_J = 25^\circ\text{C}$

Fig 6. V_{SD} - I_S Characteristics, $T_J = 175^\circ\text{C}$


Typical Performance

Fig 7. Threshold Voltage vs. Temperature

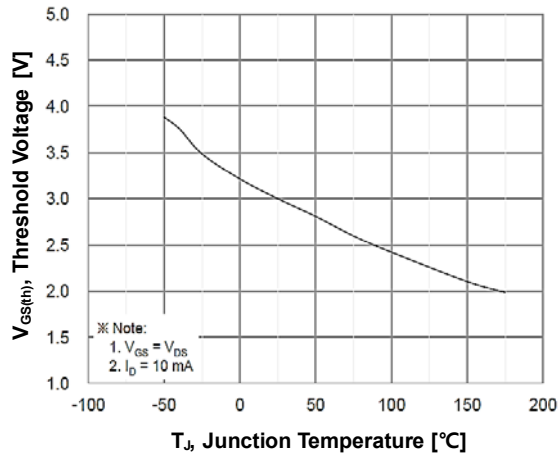


Fig 8. Gate Charge Characteristics

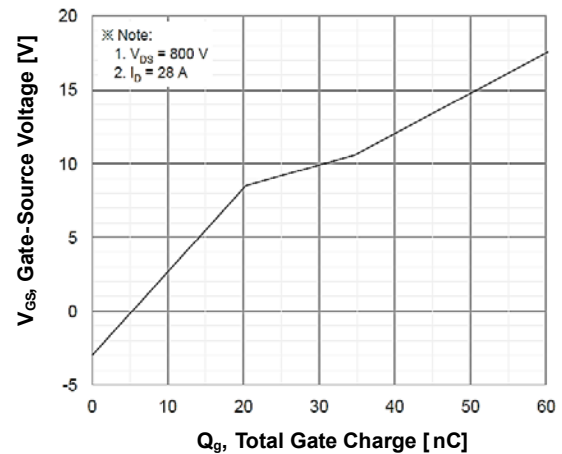


Fig 9. Stored Energy in Output Capacitance

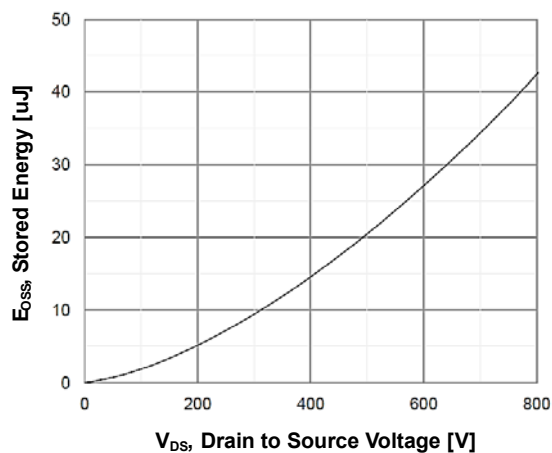


Fig 10. Capacitance Characteristics

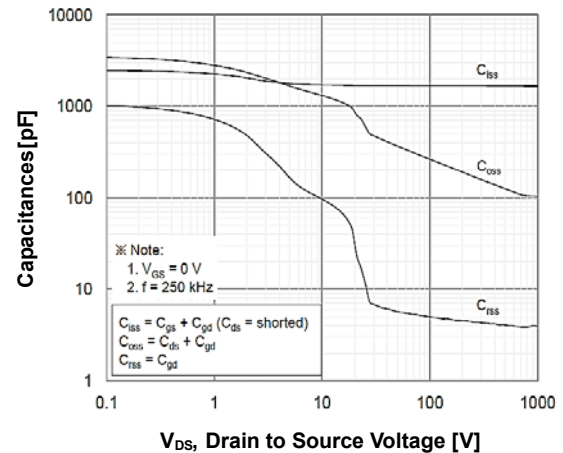


Fig 11. Max. P_D Derating vs. Case Temperature

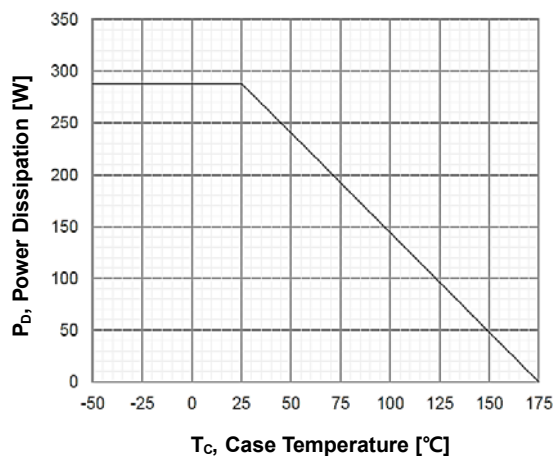
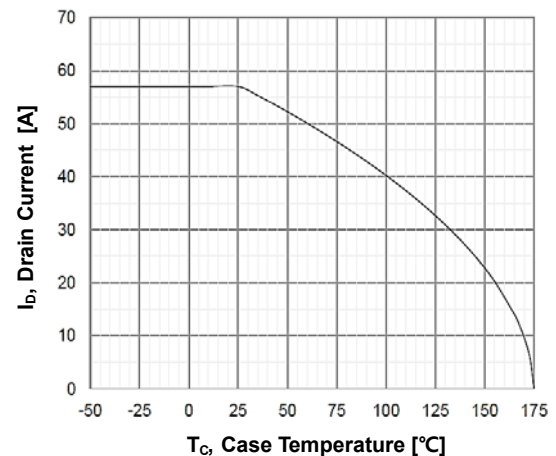


Fig 12. Continuous I_D Derating vs. Case Temperature



Typical Performance

Fig 13. Transient Thermal impedance

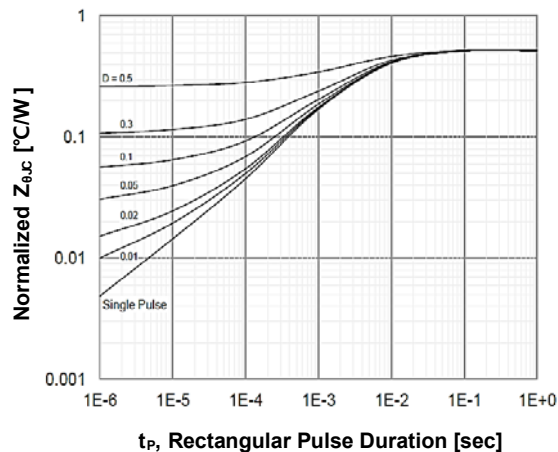


Fig 14. Safe Operating Area

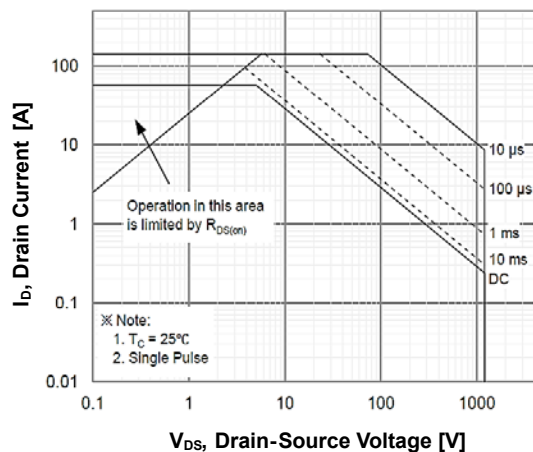


Fig 15. CIS Energy vs. Drain Current

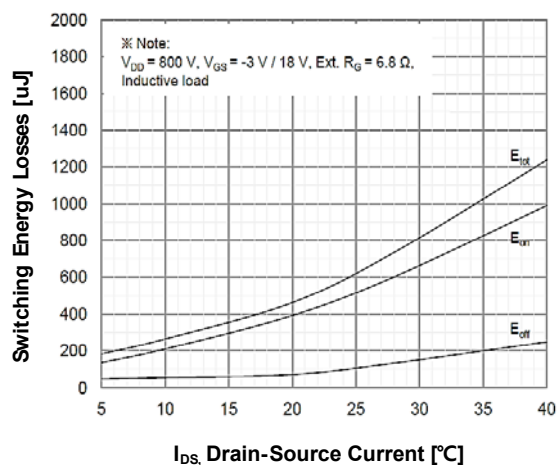
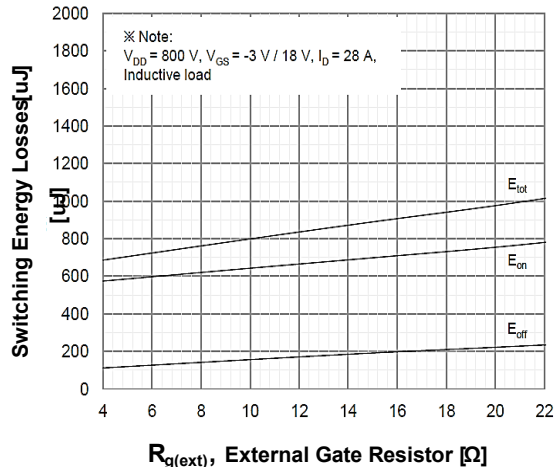


Fig 16. CIS Energy vs. $R_{g(ext)}$



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