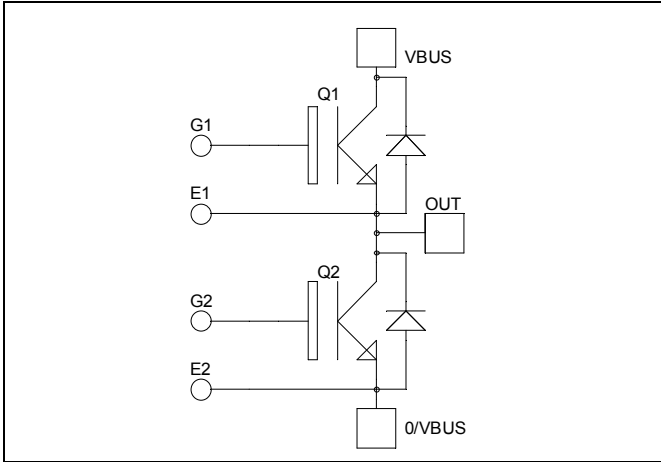


*Phase leg*  
**Fast Trench + Field Stop IGBT3**  
*Power Module*

**$V_{CES} = 1200V$**   
 **$I_C = 300A @ T_c = 80^\circ C$**

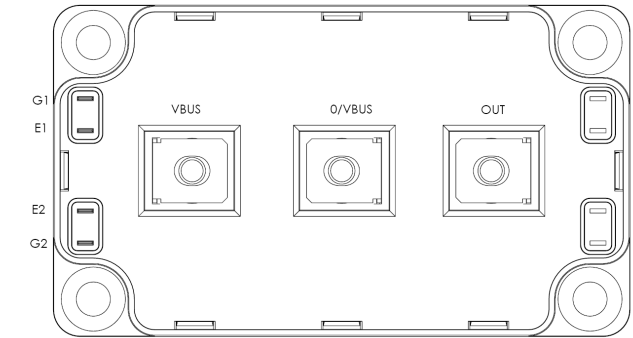


**Application**

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

**Features**

- Fast Trench + Field Stop IGBT3 Technology
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- High level of integration



**Benefits**

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile
- RoHS Compliant

**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_c = 25^\circ C$	420
		$T_c = 80^\circ C$	300
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	600
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	1380
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	600A @ 1100V

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://www.microsemi.com)

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}$ , $V_{CE} = 1200\text{V}$			500	$\mu\text{A}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 300\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.4 2.0	1.7 2.1	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$ , $I_C = 4\text{mA}$	5.0	5.8	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$ , $V_{CE} = 0\text{V}$			600	nA

**Dynamic Characteristics**

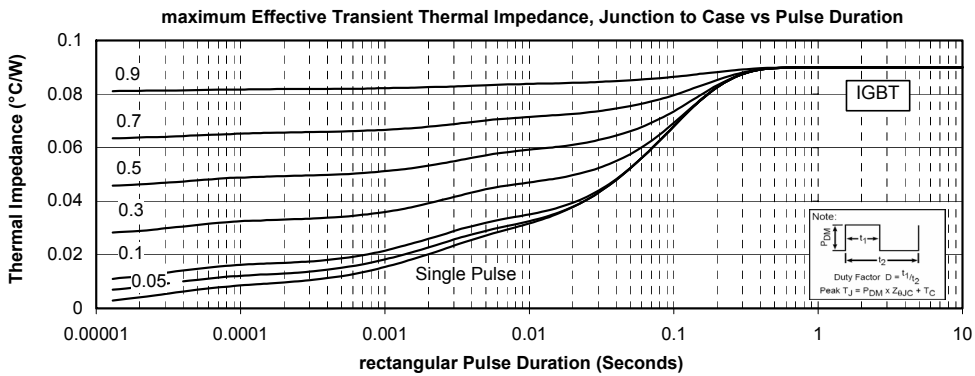
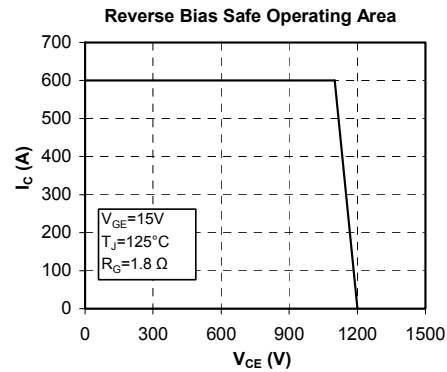
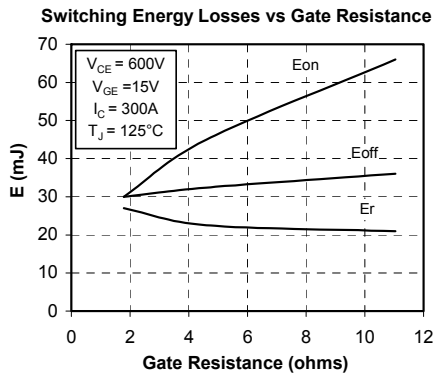
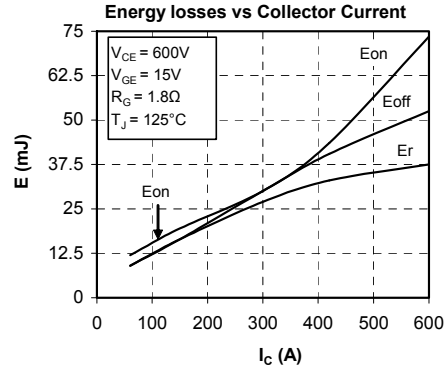
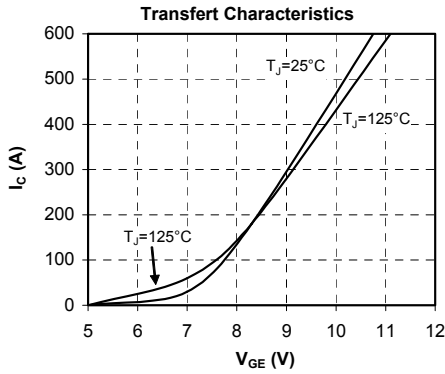
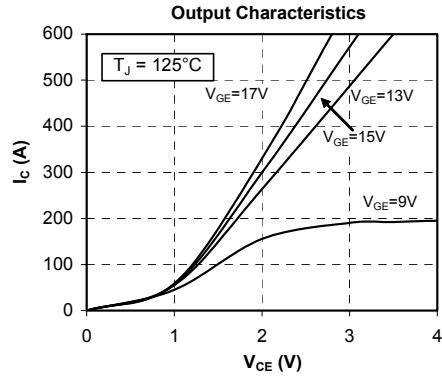
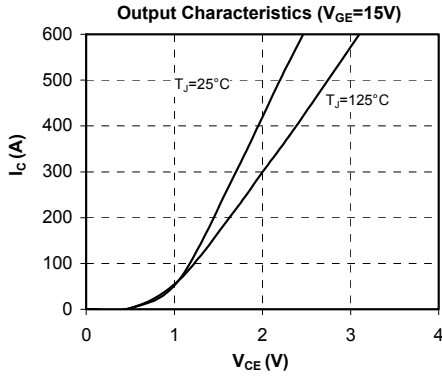
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$		21		nF
$C_{oes}$	Output Capacitance	$V_{CE} = 25\text{V}$		1.2		
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.9		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$ $R_G = 1.8\Omega$		260		ns
$T_r$	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			420		
$T_f$	Fall Time			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$ $R_G = 1.8\Omega$		290		ns
$T_r$	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			520		
$T_f$	Fall Time			90		
$E_{on}$	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$ $R_G = 1.8\Omega$	$T_j = 125^\circ\text{C}$	30		mJ
$E_{off}$	Turn off Energy		$T_j = 125^\circ\text{C}$	30		

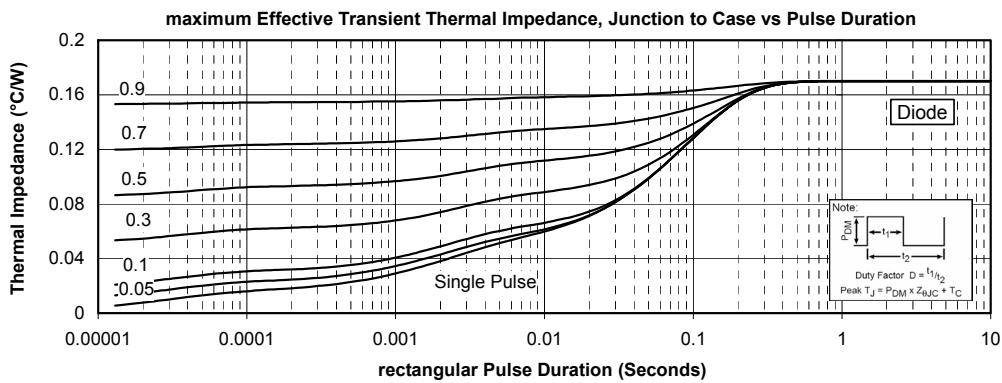
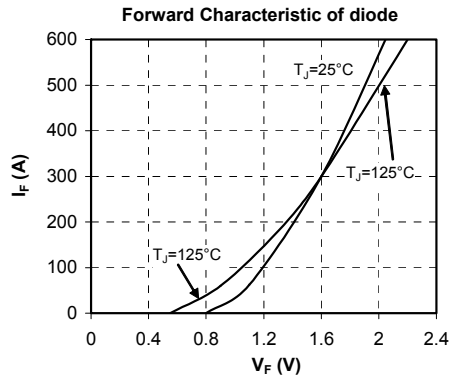
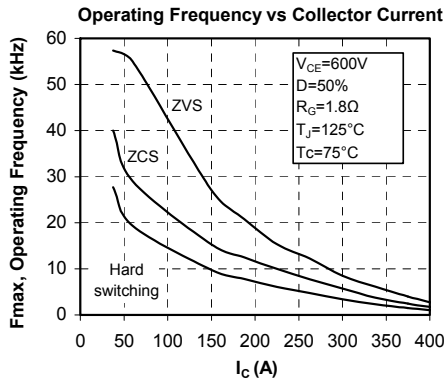
**Reverse diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		500 700	$\mu\text{A}$
$I_F$	DC Forward Current		$T_c = 80^\circ\text{C}$	300		A
$V_F$	Diode Forward Voltage	$I_F = 300\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.6 1.6	2.1	V
$t_{rr}$	Reverse Recovery Time	$I_F = 300\text{A}$ $V_R = 600\text{V}$ $di/dt = 3000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	170 280		ns
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	27 54		
$E_r$	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	15 27		mJ



## Typical Performance Curve





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