

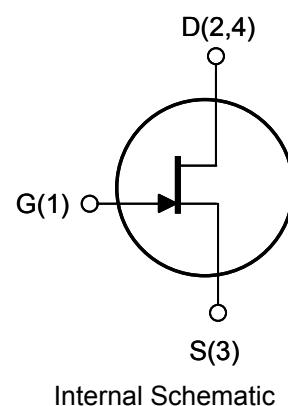
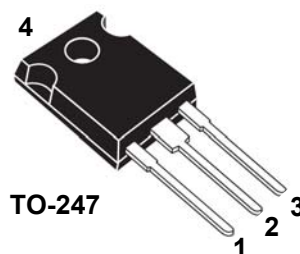
## Normally-OFF Trench Silicon Carbide Power JFET

### Features:

- Compatible with Standard PWM ICs
- Positive Temperature Coefficient for Ease of Paralleling
- Temperature Independent Switching Behavior
- 175 °C Maximum Operating Temperature
- $R_{DS(on)max}$  of 0.063  $\Omega$
- Voltage Controlled
- Low Gate Charge
- Low Intrinsic Capacitance

### Applications:

- Solar Inverter
- SMPS
- Power Factor Correction
- Induction Heating
- UPS
- Motor Drive



Product Summary		
$BV_{DS}$	1200	V
$R_{DS(ON)max}$	0.063	$\Omega$
$Q_{g,typ}$	50	nC

### MAXIMUM RATINGS, at $T_j = 25\text{ °C}$ unless otherwise stated

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current	$I_{D25}$	$T_C = 25\text{ °C}$	30	A
	$I_{D100}$	$T_C = 100\text{ °C}$	24	
Pulsed Drain Current	$I_{DM}$	$T_C = 25\text{ °C}$	50	A
Avalanche Energy, single pulse	$E_{AS}$	$I_D = 12\text{ A}, V_{DD} = 50\text{ V},$ $T_j < 175\text{ °C}$	TBD	mJ
Avalanche Energy, repetitive	$E_{AR}$		4	
Avalanche Current, repetitive	$I_{AR}$		12	A
Short Circuit Withstand Time	$t_{SC}$	$V_{DD} < 1200\text{ V}, T_j < 175\text{ °C}$	10	us
Power Dissipation	$P_D$	$T_C = 25\text{ °C}$	273	W
Gate-Source Voltage	$V_{GS}$		-15 to +3	V
Operating and Storage Temperature	$T_j, T_{j,stg}$		-55 to +175	°C

**THERMAL CHARACTERISTICS**

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Thermal Resistance, junction-case	$R_{th,JC}$		-	0.55	-	°C / W
Thermal Resistance, junction-ambient	$R_{th,JA}$		-	50	-	

**STATIC CHARACTERISTICS, at  $T_j = 25\text{ °C}$  unless otherwise stated**

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Drain-Source Blocking Voltage	$BV_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = 2000\text{ }\mu\text{A}$	1200	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = 1200\text{ V}$ , $V_{GS} = 0\text{ V}$	-	-	2000	$\mu\text{A}$
		$V_{DS} = 1200\text{ V}$ , $V_{GS} = -5\text{ V}$	-	200	-	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 1\text{ V}$ , $I_D = 68\text{ mA}$	0.75	1.00	1.25	V
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = 3\text{ V}$	-	154	-	mA
		$V_{GS} = -15\text{ V}$	-	-0.4	-	
Drain-Source On-resistance	$R_{DS(on)}$	$I_D = 24\text{ A}$ , $V_{GS} = 3.0\text{ V}$ , $T_j = 25\text{ °C}$	-	0.058	0.063	$\Omega$
		$I_D = 12\text{ A}$ , $V_{GS} = 3.0\text{ V}$ , $T_j = 150\text{ °C}$	-	0.151	-	
Gate Resistance	$R_G$	$f = 1\text{ MHz}$ , open-drain	-	TBD	-	$\Omega$

**DYNAMIC CHARACTERISTICS, at  $T_j = 25\text{ °C}$  unless otherwise stated**

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Total Gate Charge	$Q_g$	$V_{DS} = 600\text{ V}$ , $I_D = 24\text{ A}$ , $V_{GS} = 0\text{ V to } +3\text{ V}$	-	50	-	nC
Gate-Source Charge	$Q_{gs}$		-	16.7	-	
Gate-Drain Charge	$Q_{gd}$		-	33.3	-	
Turn-on Delay (Resistive Load)	$t_{on}$	$V_{DS} = 600\text{ V}$ , $I_D = 24\text{ A}$ , $C_{BP} = 68\text{ nF}$ , $R_{CL} = 110\text{ }\Omega$ , <i>Figure 9</i>	-	20	-	ns
Rise Time (Resistive Load)	$t_r$		-	70	-	
Turn-off Delay (Resistive Load)	$t_{off}$		-	30	-	
Fall Time (Resistive Load)	$t_f$		-	70	-	
Turn-on Energy	$E_{on}$		-	TBD	-	mJ
Turn-off Energy	$E_{off}$		-	TBD	-	
Total Switching Energy	$E_{ts}$		-	TBD	-	
Input Capacitance	$C_{iss}$	$V_{DS} = 100\text{ V}$	-	1168	-	pF
Output Capacitance	$C_{oss}$		-	123	-	
Reverse Transfer Capacitance	$C_{rss}$		-	122	-	
Effective Output Capacitance, energy related	$C_{o(er)}$	$V_{DS} = 0\text{ V to } 480\text{ V}$ , $V_{GS} = 0\text{ V}$	-	81	-	

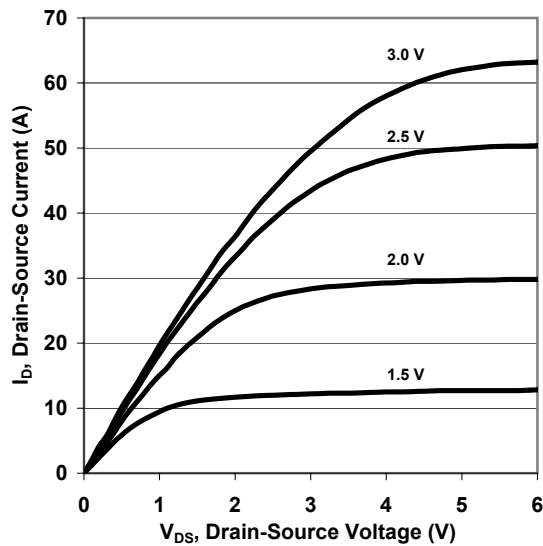


Figure 1. Typical Output Characteristics  
 $I_D = f(V_{DS})$ ;  $T_j = 25\text{ }^{\circ}\text{C}$ ; parameter:  $V_{GS}$

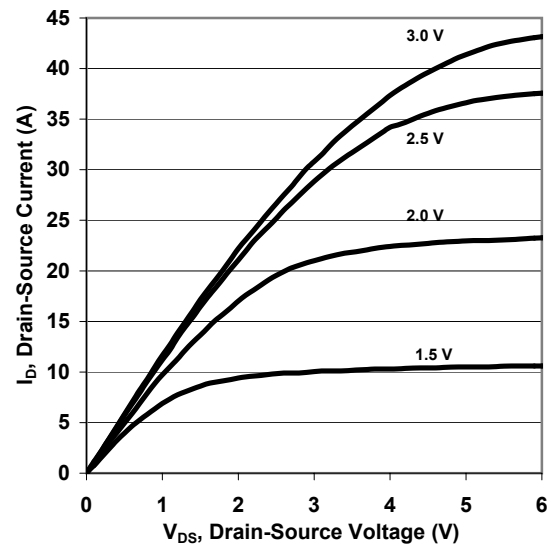


Figure 2. Typical Output Characteristics  
 $I_D = f(V_{DS})$ ;  $T_j = 100\text{ }^{\circ}\text{C}$ ; parameter:  $V_{GS}$

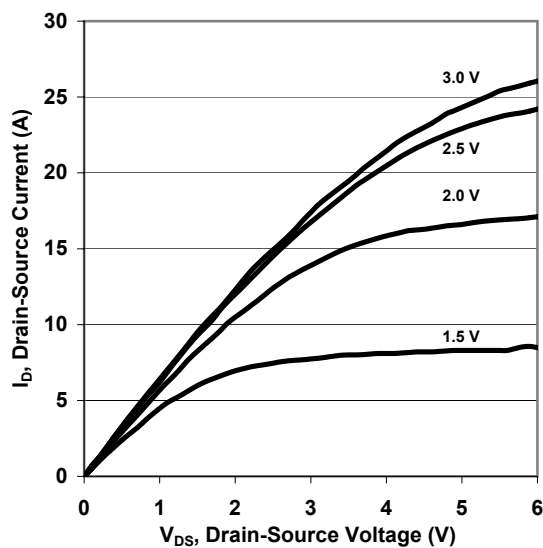


Figure 3. Typical Output Characteristics  
 $I_D = f(V_{DS})$ ;  $T_j = 175\text{ }^{\circ}\text{C}$ ; parameter:  $V_{GS}$

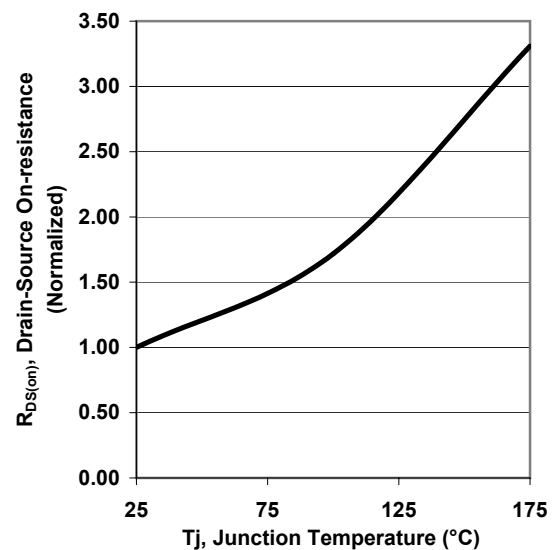


Figure 4. Drain-Source On-resistance  
 $R_{DS(on)} = f(T_j)$ ;  $V_{GS} = 3.0\text{ V}$ ,  $I_D = 0.5 \cdot I_{D25}$

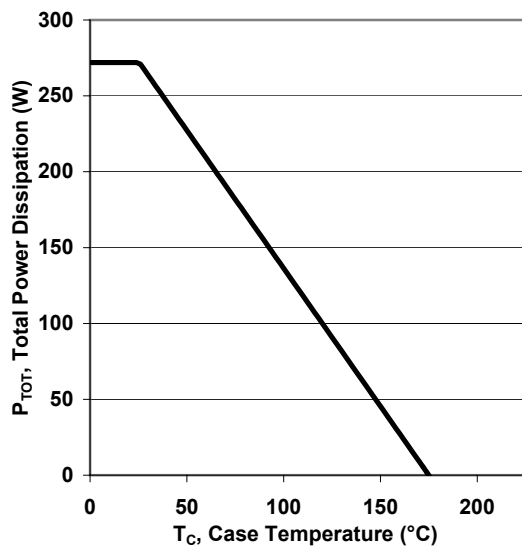


Figure 5. Power Dissipation  
 $P_{tot} = f(T_c)$

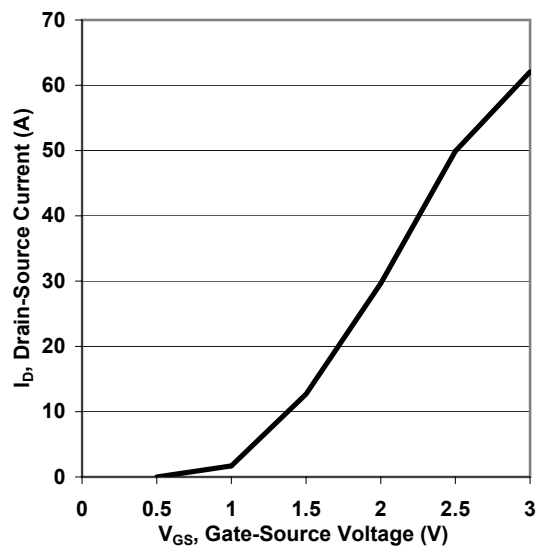


Figure 6. Typical Transfer Characteristics  
 $I_D = f(V_{GS}); V_{DS} = 5\text{ V}; V_{GS} = 3\text{ V}$

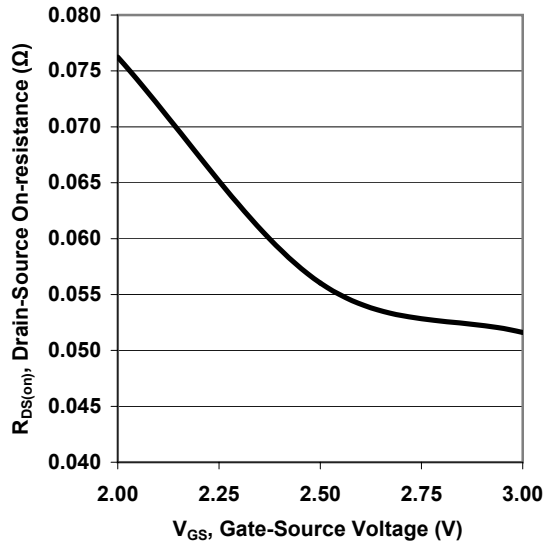


Figure 7. Drain-Source On-resistance  
 $R_{DS(ON)} = f(V_{GS}); I_{DS} = 24\text{ A}$

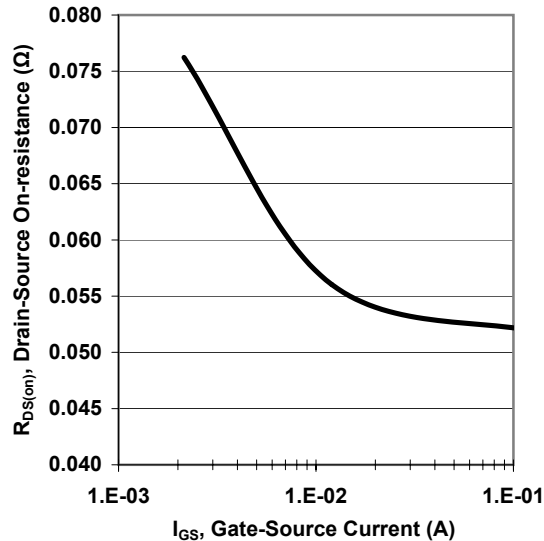


Figure 8. Drain-Source On-resistance  
 $R_{DS(ON)} = f(I_{GS}); I_{DS} = 24\text{ A}$

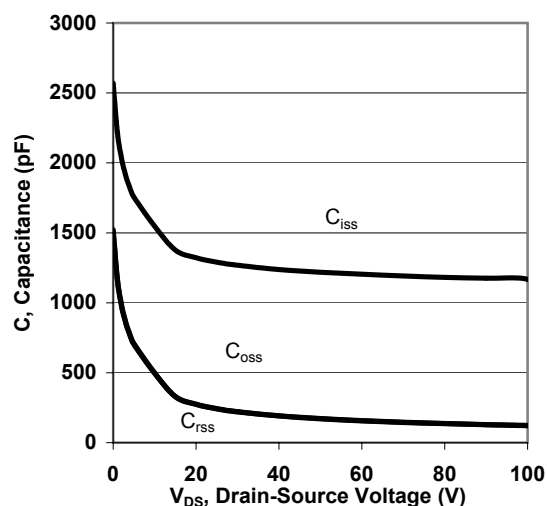


Figure 9. Typical Capacitance  
 $C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$

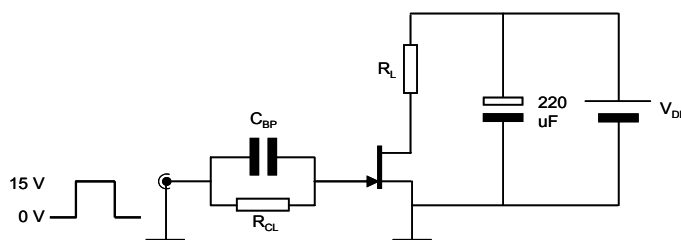


Figure 10. Resistive Load Switching Circuit

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